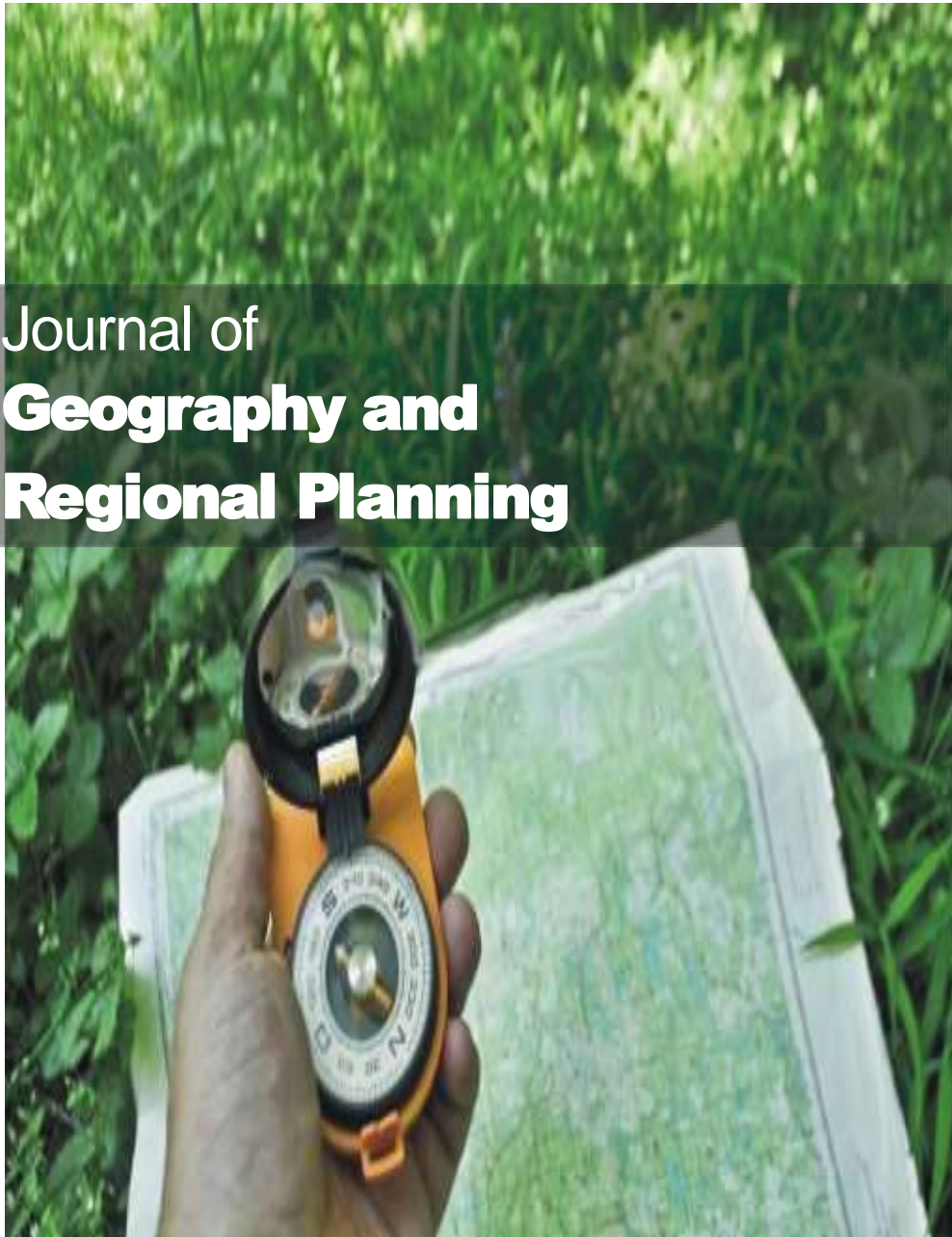


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Effect of youth engagement in vegetable farming on household well-being in Kakamega Town, Kenya

Edwin A. B. Juma, Paul Omondi and Raphael W. Kareri

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Full Length Research Paper

Effect of youth engagement in vegetable farming on household well-being in Kakamega Town, Kenya

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This paper focuses on the effect of youth engagement in vegetable production on household well-being in Kakamega Town, Kenya. Survey research design was used and data was collected from 159 urban youth farmers using structured questionnaires and interviews. It was observed that the vegetable farmers engaged more frequently in weed control, land preparation, harvesting and planting. There was significant association between time spent on the farm and the size of vegetable plot ($X^2 = 46.074$, $p = 0.000 < 0.05$) at significance level of 5%. Most of the vegetable farmers (90.5%, $n = 144$) reported that they will continue with vegetable production in the future. Some of the respondents (34.0%) reported that the vegetable produced was 'more than adequate' and 28.9% reported that it was 'adequate'. Majority of the farmers (84.3%) bought vegetables from estate groceries. The youth offered wage labour on other people's farms and were self-employed on their own farms. Urban farming was found to have led to greening of the city. To promote the well-being of the households, the Ministry of Agriculture and other key actors should support youth to engage in vegetable farming on large scale.

Key words: Food security, household well-being, informal sector, urban poverty, vegetable farming, youth.

