

CONTRIBUTIONS OF URBAN AGRICULTURE TO FOOD SECURITY IN ENUGU STATE, NIGERIA

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ABSTRACT

This study explored the contributions of urban agriculture to food security in Enugu urban of Enugu state, Nigeria. The specific objectives of the study were: to describe the socio-economic characteristics of the farmers, identify the types of agricultural activities going on in the area, describe the household income, expenditure and food share of expenditure of the farmers. The study also described the dietary diversity of the farmers and identified the constraints to urban farming. A sample of 60 urban farmers was randomly selected from 9 different communities in the study area. Data were analyzed using descriptive statistics like percentages, mean, Likert type rating scale and dietary diversity score. The results showed that the respondents earned the mean income of ₦5,280,000 per annum, and greater proportions (53.3%) of the respondents were educated up to tertiary level. The respondents were involved in the production of cereals, vegetables, ornamental plants, roots and tubers, and livestock farming. The respondents' spent about 24% of their income on food purchase. They also got more than 50% share of their food from their farms. Greater proportion of the respondents (48.3%) had high dietary diversity score of more than 10 food groups within 24 hours, which showed that they were food and nutrition secure. The major constraints to urban farming were lack of capital, lack of access to land, high production cost and transportation. Based on the findings the following recommendations were made that urban authorities and governments should protect and improve presently usable lands

so that the urban dwellers can use it for farming. Also the urban dwellers should be encouraged to have small portions of farm land to cultivate seeing that urban farming greatly improved the food and nutrition security status of the people through the food it supplied.

INTRODUCTION

The past half century has seen a massive movement of population from rural to urban in most developing countries (International Development Research Center, 1993). Urbanization is increasing worldwide, but particularly in developing countries which had an annual urban growth of 3.6 percent between 1950 and 2005, against only 1.4 percent in industrialized countries (Mougeot, 2005). Until later half of the 20th century, the developing world was predominantly rural. At the mid part of the 1900s, fewer than 20 percent of people in developing countries lived in cities and towns, but by the turn of the millennia that percentage had more than doubled (Mougeot, 2005). The US National Research Council estimates that by 2030, more people will be living in urban areas (4.1 billion) than in rural areas (3.1 billion) in middle and low income countries (Mougeot, 2005). Between 2016 and 2030, nearly all population growth will be in the cities of developing countries where some cities will be growing two or three times faster than the countries overall population. This development will amount to adding one million residents every week to a city (United Nations –Habitat, 2004).

The ever growing cities, their consequent population increase and infrastructural developments together with inherent activities in the urban area have led to the conversion of marginal lands into what has been described as urban -rural fringe or urban-rural continuum. This has reduced the land for cultivation through excessive fragmentation of land and the conversion of agricultural land into non-farm activities. This problem of the rural- urban fringe places a serious limitation on agricultural productivity. The periphery or urban buffers usually green areas of grasses and tree

providing a more natural environment than much of the intensively farmed land surrounding them, whereas in some areas, they are used for cultivation of fruits and vegetables (Hammond, 2002; Ryan, 2003; Brush, 2000; Sullivan et.al, 2004). Thus, the peripheries that serves as buffer area for cultivation of crops and also recreation and moderating urban climate.

One predictable outcome of this massive population shift is urban poverty. Many of the migrants reach the cities with no resources, bringing with them only what they can carry (Mougeot, 2000). Employment is generally hard to find and most of the urban poor live in slums and squatter settlements, without adequate clean water sanitations or healthcare (Mougeout2000). The global level of urban poverty currently estimated at 30 percent was predicted to grow by 50 percent at 2020, with nearly this entire growth taking place in the world's less developed countries (UN-HABITAT, 2004). With the ever increasing urban population and urban poverty, then, there is the question of food for the urban poor. Food has become what can only be termed “basic luxury” (Mougeot, 2000). Food security, regardless of location, depends on food availability and households' ability to access food which also depends largely on income as well as food prices. Households can also acquire food through production or transfers.

According to Cohen (2010), food looms large in the budgets of low-income urban households. A study of 20 low- and middle-income countries found that the food share of extremely poor urban households' expenditure ranged from 48 per cent in Guatemala to 74 per cent in Tajikistan; in 18 of the countries, the proportion exceeded half (Ahmed et al., 2007). In contrast, poor US city residents' expenditure on food is around 12 per cent. Food Purchases dominate in Ghana urban dependence on purchases is 92 per cent and in Egypt it is 95 per cent. Residents of Lima, Peru purchase 91 per cent and other

urban Peruvians 88 per cent. Globally, more than 97 per cent of poor urban households are net food purchasers. In Guatemala, this rises to 98 per cent; in Malawi to 99percent and 100percent in Vietnam (Garret, 2002).

A regular supply of homegrown foods can make considerable difference to the lives of the urban poor (IDRC, 2006). It not only contributes to improved nutritional health but also may free up some of a family's cash income for non-food expenses such as education and also improve food security in the nation

The very close connection in space that Urban Agriculture entertains with the ecology and economy of cities makes this very distinct from but complementary to rural agriculture. (Mougout,2000). Urban agriculture is typically opportunistic. Its practitioners have evolved and adapted diverse knowledge and know-how to select and locate, farm, process and market all manner of plants, trees and livestock. What these farmers have achieved in the very heart of major cities and dare to pursue despite minimal support, and often in the face of official opposition is a tribute to human infirmity (Mougeot, 2000). A survey report by the United Nations Development Program (UNDP) identified over 40 urban farming systems, ranging from horticulture to aquaculture, kitchen gardens to market gardens and including livestock as varied as cattle, chicken, snails and silkworms (Mougeout, 2000).

