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URBAN AGRICULTURE LIVELIHOODS AND HOUSEHOLD FOOD SECURITY: A CASE OF ELDORET, KENYA

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ABSTRACT

One of the aims of the MDGs is to halve the world's poor population with an income of less than one dollar a day as well as those who suffer from hunger (Mougeot, 2005). By 2015-2020, more than half of the world's population will be living in urban and peri-urban areas. One common livelihood that the poor venture into is Urban Agriculture (UA) which involves the production, processing and selling of livestock, poultry and horticultural produce and products due to the immediate monetary gains and the necessity for a quick source of food. The main objective of this study was to determine the socio-economic characteristics of low-income horticultural food producers and sellers (HFPS) and how this affects their livelihoods and household food security. An exploratory survey design was used to examine the diverse manifestations brought by the interface between the livelihoods of HFPS. The study integrated the livelihood framework to examine the respondents' socio-economic characteristics and the resultant food security status of their households. Non-probability sampling was used to get 110 producers and 110 sellers. The study used both quantitative and qualitative research methods. Quantitative data was analyzed using SPSS (15.0) software whereas qualitative data was triangulated into the discussions of the quantitative findings. The results revealed that the current infrastructure is not conducive for sustainable UA practices, which affects the interactive livelihoods and household food security of HFPS. A synergy of stakeholders should to engage in serious working partnerships in developing sustainable and contextual pro-poor infrastructure for enhanced UA livelihoods, in order to stimulate growth and increase efficiency, productivity, employment and generate better returns for the poor.

Keywords: urban agriculture, household food security, poor, interactive livelihoods.

INTRODUCTION

Urban agriculture is an industry located within (intra-urban) or on the fringe (peri-urban) of a town, city, or metropolis, which grows and raises, processes and distributes a diversity of food and non-food products, (re-) using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area. (Mougeot, 2000). The urban edge may be described as a surbub, exurb, urban boundary, rural-residential, green-belt, edge city, peri-urban, urban sprawl, megapolis, micropolis, urban-rural interface, or metropolitan (TUAN, 2007).

Today's world population is over half urban, North America is 75% urban, whereas Japan, Italy, England, Belgium, Netherlands and Egypt have no possible urban-rural edge (TUAN, 2007), because the geographic urban space and geographic rural space are non-definable due technology diffusion. According to the UN population prospects (median variant), the world population is expected to grow by 34% from 6.8 billion today to 9.1 billion in 2050 (WFP, 2009). Moreover, more than 70% of the world's population is expected to be urban by 2050. This urbanization will bring with it changes in lifestyles, consumption patterns and also the structure of market chains. The global demand for food is projected to be 70% higher than today, involving an additional annual consumption of nearly 1 billion tones of cereals for food and feed and 200 million tones of meat. In Kenya, 25% of the country's urban population is dependent on own production for nutritional survival (TUAN, 2004). If present trends hold, the vast majority of these people will be living in irregular settlements without access to decent food, shelter, water and sanitation (UN-HABITAT, 2004).

There is evidence to suggest that UA contributes to urban food supply and food security. In many cities, UA production has been essential in providing for vulnerable groups. Informal UA is a livelihood that the urban poor engage in and there is an important association between urban food (and non-food) production and street and market vending of fresh and processed foods. With the growth in urban population, especially the poor, the practice of UA provides an easy entry into the urban job market for a quick- fix of food for the poor and therefore UA should be re-invented and redesigned to empower the urban poor's livelihood strategies and meet the MDGs that either depend on or are affected by the health of individuals and their environment.

Access to urban ready markets open up the possibility of cultivating horticultural food crops such as fruits and vegetables on a commercial basis. The aim of the informal UA worker is usually to feed the household, and producing, processing and selling of the food may enable families to meet their basic requirements such as food, fuel, transport and rent.

Food security in recent years has been seen as one dimension of the broader concept of livelihood security. Sustainable food security refers to the maintenance or enhancement of food resource productivity on a long-term basis (Saad, 1999).

