

THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Factors Influencing the Level of Participation in Urban Agriculture Practices in Western Kenya

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Abstract:

Food insecurity and factors determining urban agriculture have been widely researched either as separate entities or in their nexus, although general understanding of these two important facets is still elusive due to a lack of reliable data. Similarly, the changing population pattern orchestrated by the spread of urbanization has resulted into a rise in poverty and food demand, necessitating UA. However, factors affecting participation in UA practices seem to have attracted scanty documentation. The purpose of the study was to assess the factors affecting participation in UA in Western Kenya. The specific objectives were to assess how farm sizes affect participation in UA practices; to analyse how type of farming affect UA practices; establish the reasons behind UA practices among households, and to the main constraints affecting UA in Western Kenya. Mixed method approach of data collection and data analysis was adopted on a target population of 440 urban farmers (Eldoret: N=137; Kakamega: N=145; Kisumu: N=158) identified through the assistance of County Agricultural officers in the three towns. A sample size of 205 respondents (Eldoret=63; Kakamega=68; Kisumu=74) was obtained using stratified technique. Questionnaire and Key Informant interviews were used for data collection. Descriptive statistics was used for data analysis. Results showed that an average of 71% of urban farmers maintained that the level of practice of urban agriculture was either high or very high in the three study towns. It was revealed that an eighth of an acre (1/8 acre) was the smallest farm sizes that were common in Kisumu city, while Kakamega and Eldoret had a quarter (1/4) acre as the most common farm size. Vegetables were the main crop grown by urban farmers in all the three towns. Poultry keeping was the most common livestock kept by the urban farmers at levels of practice within the three towns, except for average level of practice where cattle dominated in Kisumu and Kakamega.

Keywords: Urban agriculture, participation in UA, sizes of land, reasons for UA adoption, and constraints to UA practices

1. Introduction

The importance of urban agriculture has grown rapidly over the past decade, both in the international development for a and in terms of recognition by national and city authorities (FAO, 2007). Urban agriculture is becoming a popular is a coping livelihood strategy for the urban poor in developing countries (Kutiwa et al., 2010; Tefera, 2010; Lawal, 2012). The UN estimates that the global population will reach 9.6 billion, with the majority of that growth taking place in urban areas of less developed regions (United Nations 2012, 2013). By 2100 the population is expected to be 11.2 billion, leading to a huge rise in demand for resources, with the number of middle-class consumers increasing by three billion. Sub-Saharan Africa constitutes a great portion of this projected growth, as the urban population is predicted to expand faster than in any other region and to double between 2010 and 2030 (FAO, 2012). This rapid expansion of urban populations is set to put direct pressure on food sources and agricultural production; thus there exists a serious challenge in supplying enough nutritious and safe food in a situation of such rapid urbanization. This seriously calls for alternative practices for the enhancement of food production – hence Urban Agriculture (UA) becomes handy.

Urban agriculture can be defined as the production of crops and or livestock within the administrative boundaries of the city and related activities such as the production and delivery of inputs, processing and marketing of products (FAO, 2007, Kutiwa, 2010). The practice can involve anything from small backyard vegetable gardens to farming activities on community lands by an association or a neighbourhood group (van Veenhuizen, 2006, Lawal, 2012). Urban agriculture brings with it great potentials for enhancing the situation of the urban citizens especially those with the lowest incomes who are dependent on the access to locally grown food (van Veenhuizen, 2006; Kutiwa, 2010; Lawal, 2012). Urban

agriculture can increase national food reserves in the sense that it reduces the demand for market food products and increase the stocks held by the official food marketing organisations (Golden, 2013).