Food supply crisis in the developing world can come about as a result of a number of factors: political instability, climate change, market globalization and also distance from the food source, whatever the cause, a crisis in food supply tends to affect poor urban dwellers more than those in rural areas and women and children are particularly vulnerable when food is in short supply. Nigeria faces huge food security challenges as about 70 percent of the populations live on less than 100 naira (US\$ 0.70) per day, suffering hunger and poverty (Akinsami, 2005).

Cohen (2010) and Ruel (2003) in their work on environment and urban agriculture pointed out that urban farmers produce much of Accra's fresh vegetables but

wealthier people are the main customers (Ruel, 2003). Urban and peri-urban agriculture has other benefits, including low costs, with sales near the point of production as producers are responsive to market demand. Urban farming systems recycle liquid and solid wastes, but without appropriate practices or infrastructure this advantage may lead to soil and water pollution and compromised food safety (Redwood, 2009). Urban agriculture tends to be part of the unregulated, unmonitored informal economy, and there is little hard evidence on its economic value.

Ravallion (2007) estimated that about one-quarter of the developing world's poor live in urban areas, but also that poverty is becoming more urban and that the poor are urbanizing faster than the population as a whole. In the past two decades, some enlightened municipalities have recognized the value of urban food self-reliance and began to work with "urban farmers" rather than against them. Today Urban Agriculture is increasingly on the international agenda of every country, known as the part of comprehensive solution to the problem of food insecurity and runaway growth of cities in developing countries (IDRC, 2006).

Mougeot (2001) developed the most widely used definition of urban agriculture. Using technical criteria of urban agriculture (UA), he explained that, 'urban agriculture is an industry located within (intra urban) or on the fringe (peri-urban) of a town, a city or a 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. Urban agriculture (UA) has become a contemporary issue, gaining prominence especially in developing economies because it has been discovered to be a viable poverty intervention strategy for the urban poor (Salau & Attah, 2010).

The presence and potentials of UA in Nigeria especially in the big cities is not in doubt. However, researchers, policy makers and government have deliberately neglected this veritable sector and have failed to acknowledge it and channel attention to it (Salau & Attah, 2010).

Mougeot (2000) in his work on urban agriculture for sustainable agriculture pointed out some progressive work and outcome in this area which government ought to give urgent attention. One of these areas is food security and the need to support urban farming. A work by Aroh (2014) on metropolitan Agriculture in Enugu state Nigeria showed that there are agricultural activities going on in the urban and cities of Nigeria, but did not show its contribution to food security in the state. The study by Salau and Attah (2010) in Nasarawa state of Nigeria on the socio-economic analysis of urban agriculture has revealed that the major benefits derived from urban farming were household food supply, income and full time employment opportunity. They reported that urban farming contributed about 74% of the total annual income of the respondents showing that farming was the major means of livelihood of the respondents. Most research, however, lacks empirical evidence and few studies have generated reliable facts about the scale and impact of UA. Consequently, this study addressed the following research questions: What are the socio-economic characteristics of urban farmers in Enugu state? What type of crops and animals are produced in urban areas? What are the contributions of urban farming to household food security? What is the food expenditure share of the households, and what constraints are the urban farmers facing in carrying out there farming activities?

METHOD

The study was carried out in Enugu. Enugu is the capital of Enugu State in Nigeria. It is located in south east geopolitical zone of Nigeria, and lies between latitudes 5⁰55" N and 7⁰08"N of equator and longitudes 6⁰55"E and 7⁰08"E of the Greenwich meridian. The city has a population of about 722,664 (National Population Commission, 2006). The state is located in a tropical rain forest zone with a derived savannah climate that favours farming (Sanni, 2007). Enugu's climate is humid and its humidity is at its highest between March and November (Reifsnnyder, Williams & Darnhoferil, 1989). For the whole of Enugu state, the mean daily temperature is about 26.7⁰ C (80.1⁰F) (Reifsnnyder, Williams & Darnhoferil, 1989). As in the rest of West Africa, the rainy season and dry season are the only weather periods that occurs in Enugu (Sanni, 2007). The average annual rainfall in Enugu is around 2,000 millimeters (79 in), which arrives intermittently and becomes very heavy during the rainy season which is normally between April and October (Egboka, 1985). Other weather conditions affecting the city include Harmattan, a dusty trade wind lasting for a few weeks between December and January (Udo, 1989).

Enugu people produce many crops and animals, and quite a number of crops can do well in the area, such as vegetables, aromatic plants, fruit trees, banana, plantain, yam, cassava and maize and some tree crops like oil palm, mango, guava and orange. Live stock produced in Enugu includes chicken, guinea fowl and turkey and fishery.