The challenge faced by the world today is to create sustainable cities (Madaleno, 2001), which provide sustainable livelihoods to urban dwellers. In UA, production and marketing are partners and their interrelations are inevitable. The producers and sellers may be either primary or secondary (owners or employees). Proper urban planning can help to efficiently enable production and marketing components of the urban food chain to develop and contribute finely to food security demands of the urban poor (Mougeot, 2005).

Urbanization and food security

The global number of hungry people keeps rising, and in sub-Saharan Africa, it is estimated to be one in three, totaling to 183 million (UNDP, 2003). Malnutrition has recently become an urban phenomenon and the urban poor carry the majority of the starving urbanites. The rapid growth of urban population has prompted concern about food security as far as availability and accessibility is concerned (FAO, 1995). Rapid urbanization in Sub-Saharan Africa has resulted in urban poverty, which is recorded to be severe enough to put livelihoods and food security at risk. Apart from this, urban growth has also brought forth other problems such as unemployment and environmental degradation.

In Kenya today, over 54 percent of the population live in poverty. More than 12 million of them live in "absolute poverty" surviving on less than one dollar per day. They do not have access to basic social services that the people in developed nations take for granted (Machinga, 2000). Comparatively, it is estimated that 15 percent of the rural population in Kenya are absolutely poor, and in the urban area, 49 percent live on less than one dollar everyday. The number of people living in urban centers continues to grow at approximately twice the rate of rural areas. Most of Africa's urban population spends 80 percent of their earning on food only, as compared to the US, who spend an insignificant 2 percent only (UNDP, 2004). However, food per se is not everything a human being needs in life as other social amenities such as shelter, clean water and good sanitation, clothing, transport, education and healthcare are necessary for worthy living. Thus there is need for income generating opportunities especially for the vulnerable resource poor to earn an income from various micro-activities. Taken seriously, UA can help reduce poverty by providing employment and income for basic needs especially if done through community initiatives.

The issue of food security has been recognized as a major problem in many parts of the world and therefore urban food production and selling are critical in providing food to feed the urban population. Energy foods or carbohydrates are more readily and cheaply available than other important nutrient-providing foods such as fruits and vegetables which provide vital amines and trace elements for health. Animal products that provide proteins for growth and body building are also found lacking in many household diets. Urban Agriculture, taken seriously may help to reduce these deficiencies by a desirable margin.

Food availability does not guarantee nutritional quality that leads to a balanced diet. An individual's body also has to be in the right health status, free from diseases and living in good sanitary conditions so as to benefit from the available food (Saad, 1999). Thus a household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity, supply, and culturally acceptable) and when it is not at undue risk of losing such access (USDA, 2000). Food must therefore be available, accessible, affordable, adaptable and acceptable to households in order for an adequate food security status to be attained (Mugalavai, 2008).

Within the context of urban agriculture, the farmers and sellers may experience insecurity when the land or place for production, processing and selling is transitory, during harsh climatic times, when there are market failures, and also when they lack inputs due to profit loss or lack of credit facilities. It therefore becomes difficult to attain sustainable UA without the help of essential development organs.

Chronic food insecurity affects the resource-poor and may result from inadequate diet caused by the inability to acquire food due to lack of resources for buying food or producing some (USDA, 2000). Transitory food insecurity results from natural calamities which include wars, floods, climatic failures, loss of purchasing power by groups of households and market failures due to high inflation rates and grain hoarding.

The low income households in Kenya spend more than 50-80% of their disposable income on food and still do not meet their daily dietary needs (Mugalavai, 2008). Those with tangible assets such as free-lease land and housing are more likely to survive and prosper than those without.

The importance of urban and peri urban fruit and vegetable production to improve vitamin and micro-nutrient supply, especially for the urban poor, are recognized by international policy-makers (FAO 1999; Richter, *et al*., 1995). Therefore, a possible alternative to growing timber trees and using block fences in small urban homes would be to create edible fruit and vegetable hedges to meet the needs of the urban populations.

