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# Urban crop production in southeast Nigeria: Potentials and constraints

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**Urban farming (UF) offers potential benefits to urban areas and has captured the attention of residents. Based on a survey and interview of 210 urban farmers, this article explores the potential benefits, and constraints to urban farming, in southeast Nigeria. The farmers indicated that the potential benefits included: food source, income source and efficient utilization of space among others. Major food produced were staples like cassava and maize, while vegetables were *Telfaria*, okra and *Amaranthus* spp. The farmers also reported that insecurity of land, lack of access to credit facilities; theft and destruction of crops by stray animals were among the constraints faced by the urban farmers. It is, therefore, necessary that urban farming be legalized to be part of urban policy in order to realize the full potentials**

**Key words:** Urban farming, southeast Nigeria, potential benefits, constraints.

## INTRODUCTION

United Nations (2012) estimates that in 2050, the global population will reach 9.6 billion, with the majority of that growth taking place in urban areas of less developed regions. Sub-Saharan Africa in particular, constitutes a great portion of that growth as the urban population expands faster than any other region and is projected to double between 2010 and 2030 (FAO, 2012). The rapid expansion of urban population puts direct pressure on food sources and agricultural production, thus, there exists a serious challenge in supplying enough nutrition and safe food among such rapid urbanization.

Despite many technological and mechanical improvements like improved seed varieties and modern processing methods in food production, hunger and malnutrition remain central issues as poverty continues to be prevalent in many cities around the world (Magnusson et al., 2014). It is estimated that 40% of urban inhabitants are living on less than US\$1 a day, while 70% are living on US\$2 a day (FAO, 2012). Similarly, impoverished urban households are estimated to spend 60 to 80% of incomes on food, making them more vulnerable to food price volatility (Cohen and Garret, 2010). Rapid

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urbanization has produced a large group of urban poor, proliferating widespread issues like food insecurity and malnutrition in the developing world. The global food price crisis and the protests across the world pointed to the vulnerability of the urban poor (Anderson, 2014). The fact that the global urban population surpassed the rural one for the first time in the history of the planet (Satterthwaite et al., 2010) underscores the possibility that also future food security concerns would take on an increasingly urban slant.

As Africa urbanizes, urban poverty increases, there is a corresponding growth in urban food insecurity (White and Hamm, 2014). Consequently, the most pressing need of any urban agglomeration is the question of food security and ensuring the right to food. Urban populations depend on the reliable and stable availability of food products, as well as affordable and convenient access to them. High levels of urban income poverty paired with rising food prices, however, often make the formal urban food supply systems unaffordable and inaccessible to the urban poor.

With cities in Africa growing rapidly, farming in the urban area is expected to play a greater role in feeding urban population. Urban agriculture (UA) has been widely upheld as a solution to the food crisis facing increasingly metropolitan populations (Stewart et al., 2013). According to them, UA have a role to play in addressing urban food insecurity problems, which are bound to become increasingly important with the secular trend towards alleviating poverty in urban areas. Urban agriculture generates significant livelihood opportunities, not only for urban farmers, but also for trades, input suppliers and other service providers along the value chain for domestic produce (Lagerkvist, 2014).

Globally, between 15 and 20% of consumed food is produced by UA (Corbould, 2013). Urban production varies between countries, with a greater proportion taking place in low-income countries. Vietnam has the highest participation in local production of urban food. In Hanoi, 80% of fresh vegetables are produced within city borders (Corbould, 2013). Over 70% of urban growers in the city of Tamale, Ghana, state their main occupation as vegetable growing, primarily for market and less for their own consumption (Abudakari and Mahunu, 2007). Gallaher et al. (2013) demonstrated how sack gardening improved social capital, especially if carried out collectively, they stated that it enabled a measure of resistance to food insecurity by poor women in the Kibera slums of Nairobi.

