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Urban Farmers' Adoption of Improved Dry Season Vegetable Production Technologies in in Owerri Municipal Council of Imo State, Nigeria

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Abstract

This study analyzed the adoption of improved vegetable production technologies among urban farmers in Owerri Municipal Council of Imo State, Nigeria. Specifically, the study sought to ascertain the technologies adopted in dry season urban vegetable production, reasons for participation in the production, sources of information to the farmers, constraints to adoption of the technologies, and the socio-economic determinants of adoption of the technologies by the farmers. Data were collected from 125 randomly sampled urban farmers with the aid of semi-structured and validated questionnaire. The data were analyzed using frequency counts, percentages, mean and Ordinary Least Square (OLS) Multiple Regression analysis. The result showed that the production technologies adopted were use of improved crop varieties (69.5%), use of fertilizers (95.6%), irrigation (88.7%), mulching (62.6%) and seed treatment before planting (59.1%). It was also revealed that the reasons for participation in dry season urban vegetable farming included increased access to vegetable for household consumption (Mean = 2.92), income generation (mean = 3.42), and employment creation (Mean = 3.11). The major sources of information on dry season vegetable production were informal interaction with neighbours/friends (35.7%), Extension Agents (EAs)(14.8%), the radio (12.5%)and the television (11.3%). The constraints included land scarcity (88.7%), lack of water for irrigation (70.5%) and poor awareness on dry season farming (50.6%). The socio-economic determinants of participation in dry season urban farming included major occupation, income level, length of time lived in the city, and access to land. The study concluded that dry season vegetable farming in Owerri Municipal was very useful for ensuring households' access to vegetables, increased income generation and alternative means of employment.

Key words: Dry season, vegetable production, Urban, Farmers

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Introduction

In general, technology connotes mechanical, electrical and other such scientific inventions. It is also a way or method or technique of doing, making or producing something. It refers to the systematic application of scientific and other organized knowledge to practical purposes that include new ideas, innovations, inventions, techniques, methods and materials (Asiabaka, 2010). Agricultural technology can be defined specifically as consisting of the nature, system and types of available inputs that are combined to carry out agricultural activities. It may include inputs such as seeds, fertilizers, chemicals, tools, machines, etc and the way in which they are combined to perform agricultural operations. Improved technology in agriculture includes all materials, techniques, practices and innovations used to maximize agricultural production. These may include high yielding varieties of crops, early maturing crops and animals, herbicides, use of synthetic irrigation, good drainage systems, fertilizers, etc).

Farming is commonly associated with the rural areas especially in developing countries like Nigeria. This is so because farming is the dominant livelihood activity of most rural dwellers. However, the growing population of low income households in most cities in Nigeria and the need to feed them have further underscored the importance of this new concept called urban farming. Urban farming is the growing of plants and raising of animals for food and other uses, as well as related activities such as the production and delivery of inputs and the processing and marketing of agricultural products within urban settlements. In most countries, urban farming is often promoted as one of the strategies to reducing food deficits in the cities. It is also a good source of vitamin enriching foods among poor households in most cities in Nigeria and other African countries. Pingali et al (2006) also shared the view that rapid population growth and urbanization in developing countries like Nigeria imply high demand for food and require urgent supply response to prevent widespread famine, especially among low income consumers..

Tansa (1996) observed that poorest households spend up to 90% of their meager income on food. Government and Developmental Agencies have adopted different strategies to eradicate the high spending on food item and the increasing malnutrition of urban poor. Food subsidies, Food Stamps, School Children and Mother Feeding Programmes have been experimented in many nations of the world with very little success. These household food security management strategies operated on top to bottom approach, ignoring the opinions of the intended beneficiaries. And the consequence of such negligence has always been that of a high apathy towards the adoption or participation of the people in those programmes. It was in a bid to bridge this gap, that Drescher (1996) stressed the need for an individual household micro level strategy such as urban farming.

Mean while, it is pertinent to stress that vegetable production is a very important aspect of urban farming. Not only that it yields high return on investment, it also provides quick access to high quality food sources to poor households. Unfortunately, despite all these contributions, urban vegetable production is largely misconceived. This misconception stems from limited information based on urban vegetable production. Most of the claims on urban farming in Nigeria were based on speculations (Von Braun and Immink, 1994). There has not been sufficient study to validate such claims and shed light on the practices

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of urban farming especially as it concerns vegetable and adoption of improved technologies.