SAMPLING PROCEDURES

The study area, Enugu city, consists of three local government areas: Enugu East, Enugu North and Enugu South. A multistage sampling technique was used in selecting the sample for the study. Farmers who reside in Enugu urban area were purposively drawn for the study. With list of urban farmer collected from the ENADP sixty farmers were randomly selected and interviewed from the three different Local Government

Areas in this order. The first stage involves the selection of six communities from the study area. An average of six communities can be found in each of the three Local governments that make up Enugu City. Two communities were randomly selected from each of the three Local governments. In all, six different communities were selected for the study. The second stage involved the selection of the respondent. Ten farmers were selected from each of the six communities using systematic random technique. This gave a total of sixty farmers that were interviewed for the study.

Primary data were collected for the study. A semi-structured questionnaire that was validated by experts in the Department of Agricultural Economics, University of Nigeria was used in collecting data on farmers' socioeconomic characteristics, farm activities, food production, food consumption, income status, expenditure and dietary diversity. The data was collected for the research with the help of two trained field workers. The data collection lasted for two weeks between (30th of May to 11th of June, 2016).

Descriptive statistics such as averages, percentages, Likert type rating scale and frequency distribution were used to analyze the data collected and answer the research questions posed in this study. Also, question on dietary diversity score was analyzed using method of calculating dietary diversity score found in Kennedy, Ballard, and Dop(2011).

RESULTS AND DISUSSION

The socio-economic characteristics of the farmers are considered very necessary in their decision making. The socio-economic variables considered in this study were the location of the household, gender of the farmer, age, marital status, religion, educational qualification, years spent in formal education, household size, total farm size, belonging to social organization, number of years of farming experience, primary occupation, and secondary occupation.

Table 1: Distribution of respondents according to socio-economic characteristics

Socio-economic characteristic(N=60)	Frequency	Percentage	Minimum	Maximum	Mean	deviation
Gender of respondent						
Female	36	60				
	24	40				
Age of respondent(years)						
<20	2	3.4				
21-40	22	36.7				
41-60	26	43.3				
>60	10	16.6	14		45.48	
Marital status						
Married	47	78.3				
Single	9	15.0				
Widowed	4	6.7				
Educational status						
No formal education	3	5.0				
Primary	7	11.7				
Secondary	18	30.0				
Tertiary	32	53.3				
Years spent in formal education						
No formal education	3	5.0				
1-10	11	18.3				
11-20	42	70				
>20	4	6.7	5		13.96	
Household size						
1-4	20	33.3				
5-8	36	60				
>8	4	6.7	1			
Total farm size(plot)						
< 1	19	31.7				
1-5	31	51.7				
>5	10	16.6	0.4			
Those that belong to farm club or cooperatives						
Yes	21	35				
No	39	65				
Farming experience(years)						
1-10	29	48.4				
11-20	17	28.4				
>21	24	23.2	1			
Primary occupation						
Farming	31	51.7				

Trading	10	16.7
Artisan	3	5.0
Civil service	13	21.7
Others (retired)	3	5.0
Secondary occupation		
Farming	43	71.7
Trading	12	20.0
artisan work	1	1.7
civil service	3	5.0
Others (retired)	1	1.7

Source: field survey, May 2016

Gender is an important factor in determining economic roles in many socio economic settings. The result showed that 60% of the farmers were males, while 40% were females. This might be attributed to the fact that the males might have more access to productive resources such as land and capital (Aroh, 2014).

Age has a great influence on people's decision on certain woks. In most cases people do hard jobs when they are full of life and strength (Aroh, 2014). From the result presented in table 1, the mean age of the respondents was 45.48years, while the minimum age was 14years, the maximum age was 68 years. The mean of the respondents (45.48years) is an indication that urban farming was for those at the middle age which are full of strength for farming activity.

About 78% of the respondent were married, 15% were single, while 6.7% were widowed. This may imply that most people that go into urban agriculture are married. This may be due to the availability of family labour needed for the farming activities, and also the huge capital needed for the farming which most singles may not have, hence, its only few singles that were into urban farming (Asiegbu & ikeorgu, 1999).

About 12% of the respondents had primary school education as their highest level of education, and 53.3% attended up to tertiary education. Very few of respondents had no

formal education (5%). When the number of years of formal education was explored, the result showed that about 40% of the respondents spent between 5 and 12 years in formal education, while 55.2% of the respondents spent more than 12 years in formal education. The mean years of education of the respondents was about 14, which shows that the majority of the respondents spent 14 years in formal education. These results indicate that most of the respondents were educated. This might be as a result of the area being an urban place.

Household size is said to be the number of people living under the same roof and eating from the same pot, it includes the head of the house, wives, children, house helper and other relatives living in the same house (Federal office of statistics 1998). Result presented in table 1, showed that 33.3% of the respondent had household size of 1-4 people, those having household size of 5-8 and 9-12 persons were 60% and 6.7% respectively. This shows that the majority of the households had a household size of 5-8 persons. The mean household size of the respondents was about 5 persons, which shows that majority of the household had an average of 5 persons in the house. Having up to five persons in a household might help to supply the family labour needed for urban Agriculture.

The result in table 1 showed that 31.7% of the respondent had less than one plot of farmland. However, 16.6% of the respondent had above 5 plots of farm land. This implies that urban agriculture in this area is constrained by land, which may be as a result of the competing needs of land especially in the urban areas. The mean plot of land owned by the farmers was 2 plots which showed that the majority of the respondents had an average of 2 plots of lands. This work is consonant with Egbuna (2008) identified that land is a major constraint to urban agriculture both in terms of access and tenure security.