INTRODUCTION

Since early 1990's, Urban Agriculture (UA) has been widely documented in urban literature, policy initiatives and developmental agenda as one of the livelihood strategies adopted by the urban poor to enhance household wellbeing (Smit et al., 1996; Mbiba, 1995; Memon and Lee-Smith, 1993; Freeman, 1991). Pro-poor urban scholars posit that urban farming is essential in promoting food security, reducing food expenses, poverty reduction and creation of employment (Edeoghon and Okoedo-Okojie, 2015; Darkey et al., 2014; Foeken and Mwangi, 2000). Maxwell et al. (1998) elaborated that urban farming has the ability to improve the quality and quantity of food available for households and to reduce

incidences of malnutrition among children. In terms of employment creation, Foeken (2006) and Smit et al. (1996) indicated that urban farming could contribute to self-employment and casual labour earnings. Also, studies reveal that UA could greatly reduce greenhouse emissions, minimize soil pollution and lead to beautiful urban environment (Agboola et al., 2015; Bradshaw, 2013; Lemma and Rao, 2013).

However, other scholars argue that urban farming is only a coping or survival strategy adopted by the urban dwellers. Contributing to this argument, Frayne et al. (2009) contended that UA could only promote food security if the urban poor dwellers are directly involved in

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it. Moreover, Foeken and Mwangi (2000) cautioned that the income earned by the youth engaging in farming depends on the scale of production, demand of the product in the market and the place where it was sold. Despite farming contributing to improvement of urban environment conditions, Mhango et al. (2014) reported that the application of fertilizers, spray of pesticides and crop residues may contribute to environmental degradation.

Nevertheless, those urban residents who are involved in this informal activity cultivate crops, rear livestock or do both. However, due to inadequate farming resources and theft cases, many urban farmers in Africa engage mainly in crop production (Foeken, 2013). Vegetables are some of the crops commonly grown in urban areas (Foeken, 2013) mainly because it requires minimal land space, little water for irrigation and its market is readily available (Adedeji and Ademiluyi, 2009; Nichols and Hilmi, 2009; Drescher, 2002). Depending on regional foods, vegetable farmers in urban areas cultivate both traditional and exotic vegetables (Dreschel et al., 2008).

The role of youth in the social, economic and political development has also gained prominence in the urban studies [United Nations Development Programme (UNDP), 2013; United Nations for Human Settlement (UN-Habitat) 2013; Sommers, 2010]. Likewise, youth are important in agricultural production especially in the performance of various agricultural activities on the farm. Bello et al. (2011) reported that youth growing rice in Nigeria mainly engaged in farm tasks such as land clearing, farm tilling, planting, weeding, agro-chemical spraying, harvesting and marketing. Also, Daudu et al. (2009) observed that youth are involved in agriculture through provision of labour, supplying farming inputs, providing financial assistance, attending farming related meetings and seeking help from other stakeholders in Local Markurdi (Nigeria). While explaining how youth provide labour, Kimaru et al. (2015) argued that youth work on their family farms, their own farms or is through selling labour force or a combination of the three in Moshi district (Tanzania). Apart from actual involvement of youth on the farm, Alaoe et al. (2015) revealed that youth are critical in mobilizing, sensitizing, disseminating, executing and providing resources for agricultural innovation.

One strand of scholars argues that urban youth in Africa engaged in farming as one of the livelihood activities. Brooks et al. (2013) while contributing to this debate, reported that urban youth in Africa engage in agriculture. Ahaibwe et al. (2013) added that youth in Uganda are involved in urban farming. Locally, studies conducted in Kakamega Town indicate that youth were among the urban food producers (Juma et al., 2015; Wegulo, 2013). However, another line of argument indicates that urban youth rarely engage in farming. This has been attributed to negative attitude, perception and belief of the youth towards farming as well as inadequate

knowledge (D'Silva et al., 2012). Chagwiza et al. (2012) pointed out that since youth regarded farming as time consuming and tiresome, many of them in Harare (Zimbabwe) participated in economic activities such as selling of electronic goods.

Moreover, some scholars indicate that the number of youth participating in urban agriculture is on the downturn (Ahaibwe et al., 2013) and therefore, farming is mainly dominated by the elderly people [Government of Kenya and Kenya Agricultural Productivity Programme (GoK and KAPP, 2011)]. According to GoK and KAPP (2011), youth in Kenya generally perceived farmers as unskilled, uneducated and physical labourers who earn very little from agricultural production in comparison with formal and other informal sectors. Apart from negative attitudes and perception, studies reveal that young farmers were discouraged from engaging in farming due to inadequate farming resources such as land, farm inputs, finances, water for irrigation as well as environmental vagaries such as low rainfall, high temperatures and pests and diseases (Juma et al., 2015; Leavy and Hossain, 2014).

From the above background information, there is inadequate information concerning whether the youth engaging in farming would continue with the activity in future and whether they contribute to the wellbeing of households. This article intends to narrow this gap in urban farming by establishing (a) the extent of youth involvement in vegetable farming and (b) implication of vegetable production on household well-being.

MATERIALS AND METHODS

Study site

This paper is based on a study that was carried out in Kakamega Town which lies on Latitude $0^{\circ} 17^1$ N and Longitude $34^{\circ} 45^1$ E (Figure 1). In terms of altitude, Kakamega Town undulates between 1200 and 1700 m (GoK, 2004). The town occupies an estimated area of 50 sq km. The study site experiences a mean annual rainfall of about 2000 mm with two rain seasons: the long rains (March to June) and short rains (July to September) (GoK, 2004). Granite is the main type of rock in the region forming the intrusive Kavirondian and Nyanzian system rocks. The area has fertile clay-loam soils that belong to the latosols, particularly the ferrisols (Ingenieure, 2011). The climatic conditions and the soils are suitable for cultivation of crops such as maize, sugarcane, bananas and horticultural crops (GoK, 2004).