Indeed data from urban areas across the globe indicate that a significant portion of a locality's vegetable and animal intake can be met locally. In Sarajevo, for instance, two years after the blockade began in 1992, self-reliance in urban food production was estimated to have grown from 10% to over 40% for vegetables and small livestock (Sommers and Smit, 1994). According to Grewal and Grewal (2011) vegetable production practice such as conventional gardening, intensive gardening, or hydroponics are employed on over 80% of vacant land in Cleveland. This practice yields close to 25% of both poultry and shell eggs, and 100% of honey. In addition, 62% of every industrial and commercial rooftop together with the land area used can meet between 46% and 100% of Cleveland's fresh produce need, and 94% of poultry and shell eggs and 100% of honey. Similarly, Brown and Jameton (2000) contend that in the United States, households produced enough to meet 40% of the nation's fresh vegetable demand during the 'victory garden' movement of World War II. Lee-Smith and Prain (2006) found that urban agriculture provided "as much as 90% of leafy vegetables and 60% of milk sold in Dar es Salaam, Tanzania" as well as 76% of vegetables in Shanghai and 85% of vegetables in Beijing. In Kenya, Simiyu (2013) and Simiyu, Philander and Karriem (2016) found that UA have made significant contributions for household survival at some critical moments. However, studies that have focused on factors affecting participation in UA practices seem to have come with contrasting outcomes.

Grewal and Grewal (2011) developed three distinct scenarios to determine the potential level of food self-reliance for the City of Cleveland, which had been plagued with home foreclosures and resulting vacant land, lack of access to healthy food, hunger, and obesity particularly in disadvantaged neighborhoods. Findings revealed that the three scenarios can attain overall levels of self-reliance between 4.2% and 17.7% by weight and 1.8% and 7.3% by expenditure in total food and beverage consumption, compared to the current level of 0.1% self-reliance in total food and beverage by expenditure. The analysis also reveals that the enhanced food self-reliance would result in \$29 M to \$115 being retained in Cleveland annually depending upon the scenario employed. In Spain, Paül and McKenzie (2013) used a case study of the Baix Llobregat Agricultural Park (BLAP) in metropolitan Barcelona to analyse farmland conservation and alternative food networks (AFN) development issues. They concluded that AFNs in peri-urban areas are only possible if farmland preservation is guaranteed, and that the former does not come as a direct consequence of the latter. Chirenje, Manhanzva and Sibanda (2015) assessed the contribution of urban agriculture to food and nutritional security for local citizens in Epworth, Harare the capital city of Zimbabwe. Factors that were found to influence overall urban food and nutrition status are urban agriculture, total cultivated land, income levels and the education level of the household head. Githugunyi (2014) examined the contribution of urban agriculture to households' livelihoods in Nairobi County. The trend of UA in Nairobi County showed a decline of 28% of the area under forests and crops compared to an increase of 35% of the area under built up areas over the last 20 years. This shows that all the hitherto agricultural areas in the County will soon be taken up by the built up areas. These studies (Grewal & Grewal, 2011; Paül & McKenzie, 2013; Githugunyi, 2014) provide a glimpse of the fact that scanty attention seems to have been given to various factors that may affect participation in UA practices.

1.1. Statement of the Problem

Much as food insecurity and factors determining urban agriculture have been widely researched either as separate entities or in their nexus, a general understanding of these two important facets is still elusive due to a lack of reliable data. Lack of consensus also exists with regard to how land size, type of farming, reasons for the adoption of UA, and the constraints affecting adoption of UA among urban families. These elements tend to have received scanty attention compared to institutional and policy factors that affect UA. In Kenya, many studies (for instance, Muriithi, 2011; Githugunyi, 2014) have focused on UA practices in areas like Nairobi and Nakuru without looking at emerging urban areas with rising population like Eldoret, Kakamega and Kisumu.

1.2. Purpose of the Study

The purpose of the study was to explore the factors that affect participation of Urban Agriculture practices in Western Kenya.