Belonging to farm associations is an important social asset which should be given attention to by urban farmers as this could help them to request for lands as a team and even access credit facilities to improve their production. The result in table 1 showed that 65% of the farmers were not part of any farmers' association, while 35% were into one farmers' organization or the other. This may imply that urban farmers did not see farmers' associations as an important coalition that can help them further their production. According to Egbuna (2008) lack of organization among urban farmers has being a major issue. Though they have an 'official' association, they have not been able to organize themselves in such a way as to attract official recognition in order to benefit from some government and corporate incentives such as credit and other financial assistance as well as input subsidies.

The study showed that 48% of the farmers had between 1 and 10 years of farming experience, and 23% had been involved in farming for more than 21 years. The maximum years of farming experience was 15 years, while the minimum was 1 year. The mean farming experience of the respondents was 13.5 years which showed that most of the respondents had spent at least 13.5 years in farming. This goes a long way to show that most of the urban farmers are not amateurs but experts in urban farming, and also it indicates that urban farming is not a recent business, it has been there just that most people have failed to recognize this and the roles it plays in our economy at large.

Greater proportion (51.7%) of the respondent engaged in farming as their major occupation, 16.7% were involved in trading, 5% were artisans, 21.7% were civil servants while the least proportion (5%) were retired. This means that most of the respondents were primarily farmers and civil servants. In line with Salau and Attah

(2010), the study revealed that one of the major benefits derived from urban farming is full time employment opportunity.

The result presented in table 1 shows that 71.7% of the respondent had farming as their secondary occupation, 20% were involved in trading, 5% were civil servants, 1.7% were into artisan work, while the remaining 1.7% were retired civil servants. In line with the Aroh (2014), most of the residents of Enugu metropolis were government workers hence engaged in farming as a secondary occupation.

Agricultural activities in the urban areas

Different agricultural activities going on at the urban areas of Enugu were assessed and the results are presented in figure1 and table 2.

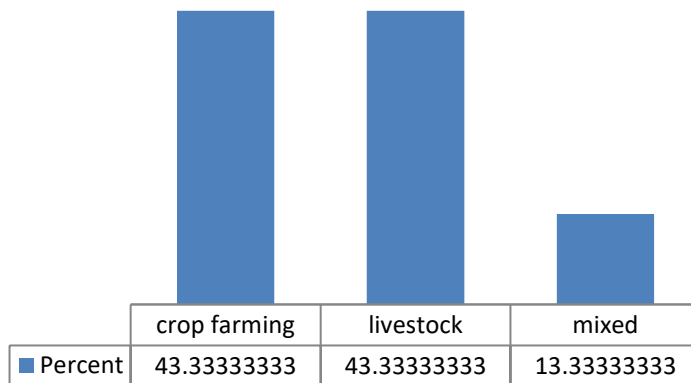


Figure 1: Types of farm practice of the respondents

The results presented in figure 1 showed that 43.3% of the respondents engaged in crop farming, likewise 43.3% of the respondents were involved in livestock farming, and a few (13.3%) engaged in mixed farming. This result showed that most of the respondents were producing either crops or animals, which may favour commercialization.

Table 2: Distribution of respondents according to agricultural activity

Variables (N=60)	Frequency	Percentage	Minimum	Maximum	Mean	STD
Livestock						
Poultry						
1-10,000	16	26.7	10	20,000	2553.44	
10,001-20,000	2	3.3				
>20,000	0	0				
Non livestock farmers	26	43.3				

Fish						
1-10,000	8	13.3	4	200,000	28203.11	
10,001-20,000	0	0				
>20,000	1	1.7				
Non livestock farmers	26	43.3				
Cattle						
1-10	1	1.7				
>10	2	3.3	10	30	21.67	
Non livestock farmers	26	43.3				
Pig						
1-10	0	0	20	50	31	
>10	4	6.7				
Non livestock farmers	26	43.3				
Breed of animal						
Exotic	19	31.7				
Local	15	25.0				
Non livestock farmers	26	43.3				
Crop farms						
Crop farm size(plots)						
< 1	8	13.3	0.4	15	1.88	3.47
1-5	24	40.1				
>5	2	3.3				
Non crop farmers	26	43.3				
Crop type						
Edible Vegetables	18	30				
Ornamental	16	26.7				
crops(aesthetic)						
Food tree crops	2	3.3				
Cereals	21	35				
Others (cassava, potatoes and yams)	10	16.7				
Livestock type						
Poultry	18	30.0				
Fish	9	15.0				
Cattle	3	5.0				
Pig	4	6.7				
Total	34	56.7				
Non livestock farmers	26	43.3				
FarmDistance(KM)						
Stays on the farm	15	25.0	0.5	90	19.11	18.15
<1	5	8.3				
1-10	12	20.0				
10-20	11	18.4				
>20	17	28.3				

Source: field survey, 2016

The results presented in table 2 show that a lot of farming activities are going on in the urban areas and it's also in line with the work of Foeken (2006) and Aroh (2014) which

pointed out that there are lots of crop and livestock farming going on in the urban areas. Greater proportion of respondents that kept poultry had a mean of 2553 birds, and a maximum of 20,000 birds. Those that kept fish had a mean of 28203 fish and maximum of 200,000 fish. Those that reared cattle had the mean of 21 and maximum of 30 cattle. The mean number of pigs kept by the farmers was 31 pigs with a maximum of 50 pigs.