Well-managed vegetation cover from urban horticulture has a positive impact on urban environments. Bernholt et al. (2009) studied the effect of species richness and diversity in homes and commercial gardens in Niger. The highest diversity was found in large, well maintained urban gardens with production of mainly vegetables and fruits for market. Maintaining green open spaces and enhancing vegetative cover in the city are important adaptive and mitigation measures for climate change (De

Zeeuw et al., 2010). According to them, urban farming may prevent building on risk-prone land. By maintaining such areas like agro-forestry spaces, not only are the impacts of climate change due to flooding, landslides and other disasters reduced but, also, urban diversity and living conditions are improved (De Zeeuw et al., 2010). It also contribute immensely to the quality of life in towns and cities (FAO, 2001), the recreation benefits includes landscape maintenance like parks. Evaporation from the canopy lowers temperature and the vegetation filters dust from the air (WOCAT, 2007).

Van Averbeke (2007) mentioned other potentials of urban farming as ability to build social network and self-worth through farming. Besides, enjoyment and mental well-being provided by agricultural activity and the chance to use knowledge and skills are also potential benefits. Women gain pride and a sense of self-worth when their produce is consumed by her family. Their involvement in productive activities may also help them to gain dignity, hope and self-respect and enhance their self-reliance (Bradiford et al., 2009).

Renewed interest in UA amongst scholars and policy makers is a positive development since local and international environments have changed greatly since the 1980s and 1990s, when most of the initial research on the concept was conducted (Crush et al., 2010). As a result, many cities of the world have developed different strategies on UA. For example, the city of Johannesburg identifies UA as its main intervention to address food security within the city. However, in some African countries like Nigeria, urban planning and development approaches do not consider food production as an objective; thus, food production capacity may become severely constrained as urbanization proceeds. In the absence of friendly land use policy and plan that encourage urban farming, city farmers are subjected to harassment and subsequent eviction from government lands. Some urban farmers gain access to land for urban farming only as customary tenants on private land, and are only allowed to cultivate annual crops (Wakuru and Drescher, 2009).

Analyzing the extent to which UA may help shield urban dwellers from some of these food problems becomes therefore a tropical policy question. However, Zezza and Tasciotti (2010) stated that important, nature and food security implication of UA is however hindered by lack of good quality and reliable data. Magnusson et al. (2014) also noted that the current scientific literature regarding UA has its shortcoming as most studies are single-city studies. Reliable data are therefore necessary to put forward urban farming practices and its potential benefits to city planners. This will help the municipal authorities and urban planners in integrating urban farming into the urban system in a more viable and sustainable way.

In Nigeria, urban crop productions are persistent features of cities. It often occurs informally and

opportunistically in the in-between spaces of towns and cities. However, despite the glaring facts on the presence of UA in Nigeria, especially in big cities like Abuja, Lagos, Kano and Ibadan, policy makers and government have deliberately neglected this veritable sector and have not made concerted effort to acknowledge it and channel attention to it. The most striking feature of urban production is that it is integrated into the urban economic and ecological system. Urban crop production is not a relic of the past that will fade away nor brought to the city by rural immigrants that will lose their rural habits over time. The findings on the potentials of urban farming need to be made available to the urban planners and policy makers in the planning of urban areas.

Literature search on urban farming in Nigeria reveal that most have been on single city or in a state. Olaniyi (2012) carried out a study on the attitudinal disposition of urban dwellers towards participation in urban agriculture in Oyo State, Nigeria. Salau and Attah (2012) also reported on the socio-economic analysis of urban agriculture in Nassarawa State, while Egbuna (2008) looked at urban agriculture as a strategy for poverty alleviation in Abuja. Chah et al. (2010) did an assessment of contribution of urban crop agriculture in Enugu Metropolis, Nigeria. Other empirical studies of Nigerian urban agriculture have concentrated majorly on the resource use efficiency in UA. This present study looked at the potential benefits of and constraint to urban crop cultivation in southeast, Nigeria. The findings of this study will expose issue for policy consideration in the whole states of the southeast in particular and Nigeria in general.

Countries have their own unique mechanisms of defining what constitutes urban or rural, and these mechanisms determine the definition of urban and rural areas. For the purpose of this study, delineations used by the National Population Commission were employed. This reflects the definition used to administer government programs. The definition of urban crop production here refers to production of any crop whether for sale or for own-consumption within the administrative boundary of an urban area.

The main purpose of this study was to show the potential benefits and challenges of urban crop production in southeast Nigeria. Specifically the study:

1. Identified major crops grown,
2. Ascertained the potential benefits of urban crop production and
3. Determined constraints to urban crop production.