Given the above situations therefore, the questions, which this study sets out to answer on urban vegetable farmers in Owerri municipal council, included:

- What are the socio-economic characteristics of urban vegetable farmers in Owerri, Imo State?
- What are the reasons for engaging in urban vegetable production?
- What are the sources of agricultural information to the urban vegetable farmers?
- What are the technologies adopted by urban vegetable farmers in the study area?
- What are the factors influencing the adoption of improved farm technologies by urban vegetable farmers in the area?

The broad objective of this study was to evaluate urban farmers' adoption of improved technologies in dry season vegetable production in Owerri Municipal Council of Imo State, Nigeria. The specific objectives were to:

1. describe the socio-economic characteristics of urban vegetable farmers in the study area.
2. identify sources of agricultural information and the reasons for engaging in urban farmers.
3. determine the technologies adopted by the farmers in the area, and
4. to ascertain the socio-economic determinants of the adoption of available technologies.

Research hypothesis

H_o The socio-economic variables of the farmers are not the determinants of adoption of improved vegetable production technologies in the study area.

Methodology

The area covered in this study was Owerri urban, presently known as Owerri Municipal Council of Imo state, Nigeria. Owerri Municipal is the capital city of Imo State, and houses many infrastructural facilities that are hardly found in the rural areas of the state. The area enjoys two climatic seasons (rainy and dry seasons), and it is located within the humid tropical zone of Nigeria with high amount of rainfall in most parts of the year which ranges from 440cm^3 to 343cm^3. The mean temperature is between 21^{o}c and 28^{o}c with relative humidity of about 98% during the dry season. The predominant soil in this part of the country is deep well drained sandy soil (Onu, 2011).

Owerri Municipal Council has a total land area of 100km square and has an estimated population of about 25,000 people, which gives a population density of 250 persons per square kilometer (Imo State Government, 2008). The area is comprised of 11 council wards, namely: Aladinma 1 & 2, Asuzu 1, 2, 3 & 4, GRA, Ikenegbu 1 & 2, and New Owerri 1 & 2. From the 11 council wards, 5 were randomly sampled, out of which 25 vegetable farmers were selected to give a total of 125 vegetable farmers interviewed for the study. The list of all the vegetable farmers were compiled through the help of the Extension Agents and used as the sampling frame. Data were collected from both primary and secondary sources. The primary data were collected using structured and validated

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questionnaire and interview schedule. Information from previous publications constituted the secondary sources of data.

Simple statistical tools such as frequency counts, percentages, tables and mean were used in analyzing the data collected. Also, the response items were measured using a 4 – point likert type scale of Strongly Agreed (SA= 4), Agreed (A = 3), Disagreed (D = 2), and Strongly Disagreed (SD =1). The midpoint for taking decision was obtained by adding up the values of the scale (i.e. 4+3+2+1 = 10) and divided by the number of scale (i.e. 4) to give a mean value of 2.5. Any mean score that is greater or equal to 2.5 was regarded as agreed while those less than 2.5 were taken as disagreed.

Also, Ordinary Least Square (OLS) regression analysis was used to ascertain the socio-economic determinants of adoption of improved dry season urban vegetable production technologies. For the regression analysis, the four functional forms (linear, semi-log, double-log, and exponential functions) of the OLS were tested and the one that produced the best fit in terms of conformity to a priori expectations, number of significant variables, size and signs of regression co-efficient, and the magnitude of the co-efficient of multiple determination (R^2) was selected as the lead equation and thus, was used for the prediction of the determinants. The model is specified as follows;

$Y = f (X_1, X_2, X_3, X_4, X_5, X_6, X_7, e)$

Where;

Y = index of adoption (percentage of technologies adopted out of the total technologies listed)

X_1 = Sex (male = 1, female = 0)

X_2 = Age (measured in years)

X_3 = Major occupation (Full time urban vegetable farming = 1, part time urban vegetable farming = 0)

X_4 = Household size (the number of persons sharing one roof and feeding with one pot)

X_5 = Years spent in school (years spent in formal school)

X_6 = City farming experience (years spent in city farming)

X_7 = Estimated monthly income (in naira)

e = Error term.