DESIGN AND POPULATION OF STUDY

This study used an exploratory cross-sectional survey design. The research was conducted in Eldoret, which is situated in Uasin Gishu District, Kenya. In this District, the poverty incidence is still high although it is a major food producer in the country. The urban aspect exhibited the reality of the situation as the movement of goods can be monitored and it also offers a concentrated population of the HFPS required for the study. The producers were those who worked on horticultural food

farms whereas the sellers were those who buy their merchandise for sell. Producer employees were chosen because they level up socio-economically with most sellers in the informal markets.

SAMPLING AND METHODS OF DATA COLLECTION

Non-probability sampling was used. This is a type of sampling where the chances of members of the wider population being selected for the sample are unknown (Cohen, Manion and Morrison, 2000), and it targets information-rich cases for in-depth study. The researcher came up with a total of 220 UA respondents, who included 110 producers and 110 sellers to participate in the qualitative and quantitative study. Out of these, 8 producers and 8 sellers volunteered to participate in the two focus group discussions and 2 producers and 2 sellers participated in the case studies. The rest, who were 100 producers and 100 sellers, participated in the questionnaire interviews.

The Chi-square and ANOVA were used to test for significant differences between variables. The food security status level measure (USDA, 2000), which contains 18 items (see Table-2) was also used. Affirmative responses for each household were recorded and the Rasch computational package was used to determine the food security status of the households.

RESULTS

Based on a sample (N = 200) of respondents who participated in filling the UA questionnaires, 50% (n = 100) were producers and 50% (n = 100) were sellers, with a total representation of 98 males and 102 females. More males (80%) than females (20%) were involved in producing horticultural food crops, whereas more females (82%) than males (18%) did the selling. This relationship between groups was significantly different (χ^2 = 76.911, p = .000, α = .01). This finding is consistent with others in Africa (Vide, 2004; Mubvami and Mushamba, 2004; and Nabulo *et al*., 2004), where more men than women were involved in cultivating crops and marketing at wholesale, and women did more of subsistence cultivation and selling. From discussions, it was noted that women would rather perform the activities that will allow them flexibility in time management so as to tend to their other reproductive and productive roles. It also makes sense because women more than men would care to have daily earnings in order to bring basic needs home as the need arises and this is easily achieved from selling activities.

The mean age of producers (M = 26.4) did not significantly differ with the mean age of sellers (M = 27.5), (see Table-1). This makes it clear that the respondents in this study were at a prime working stage in life. The mean household size of producers (M = 4.03) was lower than that of sellers (M = 4.07) in a non significant relationship.

About half of the sellers (54%) had primary level education as compared to 43% producers. However, the highest level of education was found among producers although only 12% had attended post secondary education. There was however no significant difference between the producers and sellers and their level of education. They both had a low level of education, which raises a red alert because education empowers individuals into experiencing greater successes in life.

There were significant main differences between the study groups in their employment status in UA. Sixty eight percent (68%) sellers and 25% producers were self employed. The self employment status of sellers is attributed to their being able to start their UA activities with low capital investments, which may be recycled for the purpose of diversity and continuity.

More producers (92%) than sellers (54%) indicated that their produce was for both domestic use and sale in a non-significant relationship. Statistically significant differences were also noted as far as sufficiency of produce and sales were concerned (χ^2 = 5.120, p = .017, α = .05), with more producers (58%) than sellers (42 %) indicating that their produce was sufficient for both domestic use and sale (see Table-1). This does not mean that the supplies were sufficient for the sellers' needs because producers take care of their domestic needs before any sales are done, whereas sellers cater for domestic needs alongside their sales.

Very few of the respondents rated their performance in UA as very good (13%), whereas 35% found it satisfactory, and those who thought that the performance was poor were 52%. The difference between the subgroups was statistically significant (χ^2 = 38.749, p = .000, α = .01). There was no significant difference in the average daily household income for the study groups. Sixty five (65%) percent producers and 54% sellers indicated that they got about one dollar of daily income, and 23% and 31% producers and sellers respectively indicated that they got less than one dollar a day.