## METHODOLOGY

The study adopted a survey design and was carried out in southeast Nigeria. This zone is made up of five states viz Abia, Anambra, Ebonyi, Enugu and Imo States. The population of the study comprised all urban farmers involved in crop production in the area. Out of the five states, three (Ebonyi, Enugu and Imo) were

selected through simple random sampling technique. Each state has three senatorial zones. Two senatorial zones were randomly selected from each state, giving a total of six zones. In each zone, a major urban centre was selected to give a total of six urban centres. Five urban (political) wards were purposively selected from each urban centre based on their active involvement in urban crop production. Therefore, a total of 30 urban wards were used for the study. In each ward, snow-ball technique was used to select seven urban households actively involved in crop production. This gave a sample size of 210 respondents. Data were collected using interview schedule, focus group discussion (FGD) and observations, and analyzed using descriptive statistics (percentage and mean). The instrument was validated by three senior lecturers in the Department of Agricultural Extension, University of Nigeria, Nsukka. Reliability was achieved using test-retest method, with a coefficient of 0.91.

To ascertain the potential benefits of urban crop production, the respondents were presented with a list of benefits collated from the result of focus group discussion held. The farmers were requested to rate them on a 4-point Likert-type scale indicating the extent he/she considered an item or a variable in the list, as a benefit derived from cultivating in urban area. The scale was: to a great extent (3); to an extent (2); to a little extent (1) and to no extent (0). The values were added to get 6, which was divided by 4 to get a mean of 1.5. Any item/variable with mean  $\geq 1.5$  was regarded as a major benefit.

To determine the quantity of major crops produced, the following measurements were used for the different crops. One wheel barrow of cassava was measured as 100 kg; a bag of maize, tomatoes and garden egg as 50 kg each. A bundle of *Telfaria* and *Amaranthus* was measured to be 2 kg each. The average quantity of each crop was determined by the total quantity (kg) produced divided by the number of producing households.

To determine constraints to urban crop production, a list of constraints from the FGD was given to the respondents to indicate how serious a constraint affected his/her farming activities in the urban area. The response options were assigned the following values: very serious = 2; serious = 1 and not serious = 0. The values were added to give 3 which was later divided by the number of options (3) to get a mean of 1.0. Any constraint with a mean of 1.0 and above was regarded as a serious constraint while constraints with mean less than 1.0 were minor constraints. The statistical product and service solutions (SPSS) was used for the analysis.

## RESULTS AND DISCUSSION

### Major crops grown

Entries in Table 1 reveal that majority (89.5, 87.1, 79.5 and 71.9%) of the respondents grew maize, *Telfaria*, cassava and *Amaranthus*. Other crops grown by the respondents included yam (50%), okra (51.4%), cocoyam (25.2%), sweet potato (about 15%) and tomatoes (12.9%). The results also show that more farmers cultivated yams (67.1%) in Ebonyi State than Enugu and Imo States. The findings show that short-duration crops were produced. Fruit trees like orange, plantain and banana were not grown by many of the respondents. This may be due to insecurity of land used for cultivation in urban areas. A study in Cotonou (Benin) showed that high-value labour-demanding crops were predominant on land with secure tenure, whereas more extensive

**Table 1.** Percentage distribution of respondents according to crops grown.

Crops	Enugu (%)	Imo (%)	Ebonyi (%)	All (%)
Yam	35.7	4.7	67.1	50.0
Maize	82.9	97.1	88.6	89.5
Cocoyam	11.4	34.3	30.0	25.2
Cassava	70.0	91.4	77.1	79.5
Rice	0.0	0.0	14.6	4.8
Cowpea	8.6	2.9	11.4	7.6
Sweet potato	12.9	4.3	27.1	14.8
Plantain	8.8	20.0	11.4	13.3
Banana	5.7	14.3	12.9	11.0
Orange	4.6	2.4	2.8	2.3
Carrot	5.7	0.0	0.0	1.9
Cabbage	4.3	1.4	1.4	2.4
Lettuce	4.3	1.4	2.9	2.9
Tomatoes	12.9	5.7	20.0	12.9
Okra	40.0	57.1	57.1	51.4
<i>Telfaria</i>	94.3	87.1	80.0	87.1
<i>Amaranthus</i>	75.7	72.9	67.1	71.9
Garden egg	21.4	22.9	14.3	19.5

production of staple crops such as cassava and maize took place on plots with lower tenure security (Brock and Foeken, 2006). In Nairobi, Kenya, *Solanum* and *Amaranthus* were the most widely grown crops. Majority of urban farmers in Oyo State, Nigeria, are, also, growing mainly vegetables (Olaniyi, 2012). Similarly, Salau and Attah (2012) reported that urban farmers in Nasarawa State, Nigeria grow mainly vegetables, maize and sweet potato.