1.3. Objectives of the Study

The specific objectives of the study were to:

- Assess how farm sizes affect participation in UA practices in Western Kenya
- Analyse how type of farming affect UA practices in Western Kenya
- Establish the reasons behind UA practices among households in Western Kenya
- Assess the main constraints affecting UA in Western Kenya

2. Materials and Methodology

2.1. Research Design

The study adopted mixed method approach of data collection and data analysis (Creswell and Plano, 2011). Qualitative method collects data from open-ended questions without predetermined responses while quantitative method usually includes closed ended responses such as found on questionnaire (Lewis, Saunders & Thornhill, 2007). Thus the researcher collected and analysed both quantitative and qualitative data on the same phenomenon, followed by merging of deferent results through comparison and contrasting for ultimate validation (Creswell, 2014). Through this

design, the researcher was able to bring together the differing strength and non overlapping weaknesses of quantitative methods with those of qualitative (Creswell and Plano, 2011).

2.2. Population and Sample Size

The target population comprised of 440 urban farmers from Eldoret (137), Kisumu (158) and Kakamega (145). Proportionate sampling method was used to derive a sample size of 205 farmers: Eldoret (63), Kakamega (68) and Kisumu (74). The sample size of each town was further stratified on the basis of whether one was active or not active in urban farming over the last five years. Therefore, a total of 162 and 43 urban farmers were further sampled as active and inactive sub-groups respectively. Table 1 presents distribution of sample size.

Town	Population	Proportion per Town	Sample size	Study Population Sampled			
				Active	%	Non-Active	%
Kisumu	158	0.36	74	54	26	20	10
Kakamega	145	0.33	68	58	28	10	5
Eldoret	137	0.31	63	50	24	13	6
Total	440		205	162		43	

Table 1: Distribution of Sample Size

2.3. Data Collection Methods

The study collected both secondary and primary data. Primary data is information gathered directly from respondents while secondary data is information that has already been collected and is already documented (Kombo & Tromp, 2016). Secondary data was collected through a review of literature from sources such as research articles, books, internet and government documents especially reports and Kenya gazettes. On the other hand, primary data was collected through questionnaire, interviews and focus group discussions. Structured questionnaire and interviews were used to collect data from household heads doing urban farming and key informants respectively.

The Household (HH) interviews used a semi-structured questionnaire to collect data from two hundred and five (205) respondents at the household level. On the other hand, the Key Informant Interviews (KIIs) method was used to collect data from a total of twelve (12) key informants which included, three (3) chief officers for agriculture and livestock, three (3) county directors for agriculture, three (3) county directors of livestock and three (3) town manager or municipal manager in the three towns. Focus group discussion (FGD) method was used to collect data from a total of twenty four (24) participants, mainly from three (3) urban farmer groups; each consisting of eight (8) members.

2.4. Data Analysis and Presentation

Qualitative data from FGD and KIIs was subjected to content analysis and multi-criteria. Quantitative data collected from urban farming household head interviews was analysed using Statistical Package for Social Scientists (SPSS) software version 22 which yielded both descriptive statistics.

3. Findings and Discussions

The main objective of this study was to assess the factors affecting participation in urban agriculture in Western Kenya. Specific objectives included; to establish how farm sizes affect UA practices, analyse how type of farming affect UA practices, assess the reasons for adoption of AU practice and establish the main constraints to UA practice.

3.1. Farm Sizes and UA Practices

Among those who rated the practice as very high, leading farm size was quarter (1/4) acre in both Kisumu (36.7%) and Eldoret (47.4%), while Kakamega had both 0.025 acre and an eighth (1/8) acre in equal proportions (50.0%). However, among those rating the practice as high, a quarter acre (1/4) was leading in all the towns in Kisumu (41.2%), Kakamega (49.2%) and Eldoret (45.8%), (Table 2).