More producers (88%) than sellers (60%) indicated that their income from UA was insufficient in a statistically significant relationship (χ^2 = 20.374, p = .000, α = .01), (see Table-1). Significantly more sellers (65%) than producers (33%) spent about one dollar daily on food, whereas more producers (49%) than sellers (22%) spent less than one dollar every day (χ^2 = 21.523, p = .00, α = .01). Sellers were able to organize their spending better than producers who most of the time had to wait for monthly earnings which found them with multiple needs and made it difficult to allocate their meager resources to meet the various basic needs.

Table-1. Respondents' urban agriculture characteristics.

UA Characteristics	All respondents N = 200%	Producers n = 100%	Sellers n = 100%	Chi square	Sig α
Gender of Respondents					
Males	49	80	18	76.911	.000**
Females	51	20	82		
Respondents level of education					
None	13	14	12	1.593	.661 ns
Primary	49	43	54		
Secondary	29	31	28		
Post Secondary	09	12	06		
Status in UA					
Self employed	47	25	68	42.159	.000**
Employee	53	75	20		
Mean age of respondents	28.1 ± 8.07	26.4 ± 5.1	27.5 ± 6.5	0.519	.472 ns
Mean household size	4.05 ± .648	4.03 ± .643	4.07 ± .655	0.436	.663 ns
Description of mode of production/selling					
Site selling	28	43	14	29.761	.002**
Hawking	20	18	23		
Vending	30	16	45		
Deliveries	22	23	18		
Purpose of produce					
Sale	27	08	46	44.018	.000**
Both domestic sale	73	92	54		
Sufficiency of farm produce /sales					
Sufficient	50	58	42	5.120	.017*
Not sufficient	50	42	58		
Performance of UA					
Very good	13	07	19	38.749	.000**
Satisfactory	35	23	48		
Poor	52	70	33		
Average daily household income					
More than one dollar	11	12	15	2.536	.469 ns
About one dollar	62	65	54		
Less than one dollar	27	23	31		
Daily average food expenditure					
More than one dollar	49	18	13	21.523	.000**
About one dollar	16	33	65		
Less than one dollar	35	49	22		
Adequacy/sufficiency of income					
Not adequate	74	88	60	20.374	.000**
Adequate	26	12	40		

**Significant at α < .01, *Significant at α < .05, ns = not significant

Description of general food situation in the last 12 months

The ANOVA test of differences between means revealed statistical significant differences between study groups in their food situation. The means were derived from the answers 1 = often true and 2 = sometimes true or never true. Higher means meant better food security. For all the test items, sellers scored a higher mean than producers (Table-2), except for the item "couldn't feed children a balanced meal" whereby both producers and sellers (M = 1.94) were affected in the same way. Significantly more sellers (M = 1.54) than producers (M = 1.10) were less worried that "food would run out" or "food bought didn't last" (F = 18.857, p = 000, $\alpha < .01$). The fact that "children were not eating enough" occurred less often to sellers (M = 1.72) than to producers (M = 1.43) (F = 38.500, p = .000, $\alpha < .01$). Producers depend on their farm produce which is sometimes affected by the size of land, amount of production, seasonality, pests and diseases and hence fluctuations in food situation are bound to occur occasionally. Sellers on the other hand may be affected indirectly although they most often look for other avenues of getting merchandise for sale, and they are also good at diversifying their livelihood activities.

In general, adults cut or skipped meals for a majority (82%) of the UA respondents and significantly more sellers (90%) than producers (64%) had adults cutting or skipping meals (χ^2 = 43.902, p = .000), and more producers (74%) than sellers (49%) cut or skipped meals for three or more months (χ^2 = 13.198, p = .000, $\alpha <$ .01). Significantly more sellers (90%) than producers (62%) also stated that they ate less than they thought they should (χ^2 = 46.914, p = .000, $\alpha < .01$), (see Table-2), and more adults did not eat for a whole day for more sellers (85%) than producers (45%), (χ^2 = 35.165, p = .000, $\alpha <$ .01), and all day for three months or more for more sellers (23%) than producers (12%). It was noted that one of the saving and financial coping strategies for both groups was skipping meals and reducing on the quantity and quality of their meals.

Table-2. Table of eighteen items showing differences in food situation between producers and sellers in the last 12 months.