Kakamega Town is divided into two wards which includes Sheywe ward located on the eastern while Bukhungu ward situated in the south western (Figure 1). Sheywe ward has two sub-locations namely: Sichilayi and Township (Figure 1). Similarly, Bukhungu ward has two sub-locations, Shirere and Mahiakalo (Figure 1). Vegetable farming is an agricultural activity carried out within the town and relevant for establishing the role of youth in vegetable production in household well-being in Kakamega town.

Study design, population and sample size

This study was based on a survey research design which enabled

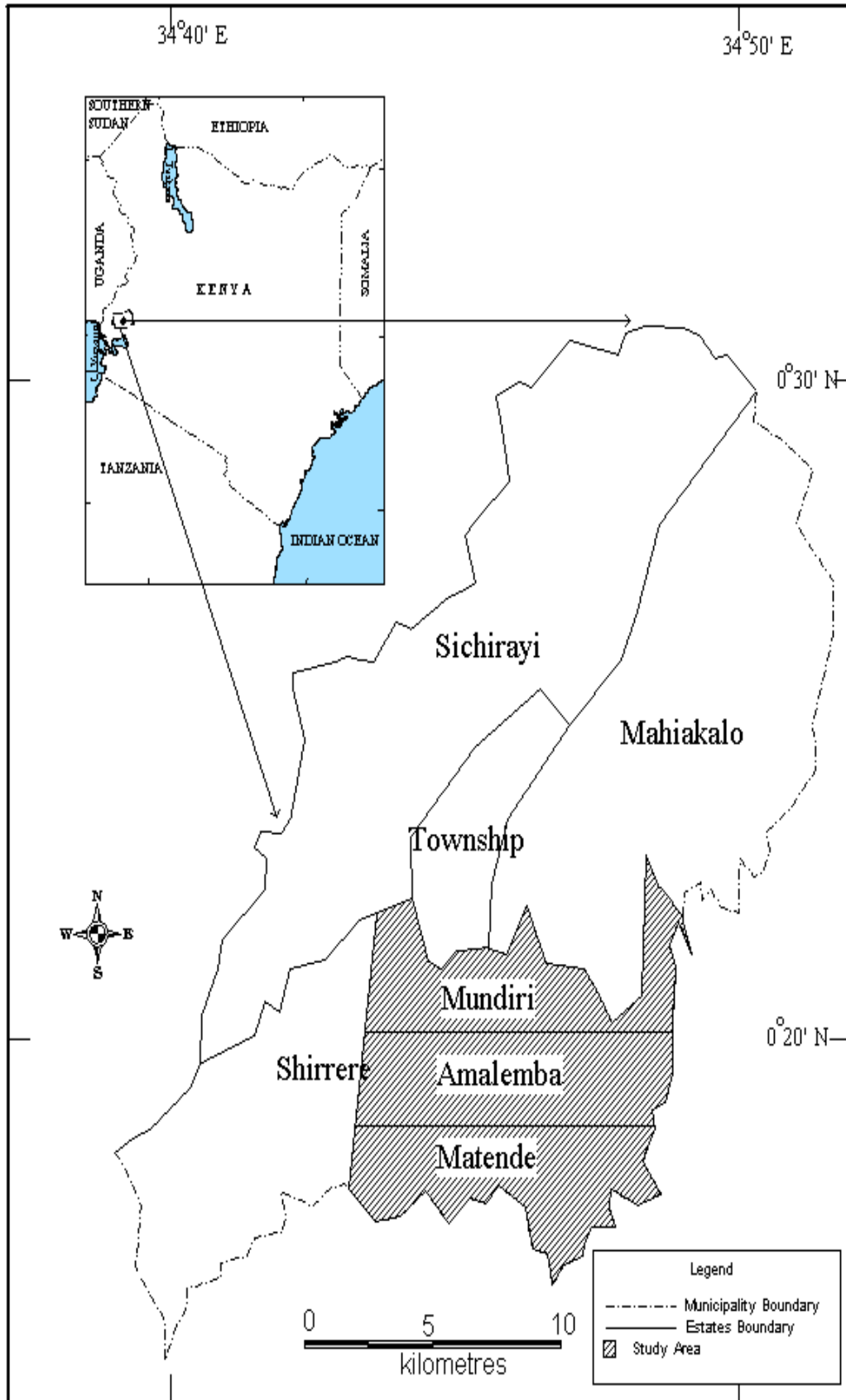


Figure 1. Map of Kakamega Town.
 Source: Author (2018).

the researcher to explain the role and implication of youth participation in vegetable production on household well-being in Kakamega Town. There were three hundred and seventy two (372) vegetable farming households in the study area. Random sampling was used in selecting 159 vegetable farming households, while the key resource persons were selected purposively. The sample size of this study was determined through estimation from the formulae proposed by Yamane which states that:

$$n = \frac{N}{1 + N(e)^2}$$

Where n = sample size, N = population size (372 vegetable farming households) and e = level of precision in this case (6% = 0.06),

$$n = \frac{372}{1 + 372(0.06)^2}$$

Sample size (n) = 159 vegetable farmers

Sixteen vegetable farmers, estate elder and agricultural officer were selected purposively for the interviews. The selection of farmers was based on gender, willingness to be interviewed and availability to reveal more information while the selection of estate elder and agricultural officer was based on the nature of their jobs.