Level of Practice		Farm Size						Total
		0.025 Acre	1/8 Acre	1/4 Acre	1/2 Acre	3/4 Acre	1 Acre	
Very High	Kisumu	16.3%	36.7%	18.4%	18.4%	0.0%	10.2%	100.0%
	Kakamega	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%	100.0%
	Eldoret	0.0%	0.0%	47.4%	34.2%	18.4%	0.0%	100.0%
High	Kisumu	0.0%	11.8%	41.2%	17.6%	0.0%	29.4%	100.0%
	Kakamega	16.9%	5.1%	49.2%	15.3%	1.7%	11.9%	100.0%
	Eldoret	0.0%	0.0%	45.8%	33.3%	20.8%	0.0%	100.0%
Average	Kisumu	14.3%	42.9%	28.6%	14.3%		0.0%	100.0%
	Kakamega	14.3%	14.3%	28.6%	28.6%		14.3%	100.0%
	Eldoret	0.0%	0.0%	0.0%	100.0%		0.0%	100.0%
Low	Kisumu		100.0%					100.0%

Table 2: Level of Practice by Town and Farm Size

The findings show that the smallest farm sizes (1/8 acre) were most common in Kisumu city while Kakamega and Eldoret had a quarter (1/4) acre as the most common farm size. Kisumu is a rapidly growing city compared to the other two towns of Kakamega and Eldoret hence plot subdivisions are common leaving urban farmers with very small plots to carry out their farming activities.

3.2. Type of Farming Practices

Results from a cross tabulation analysis of level of practice and main crop grown revealed that, those who rated level of practice as very high had majority growing vegetables in Kisumu (65.3%), Kakamega (100%) and Eldoret (86.5%). Again, among urban farmers who said the level of practice is high, majority were growing vegetables in Kisumu (29.4%), Kakamega (78.0%) and Eldoret (83.3%). Similarly, among average level of practice, vegetable growing was the main crop in all towns of Kisumu (42.9%), Kakamega (71.4%) and Eldoret (100%), (Table 3). Lastly, those who rated the practice as low were mainly growing other crops (100%).

Level of Practice		Main Crop Grown				Total
		Vegetables	Maize	Fruits/fruit tree seedlings	Others	
Very High	Kisumu	65.3%	12.2%	2.0%	20.4%	100.0%
	Kakamega	100.0%	0.0%	0.0%	0.0%	100.0%
	Eldoret	86.5%	0.0%	8.1%	5.4%	100.0%
High	Kisumu	29.4%	17.6%	17.6%	35.3%	100.0%
	Kakamega	78.0%	10.2%	10.2%	1.7%	100.0%
	Eldoret	83.3%	4.2%	8.3%	4.2%	100.0%
Average	Kisumu	42.9%	0.0%	0.0%	57.1%	100.0%
	Kakamega	71.4%	14.3%	14.3%	0.0%	100.0%
	Eldoret	100.0%	0.0%	0.0%	0.0%	100.0%
Low	Kisumu				100.0%	100.0%

Table 3: Level of Practice by Main Crop

Focus group discussion revealed that the other crops grown were arrow roots, bananas and sweet potatoes among others. Generally, vegetable was the main crop grown by urban farmers in the different levels of practice, except other crops which was mainly grown by those who rated the level of practice as low. Therefore vegetable growing was the main farming activity in crop farming in all the three towns.

However, the type of crop grown in urban agriculture is usually a contentious issue in urban planning. Fruits and maize are usually bushy and tall crops which tend to reduce visibility whenever they are grown along roadsides. This scenario therefore needed a regulatory mechanism in terms of a county legislation or by-law which was largely missing in these towns according to key informants' interview. In summary, tall crops such as fruits and maize were still being grown in the three towns especially in Kisumu, Kakamega and Eldoret.

A cross-tabulation analysis revealed that, among urban farmers of very high level of practice, poultry keeping was the main livestock kept in Kisumu (52.2%), Kakamega (100%) and Eldoret (97.3%). Similarly, those of high level of practice had poultry keeping in Kisumu (38.5%), (50%) and Eldoret (86.4%). On the other hand, those of average level of practice had cattle keeping as the main livestock kept in Kisumu (66.7%) and Kakamega (42.9%) while poultry keeping was still the main livestock kept in Eldoret (100%), (Table 4).