The result, also, revealed that indigenous vegetables were grown more than the exotic ones. Examples of indigenous/local vegetables are *Telfaria* and *Amaranthus*, while the exotic ones are lettuce and cabbage. Most of the respondents reported that they preferred local vegetables because of the taste and easy access to planting materials. Neergard et al. (2009) asserted that choice of crops in urban cultivation reflects local preferences and availability of seeds. Besides, the greater drought tolerance of traditional vegetables as compared to exotic species means that they can be cropped for longer periods of low rainfall (Oluoch et al., 2009). However, Ruma (2009) reported that 98% of urban farmers in Katsina metropolis, in northern Nigeria, cultivate mainly exotic vegetables like lettuce, cabbage and carrots.

#### Average quantity of crops produced and sold

The average quantity of cassava and maize produced in 2014 were 582.7 and 612.5 kg, respectively, while about 99 kg of cassava and 189 kg of maize were sold (Table

2). The quantities of garden egg, *Telfaria* and *Amaranthus* produced on average were 488.2, 84.6 and 69.9 kg, respectively while about 406 kg of garden egg, 24.4 kg of *Telfaria* and 9.6 kg of *Amaranthus* were sold. The finding suggests that most of the crops produced were consumed at home. The households that produced garden egg sold most of their produce, indicating that the crop is grown mainly for commercial purpose. Other crops like maize, cassava, *Telfaria*, *Amaranthus* and tomatoes were mainly consumed at home. This confirms the assertion that a relatively large number of the households consume a large part of their crop produced in urban areas (Foeken et al., 2004). This means that urban crop cultivation contribute to household food security and urban food supply. Therefore, interventions like government or non-governmental programmes developed to improve urban agriculture should be encouraged. In Nakuru, Kenya, the average quantity of maize, beans, cowpeas produced in 2005 were 224, 75 and 67 kg, respectively (Foeken, 2006). The average output of farmer per production cycle of garden egg in Uyo metropolis, Nigeria, is 890.82 kg (Okon et al., 2012).

#### Potential benefits of urban farming

The respondents stated that UF was important in various ways. Entries in Table 3 show that urban farming is important as food source ( $\bar{x} = 1.86$ ) and an income source ( $\bar{x} = 1.74$ ). Other benefits of urban agriculture such as improving urban diet ( $\bar{x} = 1.73$ ), improving food security among urban households ( $\bar{x} = 1.75$ ), efficient

**Table 2.** Average quantity of major crops (kg) produced and sold (per producing household).

Major crops	Average quantity (kg) produced	Average quantity sold (kg)
Maize	612.5	189.2
Cassava	582.7	99.1
<i>Telfaria</i>	84.6	24.4
Garden egg	488.2	406.2
<i>Amaranthus</i>	69.9	9.6
Tomatoes	14.6	--

**Table 3.** Mean distribution of potential benefits of urban farming.

Potential benefits of UF	Mean ( $\bar{x}$ )	SD
UF is a food source	1.86*	0.366
UF is an income source	1.74*	0.429
Creation of employment	1.43	0.718
Reducing seasonal gap in fresh food	1.54*	0.662
Creation of green zone	1.20	0.720
Production of floriculture	1.13	0.720
Improving urban microclimate	1.06	0.739
Improving urban diet	1.73*	0.499
Recycling solid and liquid waste in cities	1.09	0.791
Ensuring cleanliness in urban areas	1.16	0.797
Improving food security among urban households	1.75*	0.488
Improving urban economy	1.58*	0.551
Efficient utilization of spaces	1.60*	0.635
Helps farmers to build social network	1.20	0.748
Creates chance to use knowledge and skills	1.51*	0.667
Helps to regain dignity and hope for practitioners	1.23	0.779
Enhances self-worth and self-reliance	1.37	0.771
Improves the mental well-being of urban farmers	1.39	0.774
Improves physical exercise	1.37	0.637
Efficient use of household labour	1.58*	0.673
Helps to arouse youths' interest in farming	1.24	0.761