Data collection, analysis and presentation

Both quantitative and qualitative data were collected. Structured questionnaires were administered to 159 youth vegetable farmers in order to collect quantitative data. Sixteen (16) youth vegetable farmers were interviewed guided by interview schedule. Moreover, the estate elder of the study area and the Agricultural officer of Kakamega were interviewed, guided by an interview schedule. Photographs were used to supplement data collection.

Data was analyzed in form of frequencies, tables and percentages using Statistical Package for Social Sciences (SPSS, version 16.0) and presented in the form of graphs using Microsoft Excel version 2010. Regarding the role performed by youth in vegetable farming practices, a Likert scale of 3 namely; 1 = less frequently, 2 = frequently and 3 = more frequently was used to assess the frequency of participation in farming management activities. The mean score for each of the practices was calculated to determine the frequency of participation of youth in vegetable production in the area of study.

Chi-square analyses were performed to test whether there was association at significant level ($p < 0.05$) between time spent on the farm per week and the youth's age, years in formal school, farming experience and plot size as well as if there was significant association between future participation and the youth's age, years in formal school, farming experience and plot size. All the names used in this study are pseudonyms and consent was obtained orally.

RESULTS AND DISCUSSION

This section present the socio-demographic characteristics, the type of vegetables grown, role performed by youth in vegetable production, when youth engage in farming, length of time spent on the farm per week and future participation of youth in vegetable production. It also includes the implications of vegetable

farming; adequacy of vegetable supply, food expenses, urban poverty and employment opportunities and urban environment.

Socio-demographic characteristics

According to the Kenyan constitution (2010), a youth is an individual within the age bracket of 18 and 35 years (Government of Kenya (GoK), 2010). From Table 1, 67 respondents (42.2%) were aged between 18 and 23 years, 49 respondents (30.8%) were aged between 24 and 29 years and 43 respondents (27.0%) were in the age group between 30 and 35 years. Table 1 shows that 118 of the urban farmers (74.2%) were women, while 41 of the urban farmers (25.8%) were men. This was attributed to the fact that most of the women were unemployed while others were temporarily employed and therefore available to perform household tasks including vegetable gardening.

With regards to education level, 63 of the farmers (39.6%) had tertiary education, 61 of the respondents (38.4%) had secondary education and 35 of the farmers (22.0%) had primary education. This implies that most of the youth had tertiary education and therefore able to adopt and understand agricultural innovation and technologies. More than half of the respondents (52.8%, $n = 84$) were self-employed (e.g. farming, small business, tailoring etc), some of the farmers (25.8%, $n = 41$) were employed temporary (e.g. house help, football player, casual labourers at construction sites and other farms e.t.c) while other respondents (21.5%, $n = 34$) had permanent employment (Table 1).

The analysis reveal that 47 farmers (29.6%) had been farmers for between two and four years, 39 of the respondents (24.5%) had farming experience of less than two years, 32 farmers (20.1%) had been farmers for between six and eight years, 26 respondents (16.4%) had been engaging in farming for between four and six years and 15 respondents (9.4%) had been farmers for more than 8 years (Table 1). From Table 1, 58 farmers (36.5%) were cultivating vegetables on land size between 21 and 30 sq m², 42 respondents (26.4%) had vegetable plots ranging between 31 and 40 sq m², 37 farmers (23.3%) had vegetable plots ranging between 11 and 20 sq m², 14 respondents (8.8%) were cultivating vegetables on plots less than 10 sq m² and 8 farmers (5.0%) were cultivating on plots more than 40 sq m².

Types of vegetables grown

The farmers were asked to state the type of vegetables they grew and their responses were analyzed. From Table 2, 141 of the respondents (88.7%) indicated that they grew Kales (*Brassica oleracea*), 67 of the farmers (42.1%) were cultivating black night shade (*Solanum nigrum*), 19 of the respondents (12.0%) were growing

Table 1. Socio-demographic characteristics of respondents.

Socio - demographic characteristics	Frequency	Percent
Age group (years)		
18 – 23	67	42.2
24 - 29	49	30.8
30 – 35	43	27.0
Gender		
Male	41	25.8
Female	118	74.2
Educational level		
Primary	35	22.0
Secondary	61	38.4
Tertiary	63	39.6
Nature of employment		
Self	84	52.8
Temporary	41	25.8
Permanent	34	21.4
Farming experience in years		
< 2	39	24.5
2 – 4	47	29.6
4 – 6	26	16.4
6 – 8	32	20.1
> 8	15	9.4
Plot size in M²		
< 10	14	8.8
11 – 20	37	23.3
21 – 30	58	36.5
31- 40	42	26.4
> 40	8	5.0

Source: Field survey (2014).

spider plant (*Cleome gynandra*), 18 of the vegetable producers (11.3%) grew pigweed (*Amaranthus* spp.), 4 out of 159 farmers (2.5%) grew pumpkins leaves (*Cucurbita* spp.) while 3 of the farmers (1.9%) grew cow peas (*Vigna unguiculata*).

This finding indicates that some of the youth cultivated exotic vegetables such as Kales while others grew traditional vegetables such as spider plant, *Amaranthus* species and pumpkin leaves. Plate 1 shows kale variety while Plate 2 shows the indigenous vegetables such as spider plant, *amaranthus* species and black night shade. This is in line with the finding by Ibidapo et al. (2017) whereby the youth participating in vegetable production grew pumpkin and *Amaranthus* species among others.