Level of Practice		Main livestock Kept					Total
		Poultry	Cattle	Shoats	pigs	Bees	
Very High	Kisumu	52.2%	13.0%	30.4%	4.3%		100.0%
	Kakamega	100.0%	0.0%	0.0%	0.0%		100.0%
	Eldoret	97.3%	0.0%	2.7%	0.0%		100.0%
High	Kisumu	38.5%	30.8%	30.8%	0.0%	0.0%	100.0%
	Kakamega	50.0%	37.9%	3.4%	6.9%	1.7%	100.0%
	Eldoret	86.4%	13.6%	0.0%	0.0%	0.0%	100.0%
Average	Kisumu	33.3%	66.7%	0.0%	0.0%		100.0%
	Kakamega	2.6%	42.9%	14.3%	14.3%		100.0%
	Eldoret	100.0%	0.0%	0.0%	0.0%		100.0%

Table 4: Level of Practice by Town and Livestock Kept

In general, poultry keeping was the most common livestock kept by the urban farmers levels of practice in all the three towns, except for average level of practice which had cattle dominating in Kisumu and Kakamega. Shoats (sheep and goats) and pigs were most common at all levels of practice in Kisumu and Kakamega, while bee keeping was only practiced among those of high level practice in Kakamega. Pig farming is usually controlled by the veterinary Act and county

legislations. The presence or absence of pigs roaming the streets of these towns was therefore an indicator of law enforcement or lack of it by town authorities.

Simiyu (2012) found out that in Eldoret, pig farming was facing a challenge in Eldoret, as they were being baited by authorities, an exercise which could have led to reduction of their numbers or complete abandonment of pig farming as shown in this study. Bee keeping is often not seen as a suitable urban agriculture enterprise in most towns but with today's modern technology of keeping bees in houses and providing foodstuff, this enterprise is increasingly gaining ground. Similarly, Kutiwaet al (2010) and as well as Lawal and Aliu (2012) asserts that over 25% of the people living in cities and towns of Harare and Nigeria kept livestock and other urban farming practices to boost their livelihood options. This percentage has been found to be even higher in the USA, where upto 80% were keeping livestock to meet household needs and supplement family income (Grewal and Grewal, 2011)).

3.3. Reasons for Participating in UA Practices

It was observed that urban farmers had different objectives for engaging in urban agriculture which included; provision of food, income, self-employment and as a way of reducing urban poverty. Urban farmers who said level of practice was very high, majority had food provision as the main objective of farming in Kisumu (51.0%), Kakamega (50.0%) and Eldoret (94.7%). However, income and food provision were the main objectives of farming in equal proportions in Kakamega (50.0%). Among those who felt there was high level of practice, income provision was the main objective of farming in Kisumu (47.1%) and Eldoret (83.3%) while food provision was mentioned as the main objective of farming in Kakamega (79.7%). Within the average level of practice, the main objective was food provision in Kisumu (85.7%) and Eldoret (100%) while income and food provision were main objectives in equal proportions in Kakamega (42.9%), (Table 5).

Level of Practice		Main objective of farming				Total
		Provides income	Provides food	Creates self-employment	Reduces urban poverty	
Very High	Kisumu	42.9%	51.0%	2.0%	4.1%	100.0%
	Kakamega	50.0%	50.0%	0.0%	0.0%	100.0%
	Eldoret	2.6%	94.7%	2.6%	0.0%	100.0%
High	Kisumu	47.1%	41.2%	0.0%	11.8%	100.0%
	Kakamega	10.2%	79.7%	10.2%	0.0%	100.0%
	Eldoret	83.3%	12.5%	4.2%	0.0%	100.0%
Average	Kisumu	85.7%	14.3%	0.0%		100.0%
	Kakamega	42.9%	42.9%	14.3%		100.0%
	Eldoret	100.0%	0.0%	0.0%		100.0%
Low	Kisumu	100.0%				100.0%