The result showed that most of the livestock farmers kept exotic breeds (31.7%). Twenty-five percent of the farmers kept local breeds, while the rest of them keep both the local and hybrid. This result can be attributed to the location of the farms in urban areas where they have better access to these improved breeds. Rearing of exotic breed is an advantage to them as the livestock can get to marketable size on time.

The results on the type of crops grown (see table 2), showed that 30% of the respondents cultivated edible vegetables like fluted pumpkin (*Telferia occidentalis*), green (*Amarantus spp*), and fluted pumpkin. About 26.7% were into ornamental crops like carpet grass, palm flowers and garden flowers, 3.3% were involved in food tree crops like avocado pear nursery, orange plants, and guava plants, 35% were involved in cultivation of cereals like maize, and 16.7% cultivated other crops which include tuber crops like cassava, potatoes and yams. This result showed that a lot of crop varieties can be grown in the urban areas. This is also in line with the work of Hovorka, Zeeuw and Njenga (2009) that numerated the farming activities going on in the urban areas include cultivation of cereals, vegetables and tuber groups and livestock farming.

About 30% of the respondents were into poultry production, 15% were involved in fishery, 5% were into ruminant production such as cattle, sheep, goats and 6.7% kept other livestock types like pigs and rabbits. This confirms olima (2001) observation that varieties of livestock can be reared in the urban areas.

The result on the distance of farm from home showed that most of the farmers travel a distance of more than 20Km to their farms (28.3%). This is followed by those whose farms are within their compounds (25%), while the rest of the farmers travel 1-10Km (20%) and 11-20Km (18.4%) respectively.

Household Income and food share expenditure of the respondents

Data on income, expenditure and food expenditure share were analyzed to know the actual food expenditure pattern of the respondents. This will help in knowing if urban farming helps in offsetting some of the household food expenses.

Table 3: Distribution of the respondents according to income, expenditure and food share from farm

Food indicator(N=60)	share	Percentage	minimum	Maximum	Mean	STD
Household income/year(₦)			48,000	240,00000	5,280000	196,500,000
<1,000000		58.3		0		
1,000000-5,000000		30.0				
5,000000-10,000000		5				
>10,000000		6.7				
Income from crop farm(₦)			96,000	240,00000	1,020,00	47,890,000
<1,000000		35		0	0	
1,000000-5000000		5				
5,000000-10,000000		0				
>10,000000		1.7				
Non crop farmers		58.3				
Income from livestock farm(₦)			48,000	140,00000	8,950,00	28,800,000
<1,000000		35.0		0	0	
1,000000-5,000000		5.0				
5,000000-10,000000		0				
>10,000000		5.0				
Non livestock farmers		55				
Income from mixed farms(₦)			1,300,000	180,000	690,000	382375.45
<1,000000		10				
>1,000000		1.7				
Non mixed farms		88.3				
Farm income share of household income (%)						

<20	13.3				
20-40	18.4				
41-60	15				
61-80	15				
81-100	38.3				
Household expenditure(₦)		9,500,000	38,000	858,000	1328000.36
<1,000000	78.3				
1,000000-5,000000	20				
>5,000000	1.7				
Share of household expenditure from income (%)					
≤20	0				
21-40	20				
41-60	51.7				
61-80	28.3				
81-100	0				

Source: field survey, 2016

Note: \$1 = ₦360

The results in table 3 showed that greater proportion of the respondents (58.3%) earns an annual income of less than ₦1, 000000, followed by those that earn between ₦ 1, 000000 and ₦ 5,000000. The mean income of the respondents was ₦ 5,280,000; the maximum income recorded was ₦ 240, 000000, while the minimum was ₦48,000. This confirms the popular saying that urban dwellers are high income earners. Also the work by Olima (2001) in Kenya revealed that urban agriculture can be practiced by people of all income level as against the work of Asiegbu and Ikeorgu (1999), who said that urban agriculture is only practiced by the urban poor. Salau and Attah (2010), reported that urban farming contributed about 74% of the total annual income of the respondents, showing that farming was the major means of livelihood of the respondents

The result on crop farm income shows that greater proportion of the crop farmers (35%) earn below ₦ 1, 000000 annually from their crop enterprise. The mean income from crop was ₦ 1, 020, 000, which shows that the respondents earn an average income of ₦ 1,020,000 from crop in a year. The maximum and minimum incomes from crop were ₦ 240,000000 and ₦96,000 respectively. According to Alberto (2008), Urban Agriculture

can in principle have a positive impact on the food security situation of the households that engage in this activity through two main avenues: the income it generates, and the direct access to the food which it produces.

The result on income from livestock farms shows that greater proportion of the livestock farmers (35.0%), earns below ₦1, 000000 annually from their livestock enterprise. The mean income from livestock was ₦8, 950, 000, which shows that the respondents earn an average income of at least ₦8,950,000 from livestock in a year. The maximum and minimum incomes from livestock are ₦140, 000000 and ₦48,000 respectively.