Role of youth

Vegetable production performance of various farming tasks are land preparation, planting, control of insect

pests and diseases, control of weeds, harvesting and selling of vegetables. The farmers were asked to rate their frequency of involvement in vegetable production practices where by 1 = less frequently (LF), 2 = frequently (F) and 3 = more frequently (MF). The mean score (MS) for each cultivation practice was calculated and above 2.5 was regarded as more frequently while less than 2.5 was regarded as frequently. From the analysis as shown in Table 3, the farmers engaged more frequently in weed control (MS = 2.6415), land preparation (MS = 2.5849), harvesting (MS = 2.5723) and planting (MS = 2.5094). These urban farmers participated frequently in irrigation (MS = 2.4277), pest and disease control (MS = 2.1824) and procurement of farm inputs (MS = 2.0566). Furthermore, it was established that youth rarely engaged in procurement of farm inputs mainly due to financial constraints which impede purchase of farm inputs like seedlings, fertilizers and agrochemicals needed for vegetable production. This finding is in line with the observation of Bello et al. (2011) who noted

Table 2. Types of vegetables produced by respondents.

Vegetables cultivated (botanical name)	Frequency	Percent
Kales / Leaf cabbage (<i>Brassica oleracea</i>)	141	88.7
Black night shade (<i>Solanum nigrum</i>)	67	42.1
Spider plant (<i>Cleome gynandra</i>)	19	12.0
Pigweed (<i>Amaranthus</i> spp.)	18	11.3
Pumpkins leaves (<i>Cucurbita</i> spp.)	4	2.5
Cow peas (<i>Vigna unguiculata</i>)	3	1.9

*Multiple responses (total more than 100%).

**Plate 1.** Cultivation of kales.**Plate 2.** Cultivation of indigenous vegetables.

Table 3. Frequency of youth in the vegetable production practices.

Production practices	LF*	F*	MF*	MS*	Frequency of participation
Weed control	7	24	128	2.6415	More frequently
Land preparation	12	28	119	2.5849	More frequently
Harvesting	8	36	115	2.5723	More frequently
Planting	13	39	107	2.5094	More frequently
Irrigation	24	31	104	2.4277	Frequently
Pest and disease control	19	52	88	2.1824	Frequently
Procurement of farm inputs	39	67	53	2.0566	Frequently

*LF = Less frequently, F = frequently, MF = more frequently, MS = mean score.

Table 4. Time youth engage in vegetable production.

Time of participation	Frequency	Percent
In the evening during week days	63	39.6
In the morning and evening on weekends	43	27.0
In the morning and evening on week days	38	24.0
In the morning on week days	15	9.4
Total	159	100.0

that youth engaging in rice production experienced insufficient capital and inadequate farm inputs. The narrative of Cheptoo from Mundiri Estate goes as follows:

“.....tilling the land and weeding of vegetable gardens is an activity for those who were still energetic – youth. The old complain of backache because it proves tedious for them”.

This narrative indicates that tilling and weeding of the farms requires a lot of energy and since youth are energetic then they are likely to provide labour associated with it (Agbonlahor et al., 2007). With regards to harvesting of vegetables and selling, it was mainly done by daughters or mothers who were concerned with preparation of food. This finding concurs with the reports of Simiyu (2012) who revealed that in Eldoret Municipality, women engaged more in land preparation, planting, weeding, harvesting and marketing.

Time of involvement in farming

Apart from youth being farmers, Hari (2014) opined that some of the farmers in India also worked in the service sector while others were students and entrepreneurs. Based on the idea that some of the farmers were still tertiary institution students, others permanently employed and another group was self-employed, it was critical to establish the time the youth were engaged in farming practices.

From Table 4, 39.6% (n = 63) of the farmers engaged

in vegetable farming in the evening (between 5 and 7 pm) during week days. Also, 27% (n = 43) of the farmers noted that they cultivated their farms both in the morning (between 6 and 10 am) and evening on weekends. Some of the farmers (24% n = 38) reported they did so in the morning and evening on weekdays while others (9.4%, n = 15) in the morning during weekdays (Table 4). This finding is in line with Ngome and Foeken (2010) whereby urban crop farmers in Buea (Cameroon) worked on their gardens mainly in the evening. Some youth had flexible timetable and engaged in farming during the free times, especially the students and permanent employees. Onkoba (a male student) said:

“...I normally engage in vegetable farming when I am free like today especially after classes or private studies at library. I usually spare some one or two hours to work on my farm.” The Onkoba's comments reveal the extent to which farmers engage in vegetable farming especially during the day. Cheptoo's story is quite illustrative of the flexibility of the youth when they engage in vegetable farming in the study area when she said; *“... When am on night duty I do the weeding during the day. Sometimes I do weeding of the garden in the morning when I am on duty in the afternoon or evening”.* This excerpt from Cheptoo implies that some of the youth could easily juggle between their jobs to participate in farming.

Length of involvement in farming

Building on the debate that young people in urban areas

Table 5. Chi-square analysis showing the level of association between time spent on the farm and selected socio-demographic characteristics.