Table 5: Level of Practice by Town and Main Objective of Farming

It was concluded that among low level of practice, food provision was the main objective in Kisumu. However, among the average and high level of practice, income provision was leading main objective of farming while among the very high level of practice, food provision was the main objective of farming. Therefore, irrespective of the level of practice in these three towns, urban agriculture was practised mainly for the twin objective of food and income provision except at the low level of practice in Kisumu where it was meant only for food provision. Food is a basic need hence in counties where there were high poverty rates, like Kakamega and Eldoret, the objective of providing food could not have been farfetched. It was also observed that urban agriculture was being done in Kisumu, among other reasons, to reduce poverty. Kisumu County is 47.8%, in Kakamega the rate is 53% while Uasin Gishu County had a poverty rate of 51.3% (CRA, 2011 and R.O.K, 2011).

When level of practice was investigated, results showed that urban farmers who were of very high level practice, majority argued that urban agriculture contributed to urban food security between 51-75% in Kisumu (46.9%), Kakamega (50.0%) and Eldoret (94.7%). Those of high level of practice asserted that the practice contributed between 51-75% in Kisumu (47.1%), Kakamega (69.6%) and Eldoret (95.8%). On the other hand, the average level of practice said it contributed to urban food security between 51-75% in Kisumu (71.4%) and Eldoret (100%), and between 26-50% in Kakamega (57.1%). However, those of low level practice maintained that urban agriculture contributed to urban food security between 76-100% in Kisumu only (100%), (Table 6).

Level of Practice		Contribution of UA to household food security				Total
		76-100%	51-75%	26-50%	Below 25%	
Very High	Kisumu	16.3%	46.9%	30.6%	6.1%	100.0%
	Kakamega	50.0%	50.0%	0.0%	0.0%	100.0%
	Eldoret	2.6%	94.7%	2.6%	0.0%	100.0%
High	Kisumu	5.9%	47.1%	41.2%	5.9%	100.0%
	Kakamega	5.4%	69.6%	25.0%	0.0%	100.0%
	Eldoret	4.2%	95.8%	0.0%	0.0%	100.0%
Average	Kisumu		71.4%	28.6%	0.0%	100.0%
	Kakamega		28.6%	57.1%	14.3%	100.0%
	Eldoret		100.0%	0.0%	0.0%	100.0%
Low	Kisumu	100.0%				100.0%

Table 6: Level of Practice by Town and Contribution to Urban Food Security

It was noted that urban agriculture generally contribute between 51-75% among all levels of practice except those of average of practice that maintained it contributed between 26-50% in Kakamega and the low level of practice who asserted that it contributed between 76-100% in Kisumu. Therefore whereas urban agriculture contributed an average of 63% in the categories of very high, high and average level of practice, those who said low level of practice maintained it contributed an average of 88% to urban food security. It was noteworthy to mention that low level practice of urban agriculture was only mentioned by urban farmers in Kisumu. Simiyuet al (2016) found almost similar results that 82% of the respondents interviewed in Cape Town indicated that the urban food gardens contribute to their household food security although low levels of food security were still experienced within the community. Simiyu (2012) found slightly different results, that urban agriculture only made marginal contributions to household food supply and incomes, but such contributions were nonetheless significant for household survival at some critical moments. It could therefore be concluded that urban agriculture contributed 51-75% or an average of 63% to urban food security in these three towns. This study therefore recommends that since urban agriculture plays such a critical role in enhancing food security of urban dwellers, the town administration together with department of agriculture and Livestock should quickly put in place the necessary management and regulatory mechanisms, in terms of institutional structures and legislations, so as to promote the practice.