The result also shows that the respondents that keep both crop and livestock also had a mean, maximum and minimum income of ₦ 690,000, ₦1,300,000, ₦180,000 respectively. Comparing the results, it's shown that livestock enterprise earned more return as its income was the largest, also that mixed enterprises had less income; this could be as a result of delving into many things with limited resources.

Table 4: Distribution of the respondents according to their expenditure and food share from farm

Food expenditure(₦)					
<500,000	76.7	240,000000	96,000	379,000	376417.70
500,000-1,000000	18.3				
>1,000000	5				
Share of food expenditure from income (%)					
≤20	43.3				
21-40	48.4				
41-60	8.3				
61-80	0				
81-100	0				
Source of labour					
Personal	15.0				
Family	28.3				
hired labour	56.7				
Share of farm produce sold (%)					
None	11.7				
20-50	10				
>50	78.3				
Main source of food					
Purchase	80.0				
own production	20.0				

Own production share of food consumed

<50	43.3
50	3.3
>50	11.7
100	11.7
None	30.0

Source: field survey, 2016

Note: \$1 = ₦360

When the household expenditure of the respondent was explored, the result showed that greater proportion of the respondents spend less than ₦1,000,000 yearly, while 20% spend between ₦ 1,000,000 and ₦ 5,000,000 yearly. The mean household expenditure was ₦858,000, and the maximum and minimum household expenditures were ₦ 9,500,000 and ₦38,000 respectively. Their expenditure when compared with the average annual expenditure of households in Nigeria (₦ 399.6 billion) (NBS, 2013), we can see that these households spent far less (₦858,000) than an average Nigerian. This may be due to their eating from their produce.

The result on food expenditure, presented in table 4, showed that most of the respondents (76.7%) spend less than ₦ 500,000 on their food, while very few (5%) of the respondents spend more than ₦ 1,000,000 annually. The mean expenditure on food was ₦379,000, while the maximum and minimum food expenditure was ₦2,400,000 and ₦96,000. Considering the expenditure share of the household income i.e. the percentage of income spent by the household, the result showed that greater proportion of the respondents (51.7%) spent between 41-60% of their incomes on the household expenditure, while few (20%) spent 21-40% of their income on household expenditure. Greater proportion of the respondents (48.4%) spent between 21-40% of their income on food while very few (8.3%) spent between 41-60% of their income on food. The mean household expenditure and food expenditure from income are 45% and 24% respectively. This shows that most of the respondents spend less on food as most of them have enough food from their farms.

The result on labour used showed that the major source of labour used for the farming were hired labour as reported by 56.7% of the respondents. Family labour constituted 28.3% of the labour used in the farm. This might be as a result of the busy schedules of the farm owners who engage in other job, and also the large number of livestock that needs to be cared for, hence the need for hired labour.

Exploring the proportion of farm produce sold by the farmers in the study, the result showed that majority (78.3%) of the respondents sell more than 50% of their produce, while few (11.7%) consume all their produce. This might be why some of them realize large amount as returns at the end of the year. This also shows that most of them engage in this activity for the purpose of getting income and not food, and so are commercial farmers as oppose to subsistence as is usually reported about Nigerian farmers.

When the main source of food was explored the results showed that majority of the respondents' source their food through purchase (80%). This can also be as a result of them engaging in the farming activity which may constitute very few crops/ animal types for the purpose of income and not food; hence most of them purchase their food.