Selected socio-demographic characteristics	Pearson Chi-square (X^2)	Degree of freedom (d.f)	Significance level (p-value)
Age	8.207	6	0.223*
Gender	0.580	3	0.901*
Education level	4.459	6	0.615*
Nature of employment	1.954	6	0.924*
Plot size	46.074	12	0.000*

Source: Field data analysis (2018); * Significance level of 5% (0.05).

rarely engaged in urban farming in contrast to other farming activities, the amount of time spent on the vegetable farming per week was established. It was determined that the youth spent four hours and thirteen minutes (4 h and 13 min) with standard deviation of 1.58 h (1 h and 35 min) per week. Furthermore, Chi-square analysis was carried out between the time spent on the farm and socio-demographic characteristics (age, gender, educational level, nature of employment and plot size).

From Table 5, the Pearson Chi-square analysis reveals that there was significant association between time spent on the farm and the size of vegetable plot ($X^2 = 46.074$, $p = 0.000 < 0.05$) at significance level of 5%. Agboola et al. (2015) in their Chi-square analysis noted that there was significant association between gender ($X^2 = 99.37$; $p < 0.01$) and the level of participation in vegetable production at significance level of 1%. However, in this study, there was no significant association between the time spent on the farm and the age ($X^2 = 8.207$, $p = 0.223 > 0.05$), gender ($X^2 = 0.580$, $p = 0.901 > 0.05$), education level ($X^2 = 4.459$, $p = 0.615 > 0.05$) and nature of employment ($X^2 = 1.954$, $p = 0.924 > 0.05$) of the respondents (Table 5).

Future participation in vegetable production

It was revealed that 144 of the vegetable farmers (90.5%) said that they will continue with vegetable production in future while 15 of the respondents (9.5%) said that they will not continue with the activity in future. This result contradicts the findings from India where 40% of youth were expected to continue with farming in future and 60% were not expected to engage in agriculture in the future (Hari, 2014). Those farmers that intended to continue with vegetable production opined that they would encourage their children to venture into vegetable production within the town (See also Hari, 2014). The narrative of Kavere a female respondent is illustrative of the future participation of new generations of farmers in vegetable production:

I have been cultivating vegetables in Kakamega Town for quite some time. Although, I have encountered some challenges, I will continue with farming until my children take over. I normally encourage them to appreciate farming and I am ready to support them in the future."

From the sentiments of Kavere, some young farmers were planning to only stop farming when their children take over as farmers and were ready to offer support to their children. This indicates that there would be continuity in vegetable farming within the town. Cheptoo's sentiments were particular on the reasons why she would encourage her children to engage in farming when she revealed that:

"..Cultivating vegetables is an activity that should continuous. Because we get food from vegetables...at least when you do some farming, the children would not sleep hungry, even those that cultivate vegetables on large farms can sell the extra produce to obtain income. Therefore I will encourage my children to be farmers even if on part time basis"

The above quotation is indicative of the reasons why the future farmers (children of current farmers) should embrace vegetable farming even if they engage in other economic activities. Chambers and Conway (1999) revealed that intergenerational sustainability is achieved when there is transfer of tools, assets, skills and knowledge from one generation (parents) to the next generation (sons and daughters).

A Chi-square analysis was performed between the future participation of youth in vegetable production and selected socio-demographic characteristics (age, gender, education level, nature of employment and plot size). From Table 6, the analysis reveals that there was no significant association between future participation of youth in vegetable production and age ($X^2 = 8.207$, $p = 0.223 > 0.05$), gender ($X^2 = 0.580$, $p = 0.901 > 0.05$), education level ($X^2 = 4.459$, $p = 0.615 > 0.05$) and nature of employment ($X^2 = 1.954$, $p = 0.924 > 0.05$), and the size of vegetable plot ($X^2 = 46.074$, $p = 0.000 < 0.05$).

Table 6. Chi-square analysis showing the level of association between the time spent on the farm and selected socio-demographic characteristics.

Selected socio-demographic characteristics	Pearson Chi-Square (X^2)	Degree of freedom (d.f)	Significance level (5% = 0.05)
Age	2.187	2	0.335
Gender	0.29	1	0.590
Education level	0.273	2	0.872
Nature of employment	0.50	2	0.799
Plot size	2.198	4	0.699

Source: Field data analysis (2018); *Significance level of 5% (0.05).

Adequacy of vegetables cultivated

Generally, the price of vegetables in the inner cities is quite expensive as compared to in peri-urban and rural areas. Therefore, urban vegetable production could promote access to adequate vegetables for home consumption. The respondents were asked to state the level of adequacy of the contribution of vegetable to food supply to the family and the results were presented in Figure 2.

From Figure 2, 54 of the respondents (34.0%) reported that vegetable production was 'more than adequate'; 46 of the farmers (28.9%) said that it was 'adequate', 41 of the vegetable producers (25.8%) noted that it was 'less than adequate' and 18 (11.3%) indicated that they were 'not sure'. This observation resembles the work of Ango et al. (2011) who found out that majority of the urban farmers believed that UA contributed highly to household food security, while others noted that it contributed averagely to food security, some revealed it contributed less to food security while a few observed that it did not contribute to food security. This was supported by the observation of Wanjala (a male farmer from Mundiri estate) that:

"...I rarely buy green leafy vegetables because my farm always has vegetables".

This excerpt implies that some farmers grew vegetables throughout the year and therefore spent no money to buy green vegetables. Based on this finding, it could be concluded that more than half of the youth believed that the current production of vegetables was adequate for family use.