The study also analyzed the level of practice and main source of livelihoods among urban farmers. Results showed that, among whose level of practice of urban agriculture was very high, farming was the main source of livelihood in Eldoret (54.1%), small scale business in Kisumu (37.5%) and formal employment in Kakamega (100%). Those who exhibiting high level of practice had farming as the main source of livelihood in Kisumu (52.9%) and Kakamega (57.9%) while most urban farmers relied most on small scale business in Eldoret (54.5%). Those who had an average level of practice had most urban farmers having main source of livelihood as small-scale business in Kisumu (42.9%), farming both in Kakamega (85.7%) and Eldoret (100%). Also all urban farmers who rated level of practice as low had main source of livelihood as farming in Kisumu (100%), (Table 7) Generally, farming was a leading main source of livelihood in all levels of practice of urban agriculture.

Level of Practice		Source of Livelihood				Total
		Farming	small scale business	Formal employment	Rental houses	
Very High	Kisumu	33.3%	37.5%	10.4%	18.8%	100.0%
	Kakamega	0.0%	0.0%	100.0%	0.0%	
	Eldoret	54.1%	40.5%	5.4%	0.0%	100.0%
High	Kisumu	52.9%	23.5%	0.0%	23.5%	100.0%
	Kakamega	57.9%	22.8%	17.5%	1.8%	100.0%
	Eldoret	45.5%	54.5%	0.0%	0.0%	100.0%
Average	Kisumu	42.9%	42.9%	14.3%		100.0%
	Kakamega	85.7%	0.0%	14.3%		100.0%
	Eldoret	100.0%	0.0%	0.0%		100.0%
Low	Kisumu	100.0%				100.0%

Table 7: Level of Practice by Town and Source of Livelihood

A number of reasons have been put forward why the urban poor practice urban agriculture, which include; food security, a substitute to cash purchases of food items, supplementing family cash earnings, unemployment and for income. In addition, it is practiced as a commercial rather than a subsistence activity targeting growing market demands for high value foods and livestock products within cities and towns, (Sommers & Smit (1994; Lee-Smith & Prain, 2006; Grewal & Grewal, 2011; Lee-Smith and Prain, 2006). Moreover, when level of practice was analyzed with profitability of urban agriculture, results showed that, among those who said the level of practice was very high, maintained urban agriculture was profitable in Kisumu (95.0%) and Eldoret (89.5%), with those in Kakamega (100%) saying it was fairly profitable. Those who said high level of practice asserted that it was profitable in Kisumu (91.7%) and Eldoret (87.5%) while 54.2%

maintained it was very profitable in Kisumu. However, those who felt level of practice was average, argued that it was either very profitable or profitable on equal proportions in Kakamega (42.9%) while 100% said it was profitable in Eldoret, (Table 8).

Level of Practice		Profitability			Total
		Very profitable	Profitable	Fairly profitable	
Very High	Kisumu	5.0%	95.0%	0.0%	100.0%
	Kakamega	0.0%	0.0%	100.0%	100.0%
	Eldoret	0.0%	89.5%	10.5%	100.0%
High	Kisumu	8.3%	91.7%	0.0%	100.0%
	Kakamega	54.2%	20.3%	25.4%	100.0%
	Eldoret	4.2%	87.5%	8.3%	100.0%
Average	Kakamega	42.9%	42.9%	14.3%	100.0%
	Eldoret	0.0%	100.0%	0.0%	100.0%

Table 8: Level of Practice by Town and Profitability

It was noted that among the very high or high level of practice of urban agriculture, it was either very profitable, profitable or fairly profitable in all the three towns, while those who said the level of practice was average argued it was either very profitable or profitable. FAO (2012) notes that urban agriculture can be profitable, especially when producing products that are in great demand and that have a comparative advantage over rural production, such as perishable products (green leafy vegetables and milk), mushrooms, and flowers and ornamental plants). Similarly, in this study urban farmers were producing perishable products like vegetables and milk. Urban agriculture is a profitable enterprise in Kisumu and Eldoret while in Kakamega it is viewed as a very profitable venture. In addition, those who said urban agriculture was either very profitable or fairly profitable were mostly high adopters while those who viewed it as profitable were very high adopters. Since the very high adopters were mostly found in Kisumu and Eldoret, which are fairly more cosmopolitan towns with larger urban populations, it was concluded that urban agriculture is well embraced and common in these two towns than in Kakamega. The findings concur with a study in Nairobi which found out that practice rate was 60%, (Muriithi, 2011). Similarly, a study in Cleveland revealed that practice rate was 50.67% (Grewal & Grewal (2011).