Share of food from the farm

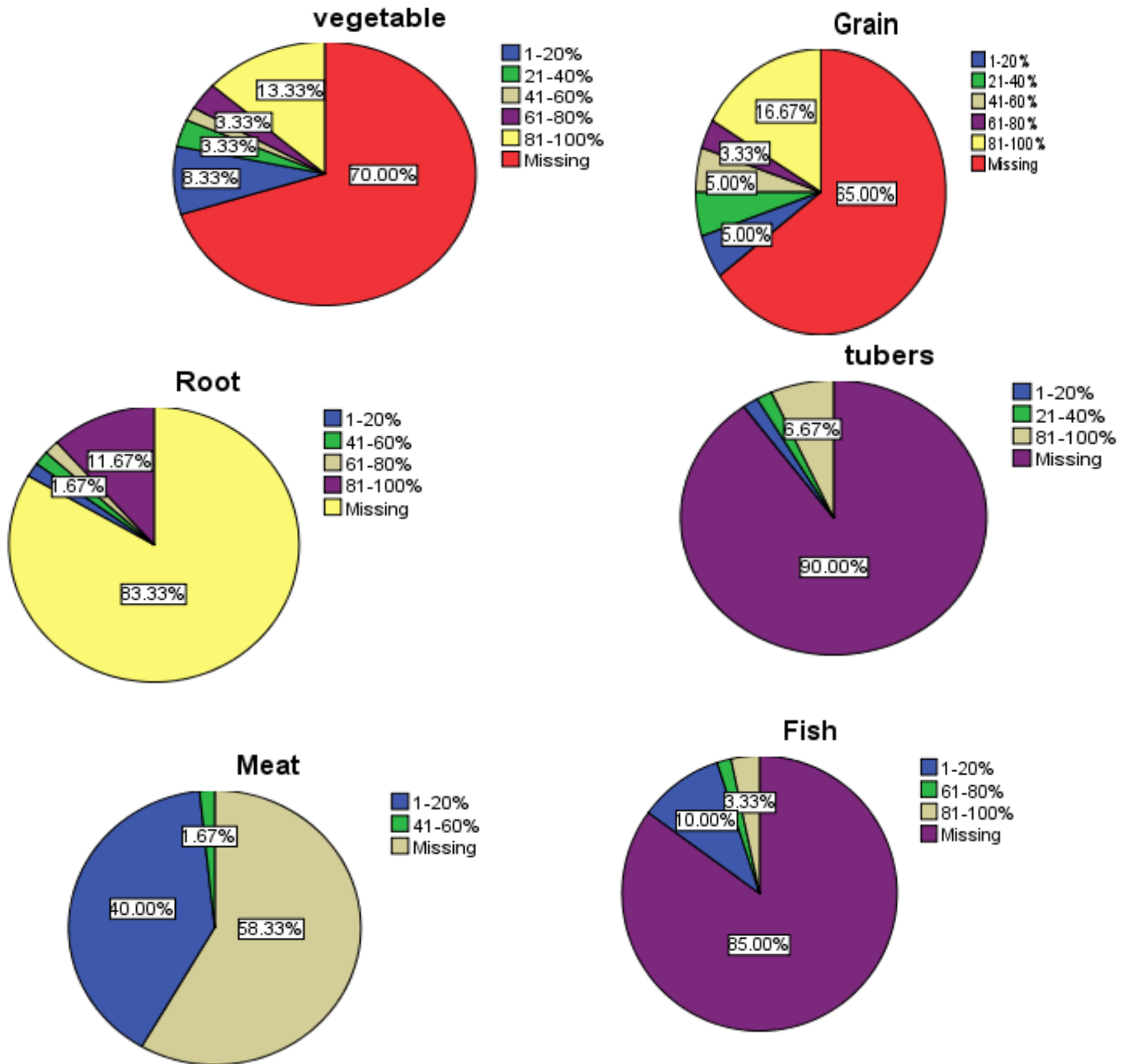


Figure 2: respondents share of food from the farm

For households that grow grains, the greater proportion of the respondents (16.67%) has up to 81-100% of their food share of grain from their farm. About 3.3% had 61-80% food share of grain from the farm. Also for those producing vegetable the greater

proportion of the respondents (13.3%) had 81-100% share of vegetable from the farm. This result is repeated in all the different food crops which the respondents get up to 81-100% of their food share from their farms except in meat and fish enterprise which had only 21-40%.

Dietary diversity score of the respondents

Dietary diversity score was used to assessed the food security status of the respondents and their nutritional adequacy. The dietary diversity score was divided into three classes- high, medium and low dietary diversity score based on the number of food groups consumed (table 5). Those with high Dietary diversity (>10) were considered food secured, based on the ranking. Based on the ranking we have the following food classes: Lowest dietary diversity, Medium dietary diversity, High dietary diversity,

Table 5: Dietary Diversity ranking of the respondents and the most consumed foods of each category

Low dietary diversity (N=13) <8	Medium dietary diversity (N=18) Between 8 and 9	High dietary diversity (N=29) ≥10
Cereals	Cereals	Cereals
Green leafy Vegetable	Green leafy vegetable	Green leafy Vegetable
Oil and fat, red oil	Oil and fat, red oil	Oil and Fat, Red Oil
Milk and milk product	Milk and milk product	Milk and milk product
White tubers and root	White tubers and root	White tubers and root
Spices	Spices	Spices
Condiments	Condiments	Condiments
Beverages	Beverages	Beverages
	Sweets	Sweets
	Fish	Fish
	Vitamin A rich fruits	Vitamin A rich Fruit
		Legumes, nuts and seed
		Eggs
		Meat
Dietary diversity order	rank	Frequency
High dietary diversity		29
Medium dietary diversity		18
		Percentage (%)
		48.3
		30

The result in table 5 and 6 showed that the food groups consumed by most households in Enugu urban were cereals (100%), vegetables (100%), vitamin A rich fruit (13.3%), oil and fats, red oil (100%), milk and milk products (86.7%), spices and condiments and beverages (95%), meat (11.7), fish (91.7%) and tubers (98%). Very few of the respondents consume meat, eggs and sweets, and the rest of the food groups are consumed moderately. This work confirms the work of Ike (2015), that the basic foods and the most consumed food groups in Nigeria are cereals, vegetables, vitamin A rich fruits oil and fats, red oil, white tubers and roots and milk and milk products.

About 48% of the households consume up to 8-9 food groups, while 35% of the respondents consume more than 10 food groups. The mean Dietary diversity score of the respondents was 8.88, meaning that each of the respondents consumes about 8 out of the 15 food groups. The minimum and maximum number of food groups consumed was 5 and 14 respectively. Greater proportion of the households (26.7% & 25%) had consumed 9 and 10 food groups out of the 15 classes of foods with 24 hours, while 3.3% of the households had the least dietary diversity score (5).

