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Type and distribution of urban and peri-urban agriculture production systems in Nairobi County, Kenya

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Abstract

This research established the type and distribution of urban and peri-urban agriculture production systems in Nairobi County, Kenya. Results revealed that crops only were grown in Kamukunji district (58.8%) while mixed farming was practiced mainly in Starehe district (39.1%). Multi-storey (42.5%) and moist gardens(25%) were the most common production technologies in urban areas while in the Peri-urban, drip irrigation (23.6%) and multi-storey gardens (25.5%) were the preferred technologies.

Key words: Active farming households, crop production technologies, garden, open space

Résumé

Cette recherche a établi le type et la distribution de systèmes de production agricole urbaine et périurbaine dans le comté de Nairobi, au Kenya. Les résultats ont révélé que les cultures sont seulement cultivées dans le district de Kamukunji (58,8%), tandis que la polyculture est pratiquée principalement dans le district de Starehe (39,1%). Des jardins de plusieurs niveaux (42,5%) et des jardins humides (25%) ont été les technologies de production les plus courants dans les zones urbaines tandis que dans les technologies d'arrosage (23,6%) et des jardins à plusieurs niveaux (25,5%) ont été les préférées des périurbains.

Mots clés: les ménages agricoles actifs, technologies de production agricole, jardin, espace ouvert

Background

Urban and peri-urban agriculture can play a crucial role in the economic, social, and dietary life of the urban poor, since urban farming households cultivate a wide range of crops and rear various types of livestock with substantial yields. The question of food supply and urban food systems is consequently becoming an issue of significance for urban politicians, policy-makers, administrations and populations; and internal agencies. The increasing urban population has put pressure on food demand. In Kenya, Nairobi city has the largest urban population (3,138,369 people) as per the population statistics from the 2009 Kenya Population and Housing Census Report, and is ranked position two (2) in poverty with a poverty rate of 22.5 percent.

The type of agricultural production and location influences food safety and space usage. Little is known on how urban and peri-urban farmers utilise space and how that influences the type of production system. Therefore, the aim of this study was to identify type of production systems utilised by urban and peri-urban farmers in Nairobi County and determine how these production systems were distributed along the Nairobi urban gradient.

Literature summary

Urban agriculture has taken several production systems carried out on the standard, ground level farm or garden, which is either on communal land or private property (Eloglu, 2012; Camara, 2013). Production systems range from agricultural and horticultural crops, to forestry, floriculture, aquaculture and livestock production (Ambrose-Oji, 2009). The range of urban and peri-urban agricultural activities also differ according to the characteristics of available land; revealing urban agriculture in a multitude of locations in the city including "small community gardens", personally managed allotments, home gardens, portions of parks that were previously planted entirely with amenity species, fruits trees along roadside reserves, greenhouses, green roofs and green walls"(Pearson *et al.*, 2010). The variation of these examples depends on the characteristics of the urban setting defined by geography and climate along with the abilities of the urban populations in terms of reaching and creating resources. Cultivating communal land, as opposed to privately-owned, has been advantageous because in dense cities, most people do not have access to their own parcel of land (UN-HABITAT and UNESCAP, 2008). Moreover, rapid growth and the constant development pressure on land in peri-urban areas has forced agriculture to compete for land with other urban land uses, forcing it onto marginalised lands and hazardous areas; thereby encroaching on open spaces and other public lands such as cemeteries, playgrounds, and road and utility rights-of-way (Schmidt, 2012).

Today, it is expected that more than 800 million people are practicing some type of urban agriculture in or close to an urban setting providing food for themselves and their families (FAO, 2013). The rate is expected to rise as urban issues will continue to rise to threaten populations, restrain urban food security and endanger urban ecosystems. There is urgent need to question the current status of cities in regard to available food systems, and it is necessary to search for new methods to alleviate the current conditions (Eloglu, 2012; UN, 2012). Thirty per cent of the Nairobi County urban residents practice urban agriculture with a majority of the farmers using untreated sewage to irrigate crop and fodder. Confronted with rapid urbanisation, thousands of families strive to "improve their access to food and raise income through agricultural activities in urban and peri-urban areas"(Karanja *et al.*, 2009).