Sources and expenses of vegetables

Urban farmers obtained vegetables from a myriad of sources during the off-peak. According to Crush et al. (2011), urban dwellers got vegetables from the neighbourhood, supermarkets and rural areas. The results reveal that 134 of the farmers (84.3%) bought

vegetables from estate groceries, 47 of the respondents (29.6%) bought from the municipal market or supermarkets within the inner city, 23 (14.5 %) borrowed vegetables from their neighbours and 11 (6.9%) borrowed vegetables from their friends within the town and 8 got vegetables from their rural homes (Table 7).

The estate groceries were operated by "*mama mboga*" (Kiswahili word for female grocers) and these groceries are located a few distance from the respondents houses. This generally, explains why most of the youth sought vegetables from groceries which are found within their neighbourhoods since they spent minimal time covering short distance. It was also observed that vegetables were bought from municipal markets as well as borrowed from the friends and neighbours. Moreover, it was established that urban dwellers obtained vegetables during the off-peak seasons which enhanced rural-urban ties (Owuor, 2006). Furthermore, to cater for the vegetable shortage, the farmers bought green vegetables from the markets. In their findings, Ngigi et al. (2010) noted that middle and high income urban dwellers bought vegetables from the supermarkets and high-end stores.

Some farmers spent money on purchasing green vegetables on a daily basis to access food. The respondents were asked to state the amount of money they spend on green vegetables per day during off peak season. From Table 8, 28 of the respondents (17.6%) revealed that they spent less than 10 Kenya Shillings per meal on vegetables during off peak season, 39 (24.5%) revealed that they used between Ksh 10 and 20 per meal, 26 (16.4%) said that they used between Ksh 20 and 30, 47 (29.6%) reported that they used between Ksh 30 and 40, 14 (8.8 %) used between Ksh 40 and 50 per meal and 5 (3.1%) used more than Ksh 50 per meal. The mean expenditure on vegetables was Ksh 25 with the standard deviation of Ksh 3. It could be argued that the expenditure on food could be reduced if the youth cultivated vegetables throughout the year.

Urban poverty and employment opportunities

Dose (2007) revealed that urban poverty in Kakamega

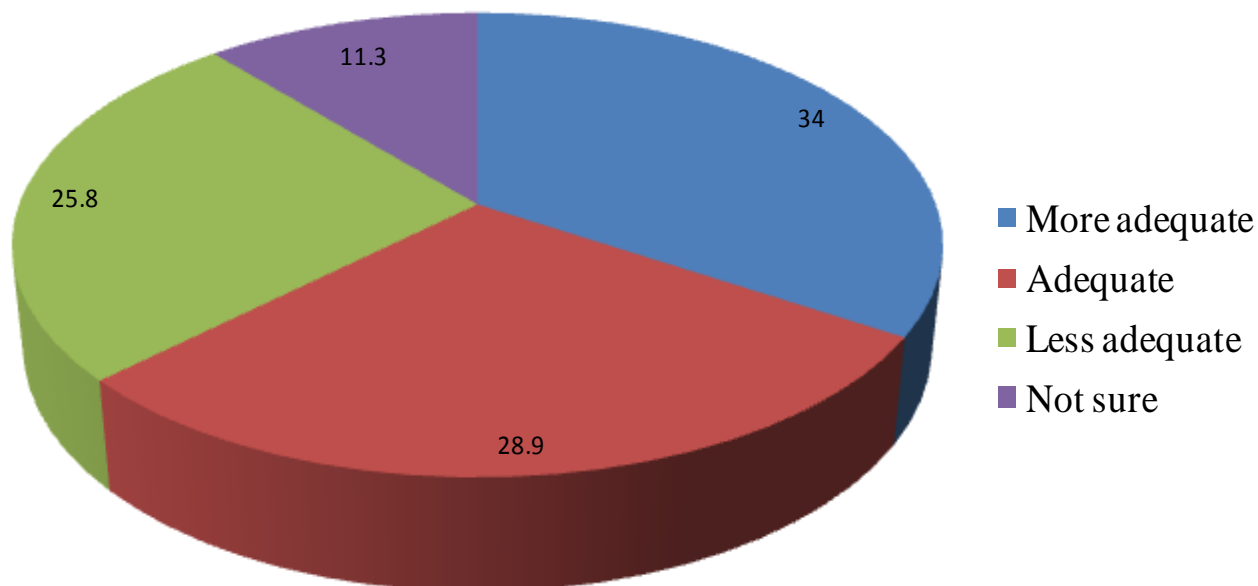


Figure 2. Adequacy of vegetables for household consumption.

Table 7. Sources of vegetables during off peak season.

Sources of vegetables	Frequency**	Percent
Estate groceries	134	84.3
Municipal Market/ supermarkets	47	29.6
Neighbours	23	14.5
Friends	11	6.9
Rural home	8	5.0

Source: Field Survey (2014); **Multiple responses (the total does not add to 100%).

Table 8. Amount of money spent on vegetables per meal during off-peak season.