Results and Discussion

Socio-economic characteristics of the farmers

The results in Table 1 indicate that the majority of dry season urban vegetable farmers in Owerri Municipal Council of Imo State were males (52.00%), aged between 41 – 50 years (52.00%), and who engaged in full time vegetable production as their major occupation. The mean age of the farmers was 42.46 years, implying that they were still in their active years, and can easily adopt innovations. Other researchers have also observed that adoption of innovation is inversely related to age. Younger people are more prone to innovation (Nnadi and Amaechi, 2004; Adesope, 2007; Aja et al, 2010; Asiabaka, 2010). Also, the table further reveals that most of the city farmers had a moderate household size of between 1 - 5 persons (58.40%). It was revealed also that most of the farmers had up to secondary education (46.40%), and had spent between 6 – 10 years in urban farming. The estimated monthly income of the majority of the farmers was less than

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N10,000.00. However, their average monthly income was N20,728.00, which implies that majority of those who engaged in urban vegetable production in the study area were poor.

Table 1: Distribution of the respondents according to socio-economic variables

Variables	Percentage	
Sex		
Male	52.00	
Female	48.00	
Total	**100.00**	
Age(yrs)		
21 - 30	9.60	
31 - 40	20.80	
41 - 50	52.00	
51 and above	17.60	Mean = 42.46yrs.
Total	**100.00**	
Major Occupation		
Full time	76.00	
Part time	24.00	
Total	**100.00**	
Household size		
1 – 5	58.40	
6 – 10	33.60	
11 – 15	6.40	
16 and above	1.60	Mean = 5.48
Total	**100.00**	
Years spent in school		
1 – 6	22.40	
7 – 12	46.40	
13 and above	31.20	
Total	**100.00**	
		Mean = 9.25yrs.
City farming experience(yrs)		
1 – 5	30.40	
6- 10	36.80	
11- 15	20.80	
16 and above	12.00	
Total	**100.00**	Mean = 11.42yrs.
Monthly income (N)		
Less than 10,000	32.00	
11,000 – 20,000	26.40	
21,000 – 30,000	16.00	
31,000 – 40,000	20.00	
41, 000 and above	5.60	
Total	**100.00**	Mean = N20,728

Source: Field Survey, 2012

Production technologies adopted by the farmers

Table 2 shows that the technologies adopted by urban vegetable farmers included use of improved varieties of crops (69.5%), seed treatment before planting (59.10%), replacement/supplying (36.50%), irrigation (88.70%), use of fertilizers (95.60%), and maintenance of recommended spacing (33.91%). Others included mulching (62.6%) and staking (81.7%). The result implies that the farmers had a favourable disposition to

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recommended dry season vegetable production technologies available to them. The presence of Agricultural Development Programme (ADP) office in the study area may have been responsible for the high level of technology adoption by the farmers in the area.

Table 2: Distribution of the respondents according to technologies adopted

S/N	Technologies	*Percentages
1.	Use of improved varieties of crops	69.5
2.	Seed treatment before planting	59.1
3.	Replacement/supplying	36.5
4.	Line planting	11.3
5.	Irrigation	88.7
6.	Use of fertilizers	95.6
7.	Maintenance of recommended	33.9
8.	spacing	62.6
9.	Mulching	81.7
10.	Staking	18.3
11.	Drainage	9.6
	Rouging	

Source: Field Survey, 2012 *Multiple response

Sources of agricultural information

The data in Table 3 show that information from neighbours/fellow farmers accounted for the highest means of getting agricultural information with 35.7 percent, followed by extension agents (14.8%). Television accounted for 11.3 percent while research institutes had 9.6 percent. Other sources of information to the farmers included cooperative society (8.7%), and radio (8.7%). From this result, it implies that informal sources of information are still common among farmers in the area. The high rating of television as a source agricultural information may stem from the fact that most urban dwellers enjoy electricity facilities unlike their counterparts in the rural areas.

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Table 3: Distribution of urban vegetable farmers according to sources of agricultural information

Sources	*Percentage
Neighbours/fellow farmers	35.7
Extension agents	14.8
Cooperative society	8.7
Research institute	9.6
Radio	8.7
Television	11.3
News paper/magazine	1.7
News letter	6.1
Internet	1.7

Source: Field survey, 2008.

Reasons for engaging in urban vegetable farming

The results in Table 4 show that the urban vegetable farmers engaged in the enterprise for many reasons, among which include: for household consumption (Mean = 2.92), income generation (Mean = 3.42), and gainful employment (mean = 3.11). Other reasons included land ownership consolidation (Mean = 2.95), to utilize available land areas (3.41), and to utilize opportunity created by nearby markets in the study area (mean = 2. 95). The table further indicate that aesthetic purposes (Mean = 1.91), and production of raw materials (Mean = 1.95) were not important reasons for engaging in urban vegetable production. The findings were in line with other studies (Mohammed and Abdullahi, 2010; Akinlade et al, 2013) which also reported that reasons for urban farming included food access to household, alternative income source and employment generation.