Study description

The target population for this study was the Nairobi County active urban farming households, who were identified by the help of the district agricultural officers and the divisional agricultural extension officers. The research study was carried out in the following districts of Nairobi County: Starehe, Makadara, Kamukunji, Embakasi (urban districts), Kasarani, Njiru,

Westlands and Dagoretti (peri-urban districts). Data was collected from the purposively sampled active urban farming households using a structured questionnaire administered through face-to-face interview, augmented with field observations. A Global Positioning Systems (GPS) receiver was used to map respondents' farms and in total, 95 farmers were interviewed. The information gathered during the field survey included the respondents' socio-economic characteristics, land tenure, farming systems in use, crop production techniques, consumption patterns, source of production water, waste management, farming challenges, farmer's perception on public open space and land-use planning for urban and peri-urban agriculture. Data was analyzed using SPSS version 20 and descriptive statistics and chi-square tests were performed. General analysis was done testing frequencies on occurrence of farmers for productions systems over the whole county and further tests were done by districts for any significant difference of occurrences of production systems between urban and peri-urban districts. The statistical tests were performed at 95% level of confidence.

Research application

There was a significant association between the districts of Nairobi county and the distribution of UPUA production systems (χ^2 =23.6; P-value=0.001). A greater majority of farmers in Kamukunji (76.9%), Njiru (60%) and Westlands (83.3%) were mainly engaged in growing crops only while those from Kasarani (81.2%), Starehe (81.8%), Makadara (62.5%), Embakasi (75%) and Dagoretti (66.7%) were practicing mixed farming. There was a significant association between urban districts and farming system (χ^2 =10.05; P-value=0.018). Crops only were grown in Kamukunji district (58.8%) while mixed farming was practiced mainly in Starehe district (39.1%). There was also a significant association between peri-urban districts and farming system (χ^2 =13.39; P-value=0.004). Crops only were grown in Westlands district (38.5%) while mixed farming was practiced mainly in Kasarani district (44.8%). Generally, mixed farming (54.7%) was the most commonly practiced farming system by the UPUA farmers.

Although there was no significant association between marital status of respondents and the farming system adopted (χ^2=2.771; p-value=0.250), married respondents were predominantly engaged in both the production of crops (86%) and mixed farming (86.5%). Despite there being no significant association between household size of respondents and the farming system adopted (χ^2=4.746; p-value=0.191), household size of 4 to 6 members was the most engaged category both in crop cultivation (34.9%) and mixed farming (42.3%). Most of UPUA farmers had been engaged in crop production for a period of 1 to 2 years (32.6%) and in mixed farming, for 6 to 10 years (23.1%).

UPUA farmers mostly used a land size of less than ¼ acres (38.9%) for crop production. Land size limitation in urban areas led to ingenious production technologies. Multi-storey (42.5% and moist gardens (25%) were the most commonly used crop production technologies in the urban districts while in the Peri-urban, drip irrigation (23.6%) and multi-storey gardens (25.5%), in addition to open field crop production (58.2%), were the preferred technologies. The other technologies employed in different districts were as shown in Table 1.

Table 1. Preference (in percentages) of production technologies in UPUA districts.

Production technologies	Kasarani	Njiru	Westlands	Dagoretti	Starehe	Makadara	Kamukunji	Embakasi
Greenhouse	6.3	_	25	25	18.8	6.3	6.3	12.5
Multi-storey garden	12.9	3.2	16.1	12.9	12.9	9.7	22.6	9.7
Moist gardening	18.2	9.1	18.2	9.1	22.7	4.5	13.6	4.5
Drip irrigation kit	9.5	4.8	19	28.6	19	4.8	4.8	9.5
Rooftop garden	-	50	-	-	-	-	-	50
Hanging garden	33.3	-	16.7	16.7	33.3	-	-	-
Micro garden	27.8	16.7	5.6	16.7	16.7	-	5.6	11.1
Balcony garden	-	-	-	-	-	-	-	100
Roof water harvesting	10	-	30	20	20	-	-	20
Water reservoir	50	-	-	50	-	-	-	-
Open field	17	25.5	14.9	10.6	6.4	8.5	10.6	6.4

So far, a total of 11 production technologies used by Nairobi County UPUA farmers were identified, and balcony garden was spotted in Embakasi district only.

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