\*Major benefits

utilization of spaces ( $\bar{x} = 1.60$ ), efficient use of household labour ( $\bar{x} = 1.58$ ), improving urban economy ( $\bar{x} = 1.58$ ), creates chance to use knowledge and skill ( $\bar{x} = 1.51$ ). Improving microclimate ( $\bar{x} = 1.06$ ), helping farmers to build social network ( $\bar{x} = 1.20$ ) enhances self-worth and self-reliance among practitioners ( $\bar{x} = 1.37$ ), which are regarded as minor benefits of urban farming.

That UF improves food security among urban household is not surprising. Urban farming contributes to food availability in cities and also to the diet of urban consumers (Hoestra, 2010). This is particularly important for fresh foods (vegetables, eggs and poultry) which can be produced for home consumption or sold on the street and markets.

This implies that urban farming helps to improve food security among urban farming households. Salau and Attah (2012) reported that additional household income is a major benefit of urban agriculture in Nassarawa State, Nigeria. Hovorka et al. (2009) noted that UF has important positive effects on poverty alleviation, local economic development, food security, nutrition and health of the urban poor. In Nairobi, Mugambi (2002) indicated that farming households are better off in terms of energy consumption when compared with non-farming households. Foeken (2006) also reported better height and weight growth among children of urban farmers than non-urban farmers.

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**Table 4.** Mean distribution of constraints to urban crop production.

Constraints	Mean	SD
Inadequate land for cultivation	1.86	0.363
Theft of crops	1.52	0.669
Insecurity of land	1.68	0.544
Lack of access to credit facilities	1.66	0.552
Lack of input for crop cultivation	1.39	0.739
Lack of safe water for irrigation	1.12	0.842
Lack of capital to invest	1.57	0.612
Inadequate information on urban farming	1.09	0.753
Lack of farmer organization	1.00	0.834
Inadequate labour to hire	1.00	0.863
No market to sell surplus produce	0.70	0.842
Lack of modern storage facilities	1.38	0.710
Inadequate processing equipment	1.32	0.744
Sewage bursts can destroy crops	1.00	0.835
Harassment by municipal authorities	1.22	0.796
Pest and diseases infestation	1.41	0.634
Poor soil condition	1.20	0.790
Inadequate rain which affects crop yield	1.17	0.782
Variation in climate	1.00	0.787
Inadequate extension service	1.10	0.848
Destruction of crops by stray animals	1.47	0.503

liquid wastes in cities, and improving physical exercise were not regarded as major benefit of urban farming was surprising. This is because several studies have shown that urban agriculture helps in improving urban microclimate and physical exercise. Boland (2002) asserts that recycling of organic waste can be an effective and sustainable way of improving soil fertility in urban areas.

Bryld (2003) also reported that urban farming has a number of benefits for the local microclimate. Firstly, evaporation from the crops lowers temperatures in cities. Again, the vegetation filters dust from the air, thereby improving air quality. Improved air quality can also contribute to decreasing respiratory diseases (Baumgartner and Belevi, 2001). According to Pasquini (2006), UF offers wide-range of benefits including improved waste recycling, and health benefits due to increased physical activity.

Another aspect of UF perceived to be important was its contribution to urban greening. Nel et al. (2009) indicate that greening the environment is important. So, continuous cropping on the same plot contributes to urban greening. Hence, environmental policy concerns the maintenance of green spaces in city areas as part of urban greening and management of air quality.

The standard deviation values of the mean of potential benefits of UF were less than one. This implies that the respondents' opinion on the potential benefits of urban

farming did not differ much. The major contributions had lower standard deviations as revealed in Table 3. These included UF as a source of food ( $\bar{x} = 1.86$ ;  $SD = 0.366$ ); UF as income source ( $\bar{x} = 1.74$ ;  $SD = 0.429$ ) and improving food security among urban households ( $\bar{x} = 1.75$ ;  $SD = 0.488$ ).