Table 6: Distribution of respondents according to food group consumed

Dietary diversity score(N=60)	Frequency	Percentage	Minimum	Maximum	Mean	STD
Food groups						
Cereals	60	100				
White tuber and root	59	98				
Vegetable	60	100				
Vitamin A rich fruit	8	13.3				
Meat	28	46.7				
Egg	7	11.7				
Fish	53	88.3				
Legume Nuts	55	91.7				
Milk and Milk products	52	86.7				
Oil and Fats, Red Oil	60	100				
Sweet	24	40				
Spices Condiments& beverages	57	95				
Sum of the food groups consumed by each						

respondent						
<5	0					
5-7	10	16.7				
8-9	29	48.3	5	14	8.88	1.738
≥10	21	35				
DDS household (N=60)						
1	0	0				
2	0	0				
3	0	0				
4	0	0				
5	2	3.3				
6	4	6.7				
7	4	6.7				
8	13	21.7				
9	16	26.7				
10	15	25				
11	2	3.3				
12	2	3.3				
13	1	1.7				
14	1	1.7	5	14	8.88	1.738

Source: field survey, 2016

The respondents were ranked into 3 categories based on the number of food groups consumed using the mean score. This was to indicate how diversified their diets were. Those that consumed less than 8 were ranked low food security compare to other respondents. Those that consumed between 8 and 9 food groups were ranked medium while those that consumed above 10 foods groups were ranked high. The results based on the ranking shows that 48.3% of the respondents were in high dietary diversity score, while 21.7% were in low dietary diversity score class, and the rest of the respondents had medium dietary diversity score. The result showed that majority of the households had higher dietary diversity score which indicates that they are food secure. In consonant with the work of Ike, (2014&2015), most farming households have high Dietary diversity which can be attributed to the share of food they get from their farms. Also UNDP (1996), revealed that urban farming increases household food supply. Babatunde (2004), also reported that increase in urban farming can lead to more supply of food and hence increase household food security. In line with this work, Alberto and

Luca, (2008), found evidence that engagement in farming in urban areas is associated with greater dietary diversity in 10 out of 15 countries they studied. This result shows that the urban farmers are mostly food and nutrition secure. Drawing from the work of Hoddinott, John and Yohannes (2002), households that consume an average of about 6 foods in 24 hours, which is what DDS captures, show a good food and nutrition security status of the respondent.

Constraints in Urban Agriculture

This section, presents the results on the major constraints faced by urban farmers as the issue of urban farming has not been without its challenges despite the advantages derived from it. This constraint was determined using the Likert type rating scale.

Table 4: Major constraints faced by the respondents

Constraints	Minimum	Maximum	Mean	Std
Lack of capital	1	3	2.65	.685
High cost of equipment	1	3	2.50	.597
High cost of production input	1	3	2.62	.640
High cost of transport	1	3	2.38	.761
Lack of access to land	1	3	2.77	.563
Government policy	1	3	2.45	.699
Lack of market	1	3	1.65	.799
Unpredictable weather	1	3	2.00	.803
Harassment by local/ state govt. tax and environmental authority	1	3	1.77	.722
Theft and high cost of security	1	3	1.85	.732
Lack of organization among urban farmers	1	3	1.47	.724

Source: field survey, 2016

Constraints of each respondent were determined using a 3-point likert scale. The mean score cut-off of respondents based on the 3-point likert scale rating is 2.0. Using the interval scale of 0.05, the upper limit cutoff point is 2.05, while the lower limit is 1.95. Based on the limit, any mean above 2.05 is very serious; those between 2.05 and 1.95 are considered serious while any mean that is below 1.95 will be considered not serious.

The result presented in table 6 showed that lack of access to land and lack of capital were rated by the respondents as very serious constraints with a weighed mean of 2.77 and 2.65 respectively. This indicates that these constraints are very serious constraints to the farmers. Other constraints that were very serious to urban farming include high cost of equipment, transportation and government policies. This is in line with the work of Olima (2001) in Kenya and also the work carried out by Egbuna (2008) in Nigeria whose findings showed that lack of access to land, capital, government policies, transportation constituted very serious challenges to urban farming. Other constraints like theft (1.85), lack of market (1.65), harassment by local/state government tax and environment authority (1.77) and lack of organization among urban farmers (1.4) were rated as not serious constraints showing that there was enough market for the produce of the farmers and the security was not constituting a serious problem in the area. Hence farms in these urban areas had enough market and security.

CONCLUSION

Based on the findings of this study, one can agree that support for urban agriculture could go a long way to expand and enhance agricultural development in our country Nigeria. Also of food insecurity problem will be addressed as urban agriculture will go a long way to supply the needed food and increase food access in the country.

POLICY RECOMMENDATION

From the findings of this research work, the following policy recommendations were made:

Urban agriculture should be encouraged, as this will help reduce food insecurity through the supply of food and reduced food miles which in turn improve access to food.

Government should take it upon herself to release usable lands in the urban areas for agricultural purposes as this is a major constraint to urban farming.

The government should also help in providing subsidies in the form of credit and loans, and also provide some of the farm inputs as this will help to reduce the cost of production.

Urban residents should endeavor to have at least a small portion of backyard garden near their compounds to practice agriculture as this will go a long way in improving their food supply.

Urban farmers should be advised to organize themselves into farm societies as this will help them in accessing credit from the government and this will also help them to improve on their marketing strategies.

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