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Table 4: Distribution of the respondents according to their agreement to statement on reasons for engaging in dry season urban vegetable farming

S/N	Reasons	Mean
1.	Access to vegetable for house hold	2.92*
2.	For income generation	3.42*
3.	For employment generation	3.11*
4.	To consolidate land ownership	2.95*
5.	To utilize opportunity created by nearby markets	2.96*
6.	To utilize available land areas	3.41*
7.	To produce raw materials	1.95
8.	To beautify the surroundings	1.91

Source: Field survey, 2012

Socio-economic determinants of adoption of dry season urban vegetable farming

The multiple regression results in Table 5 show that the exponential function of OLS produced the best fit in terms of the number of variables that were statistically significant, the signs and magnitude of the regression coefficients, and the value of coefficient of multiple determination (R^2) . The value of the coefficient of multiple determination (R^2) was found to be 0.7938, which implies that about 79 percent variations in the adoption of urban vegetable production technologies was accounted for by the joint action of the socio-economic variables investigated. The coefficient of years spent in school (t = 3.1728), and income level (t = 2.8261) were significant at 1% probability level. By this result, it means that formal education and income level were important factors influencing the adoption of technologies. This is in line with the findings of Aja et al (2013) and Ifeanyi-Obi (2013). Similarly, the coefficient of age, major occupation, household size, and city farming experience were all significant at 5% probability level, indicating that these variables were among the socio-economic determinants of adoption of the technologies. The F-value was found to be 26.7001 and was significant at 5% probability level. Based on the result, the hypothesis was stated that the socio-economic variables of the farmers were not the determinants of adoption of the urban vegetable production technologies

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was rejected. It was therefore concluded that the socio-economic characteristics of the farmers were the determinants of adoption of the urban vegetable production technologies. This result is supported by the findings of Nnadi and Amaechi (2004), Asiabaka (2010), and Ifeanyi-Obi (2013).

Table 6: Socio-economic determinants of adoption of dry season urban vegetable farming

Explanatory Variables	Linear Function	Semi-log Function	Double-log Function	Exponential Function
Constant	8.3043	12.4414	12.3918	18.1083
X_1	0.5549	2.7814	0.0851	0.0093
X_2	(1.1145)	(0.9875)	(1.0541)	(1.1772)
X_3	4.1893	1.7545	0.1608	- 0.0092
	(1.0736)	(1.1856)	(3.1103)*	(-2.2439)*
X_4	5.6719	1.4914	0.0782	0.0078
X_5	(2.7921)*	(0.8822)	(3.6037)*	(2.5161)*
X_6	7.4163	1.5928	0.0659	0.0087
	(3.5825)*	(1.2982)	(2.7119)*	(3.7826)*
X_7	6.399	2.5814	0.0227	0.0092
R^2	(1.1239)	(1.1827)	(2.7349)*	(3.1728)**
F-value	3.6605	0.8413	0.0689	0.0076
Observation	(1.2218)	(1.0653)	(1.1514)	(2.7143)*
	5.447	1.2281	0.917	0.0065
	(1.0917)	(2.9942)**	(1.0713)	(2.8261)**
	0.4936	0.40231	0.6029	0.7938
	14.1029*	9.5876*	21.5321*	26.7001*
	125	125	125	125

Source: Field Survey, 2012

** = t- ratios significant at 1% probability level
* = t-ratios significant at 5% probability level
Figures in parenthesis are t-ratios

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Conclusion and Recommendations

The study concluded that urban vegetable production was an important livelihood option for low income households in Owerri Municipal Council of Imo State. The farmers were into urban vegetable production for the purposes of producing vegetables for household consumption, income generation, employment, and consolidation of land ownership. The farmers have also adopted most of the recommended vegetable production technologies. To this end therefore, the study recommended that:

1. Urban farming should be encouraged and strengthened through relevant policies by the governments and other agricultural stakeholders. Other institutional support such as credit facilities, subsidized inputs, extension services, etc should be provided to the farmers. This will help to attract more households into the practice of urban farming, and thus help to boost food availability especially to the poor households in the urban areas.
2. The socio-economic variables of the people should be considered when designing technologies aimed at improving urban farming. This will help in enhancing the acceptability of the technologies.

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