3.4. Main Constraints affecting Participation in UA

Results show that, amongst urban farmers who maintained level of practice was very high, land shortage was the main constraint in Kisumu (40.8%) and Kakamega (50.0%), while access to credit was main constraint in Kakamega (50.0%) and Eldoret (86.8%). Those who said the level of practice is high, had inadequate knowledge and skills as main constraint in Kisumu (29.4%), land shortage in Kakamega (69.5%) while water shortage was a main constraint in Eldoret (66.7%). Similarly, among those who said level of practice is average, access to credit was main constraint in Kisumu (57.1%), land shortage in Kakamega (57.1%) and water shortage in Eldoret (100%). However, among those who said the level of practice is low, water shortage was their main problem in Kisumu (100%), (Table 3.8).

Level of Practice		Main Constraint					Total
		Government Policies	Land Shortage	Access to credit	Inadequate Knowledge & skills	Water Shortage	
Very High	Kisumu	16.3%	40.8%	20.4%	22.4%	0.0%	100.0%
	Kakamega	0.0%	50.0%	50.0%	0.0%	0.0%	100.0%
	Eldoret	0.0%	5.3%	86.8%	0.0%	7.9%	100.0%
High	Kisumu	23.5%	11.8%	17.6%	29.4%	17.6%	100.0%
	Kakamega	10.2%	69.5%	20.3%	0.0%	0.0%	100.0%
	Eldoret	0.0%	25.0%	0.0%	8.3%	66.7%	100.0%
Average	Kisumu	0.0%	28.6%	57.1%	14.3%	0.0%	100.0%
	Kakamega	14.3%	57.1%	28.6%	0.0%	0.0%	100.0%
	Eldoret	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Low	Kisumu				100.0%		100.0%

Table 9: Level of Practice by Town and Main Constraint

Among those of very high level of practice, land shortage was the main constraint except in Eldoret where credit access led. Those of high level practice had inadequate knowledge and skill as main constraint in Kisumu, land shortage in Kakamega and water shortage in Eldoret. However, those of average level practice maintained that access to credit was main constraint in Kisumu, and land shortage in Kakamega and Eldoret. Majority in Kisumu had inadequate knowledge and skills as main constraint. In general, land shortage was the leading main constraint in all levels of practice, followed by access to credit and inadequate knowledge and skills, and lastly water shortage.

4. Conclusions

The study concluded that urban agriculture was highly practiced within the three study towns. It was revealed that an average of 63% of urban farmers indicated the level of practice of urban agriculture was very high in Kisumu and Eldoret, while 86.8% of respondents in Kakamega indicated the level of practice was high. In all, an average of 71% of urban farmers maintained that the level of practice of urban agriculture was either high or very high in the three study towns. However, the average contribution of urban agriculture to urban food security was estimated at 76% in these towns, despite challenges which included; inadequate effective government policies, knowledge and skills, land shortage, access to credit and water shortage.

5. Recommendations

The study recommends that there is an urgent need to address the current challenges affecting urban agriculture such as land shortage, inadequate government policies, inadequate knowledge and skills, access to credit and water shortage, so as to increase the level of practice of urban agriculture

6. Acknowledgement

The paper acknowledges the contribution of the Town Managers and Chief Officers of the County Departments of Planning, Agriculture and Livestock for availing me the necessary data for this study. Many thanks also go to government staffs for assisting me with the necessary data for this study. To all the household heads who do UA and who volunteered information freely, I thank you very much.

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