Amount of money (Ksh*)	Frequency (N = 159)	Percent
< 10	28	17.6
10 – 20	39	24.5
20 – 30	26	16.4
30 – 40	47	29.6
40 – 50	14	8.8
> 50	5	3.1
Total	159	100.0

Town has been on the upturn. A small proportion of the youth in Kakamega Town are permanently employed in formal sector while most of the youth are either self-employed or casual workers (Atieno, 2013). This predisposes them to food insecurity, poverty and poor living conditions. Since, few of the youth were engaged in informal employment, the living standards were generally low as it was revealed by some of the youth in Kakamega

Town (Atieno, 2013). A female farmer from Amalemba estate revealed that:

“.....I was brought up by my grandmother within Kakamega Town since my mother and father passed away when I was still a child. I dropped out of secondary school in form three in 2009. Furthermore, my grandmother is now old and sick hence I cannot depend

on her any more... I do not have a reliable source of income. I also operate my vegetable grocery and cultivate vegetables on the farm that we have borrowed from our land lord. In the evening, I am supposed to take care of my grandmother and perform other household chores. Although, I am facing economic challenges, I have to survive."

From this quotation, although some of the youth participating in urban farming were facing economic challenges, they had to fend for their families. Some of the women through interviews revealed that they were facing economic constraints due to being single parents since they had to take care of their children alone. This findings confirms Amis's (1995) hypothesis that female-headed household consists of the highest proportion of the urban poor dwellers due to women's dependency on casual and low paying jobs, barriers to education, health and the labour market, inadequate access to land and finances and household fragmentation.

Urban vegetable production is a source of employment to the youth. Through interviews, some of the respondents agreed that vegetable production was a source of wage labour and self-employment while most of them did not agree that vegetable farming was a source of main occupation. Wangila, one of the vegetable farmers said

'....most of the youth here are employed as labourers on the farms during the peak season. Some of the youth are employed on their own vegetable farms. It is rare for youth to be permanently employed in farming.'

The narrative above reinforces the idea that youth are ready to offer labour on other people's farms and on their own farms. However, very few people are employed on the farms permanently due to limited scale of production and involvement in other economic activities such as motorcycle transport services for male youth and hair dressing for female youth (Atieno, 2013). This revelation contradicts the findings of Ango et al. (2011) who noted that most of the urban farmers were full time farmers, some were part-time farmers while others were hired as labourers on the farms in Birnin Kebbi metropolitan area, Kebbi State, north western Nigeria.

Vegetable farming and environment

Generally, urban vegetable production contributes to greening of the city, making it to have a best aesthetic value. All the vegetable farmers (100%, n = 159) that participated in this study revealed that vegetable production contributes to the beauty of Kakamega Town. This implies that vegetable production benefit the environment as supported by the findings by Brock and Foeken (2006) who observed that crop farming promoted

that aesthetics of the urban environment as well as eliminated areas where people could dispose human waste hence reduce water pollution in Cotonou (Benin). However, according to Flynn (2001), urban farming leads to soil erosion, land degradation and contamination of water bodies. To underline this challenges, urban authorities in Eldoret town has prohibited cultivation of crops along river banks and along the road side (Simiyu, 2012). Wekesa, a vegetable farmer when asked about the influence of vegetable farming on the environment said:

"...I mainly use organic fertilizers to supplement the depleting soil nutrients. I rarely use insecticides or fungicides but normally apply wood ash or uproot the affected plant and burn to control the spread of pests and diseases. During vegetable irrigation, I usually apply sufficient amount of water to reduce soil erosion. The vegetables grown in urban areas as compared to rural areas will have some pollutants but nowadays every food grown in the soil is contaminated due to pollution".

The above revelation, points out that some of the vegetable farmers were aware of the negative effects of the use of agro-chemicals and soil contamination but these farmers argued that soil contamination can occur both in urban as well as rural areas. This is supported by the findings by Pasquini (2006) and (Foeken, 2006) who reported that the use of refuse ash and sewerage water in urban vegetable production increased the concentration levels of heavy metals in vegetables and soil.

Conclusions

Based on the above findings, urban youth engaged more frequently in weeding, land preparation, harvesting and planting and frequently in irrigation of vegetables, and controlling of insect pests and diseases of vegetables. Since the youth were flexible, they engaged in agricultural activities at varying times of the day and the week. Concerning the length of time spent on the farm, there was a significant association between length of time spent on the farm and the size of the vegetable plots. Intergenerational sustainability of the urban vegetable farming was guaranteed because most of the current farmers were planning to continue with the activity in future and pass the knowledge and skills to their children in future. Parents and older siblings influenced the youth greatly to start vegetable cultivation.

Through youth involvement in vegetable production, many households were able to obtain adequate vegetable for household consumption. To supplement vegetable during off-peak season, the urban farmers bought vegetables from estate groceries and municipal market or supermarkets while others borrowed vegetables from their friends, neighbours and relatives. It

is clear from the findings, that vegetable production could reduce the vegetable expenses if they are cultivated throughout the year. Due to poverty incidences, single-parenthood and low educational level, urban youth are vulnerable to economic shocks. Urban farming as established, was perceived as a source of wages and self-employment among the youth. It was confirmed that vegetable production contributes to improvement of the urban environment through greening of the city although the use of fertilizer could contribute to soil pollution.

RECOMMENDATIONS

It is argued that urban farming is an activity that can uplift the wellbeing of urban households. It is recommended that youth should embrace vegetable farming because its returns are higher and the market is readily available. Since urban vegetable production requires minimal time and space for production is small, it is proposed that vegetable farming can be practiced by the youth who are busy with learning activities or formal employment. It is suggested that to enhance food security, youth should form groups to enable them secure loans that can facilitate green-house farming. For the sustainability of urban farming, the current youth should cultivate positive attitudes and perceptions about urban farming to their children, so that the future generations that failed to secure formal employment can create self-employment in this urban farming sub-sector.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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