### Constraints to crop cultivation

Table 4 presents constraints to crop cultivation as indicated by the urban farmers. Almost all the constraints listed were perceived as major constraints by the respondents. These include, inadequate land for cultivation ( $\bar{x} = 1.86$ ), insecurity of land ( $\bar{x} = 1.68$ ), lack of access to credit facilities ( $\bar{x} = 1.66$ ), theft of crops ( $\bar{x} = 1.52$ ) and lack of capital to invest ( $\bar{x} = 1.57$ ). Other constraints included pest and disease infestation ( $\bar{x} = 1.41$ ), lack of farmer organization ( $M = 1.00$ ), lack of safe water for irrigation ( $\bar{x} = 1.12$ ), lack of modern storage facilities ( $\bar{x} = 1.38$ ) harassment by municipal authorities ( $\bar{x} = 1.22$ ) inadequate extension service ( $\bar{x} = 1.10$ ) and destruction of crops by stray animals ( $\bar{x} = 1.47$ ).

Inadequate land for cultivation was the most critical problem. This is not surprising because land is a scarce resource in urban areas. Many farm sites are too small for the farmers to invest and expand their crop production. Related to the problem of land, is the frequency of harassment by government officials and plot owners.

According to Baumgartner and Belevi (2001), availability and access to land have been the crucial elements for engagement in UF. This finding is consistent with that of Egbuna (2008), who reported that land access and tenure security including harassment by environmental authorities are major problems faced by urban farmers in Abuja, Nigeria. However, urban farmers in Katsina urban, Nigeria, do not complain of any harassment by local authority (Ruma, 2009).

Lack of information was another problem faced by urban farmers. This may reflect inadequate extension assistance. Urban farmers need to apply production or farming techniques appropriate to their urban situation. Ruma (2009) noted that urban farmers, who cannot access the services of extension, apply chemicals using their own instinct. These have negative consequences on the environment and health of farmers. Salau and Attah (2012) reported poor extension service as constraints to urban farming in Nasarawa State, Nigeria.

Theft of crops was also perceived as a serious problem to urban farmers. Visser (2004) had earlier reported that theft is a big impediment to urban farming. Crops and equipment get stolen if they are not properly guarded. The provision of security again places extra cost on the farmers. In-depth interview during the FGD revealed that thieves steal produce in the farm. This forces people to harvest crops before they are fully matured. This finding

is in line with most studies that had earlier indicated that theft of crops was a major constraint to urban agriculture (Foeken and Owuor, 2000; Egbuna, 2008; Chah et al., 2010).

Destruction of crops by animals was also a problem to the farmers. This may be attributed to the fact that some farmers allow their animals to roam about and scavenge for food. These animals are usually allowed to go about during dry season when it is difficult to get food for them. They can enter peoples' farm and destroy crops. They usually disturb those who engage in dry season production.

Some problems mentioned are not specific to urban setting, example, poor soil, lack of inputs, pest and diseases and inadequate rainfall. However, constraints that are typically urban include, theft of crops, harassment by government officials, insecurity of land and sewage burst which can destroy crops.

## Conclusion

Crop farming is thriving in cities of southeast Nigeria. The importance of urban farming cannot be overlooked. Farmers are engaged in producing various crops which provide them with food to meet their health and growth requirements. Furthermore, urban farming improves household's security in terms of uncertainty by having access to more stable food sources.

However, challenges facing production systems have also been identified. Specifically, they include inadequate land for cultivation, theft of crops, lack of access to credit facilities, inadequate information from extension, to mention a few.

Land access remains a major factor in urban production systems. The uncertainty of rights is an obstacle for long-term farming strategies. Land is becoming largely expensive and unavailable, leaving it to the rich who use it for capital development and not agriculture.

Based on these findings, there is need to use intensification methods where more is produced from less land. Extension personnel will then play a role in providing the urban farmers with the required technical assistance.

The city authorities should also designate areas for crop cultivation. In this case, farmers should be given permanent ownership to avoid harassment by the government. This will make room for urban farming to be properly legislated to maximize its potentials.

## Conflict of Interests

The authors have not declared any conflict of interests.

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