Statements of food situation	**Producers mean**	**Sellers mean**	**F value**	**Sig α**	
Worried food would run out	1.10	1.54	18.857	.000**	
Food bought didn't last	1.30	1.62	18.857	.000**	
Couldn't afford balanced meals	1.93	1.99	4.752	.030*	
Had few kinds of low cost food for children	1.30	1.45	8.609	.004**	
Couldn't feed children balanced meal	1.94	1.94	.000	1.000 ns	
Children were not eating enough	1.43	1.72	38.500	.000**	
	All N = 200% **Yes No**	**Producer n = 100%** **Yes No**	**Sellers n = 100%** **Yes No**	**Chi square**	**Sig α**
Adults cut or skipped meals	82 18	64 36	90 10	43.902	.000**
Adults cut or skipped meals for more than 3 months	61 39	74 26	49 51	13.198	.000**
You ate less than you felt you should	81 19	62 38	90 10	46.914	.000**
You were hungry but didn't eat	72 28	76 24	71 29	.642	.261 ns
You lost weight because there wasn't enough	73 27	63 37	84 16	11.321	.001**
Adults did not eat for a whole day	65 35	45 55	85 15	35.165	.000**
Adults did not eat for a whole day 3+	17 83	12 88	23 77	4.190	.031*
You cut size of children's meals	76 24	56 44	96 04	43.860	.000**
Children skipped meals 3+month	11 88	11 89	13 87	.189	.414 ns
Children were ever hungry	62 38	57 43	68 32	2.581	.072 ns
Children did not eat for a whole day	29 71	49 51	09 91	38.854	.000**
Few kinds of low cost food	05 95	08 92	12 88	.156	.315 ns

**Significant at $\alpha < .01$, *Significant at $\alpha < .05$, ns = not significant

The food security status of the respondents' households was determined using the 18 items (Table-2) USDA food security test (Gary *et al*., 2000). The respondents were asked to answer either affirmatively or negatively to each item. The number of affirmative responses was calculated using Microsoft Excel and the household food security level was thus determined using the RASCH computational software. The scores were based on a scale factor of 5/7 (USDA, 2000). Only 5% of the respondents had a food security scale value of 5.1, which was the highest, with 9 affirmative responses. More producers (36%), than sellers (23%) were food insecure with moderate hunger (scale value 4.7- 5.1), and more sellers (77%) than producers (64%) were food insecure without hunger (scale value 3.4 - 4.3), (Table-3).

These results indicate that the food security status of the households of sellers was better than that of producer households, although both groups suffered deficiency in quality and quantity of the required nutrients.

Table-3. Food security status of respondents' households.

Number of affirmative responses	All respondents N = 200 %	Producers n = 100%	Sellers n = 100%	Food security scale value	Food security status
9	5	5	4	5.1	Food insecure with moderate hunger
8	25	31	19	4.7	Food insecure with moderate hunger
7	35	37	34	4.3	Food insecure without hunger
6	28	22	33	3.9	Food insecure without hunger
5	7	5	10	3.4	Food insecure without hunger

USDA (2000) food security scale used

CONCLUSIONS

Despite the fact that household sizes of UA households are generally low, the food situation is not encouraging as deficiencies in quality and quantity were generally cited. Sellers (most of whom were women) were found to have better food security status than producers because they are able to practice continuity of livelihoods as well as diversification despite the constraints faced in their triple day (reproductive, productive and household roles). They were also willing and cultured into practicing coping and motivational strategies to buffer the food situation during hard times. Sellers in low income UA households would rather fend for their families by considering the quantity of food first, rather than quality to satisfy hunger, whereas producers feel safer when they provide quality food to their households.

The producers and sellers of horticultural foods affect each others livelihoods and the success of one leads to another. It is possible to nurture a win-win situation for contextually interactive livelihood groups to affect their household food security positively and help them to attain the human right to food. There is need for increased farming in the city to cater for the food needs and employment of the urban population, especially the poor. The poor continue to work perilously because they are often deprived of a safer or sustainable way to make a living. Therefore more efficient and enabling structures are necessary to make UA a successful venture and improve household food security.

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