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Contribution of Urban Agriculture to Household Income and Poverty Alleviation in South West Nigeria: a Multidimensional Approach

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A b s t r a c t

With the recent rise in the poverty status in the country and increase in the population of urban dwellers living in poverty despite different government intervention programmes, this study thus sets out to examine the contribution of urban agriculture to household income and how it helps to alleviate poverty among urban households. A multi-stage sampling technique was adopted in the selection of 209 respondents. Data were obtained on their socio-economic characteristics, type of urban agriculture engaged in and the returns from such activities, the contribution of returns from urban agriculture to total household income, household asset base, house ownership and housing condition among others. The data obtained were analyzed using descriptive statistics, budgetary analysis, fussy set and Ordinary Regression Analysis. The result of the analysis indicates that the mean age, household size, years of formal education and experience in agriculture is 43.18±13.07 years, 5.34±2.94, 14.98±2.03 and 6.01±3.24 respectively. The result of the socio-economic characteristics of the respondents further shows that majority (60.1%) of the respondents are married and are members of social organization (59.8%). The mean profit from vegetable production is 370 per Kg while the mean profit from poultry production is 679.99 per kg of bird. The result of the analysis further shows that profit realized from urban agricultural activity contributes 13.7% to 100% with an average 46.9% to total household income. The result of the poverty analysis reveals that 39.7% of the households are poor. Further decomposition of the poverty status of households based on their agricultural activities reveals that households that are into livestock rearing have the majority (69.3%) of their respondents belonging to the non-poor group while the majority of those that are into vegetable production are living in poverty. The study, therefore, established that urban agriculture contributes to household income and invariably enhance welfare status of urban households by alleviating poverty among them. Urban households should, therefore, be synthesized to take up agriculture as a livelihood strategy. In addition, government and other stakeholders should find a means of enhancing the value of the output of crops especially vegetables so as to encourage urban households to go into its cultivation so as to increase its contribution to total income in urban centers.

Keywords: *Fuzzy set, Poverty, Urban*

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Background to the Study

Nigeria is enormously endowed with agricultural resources, but rather than record remarkable progress in national socio-economic development, Nigeria is still sitting twentieth among the world's poorest countries. The situational analysis of poverty profile in Nigeria shows that about 70 percent of Nigerians live below the poverty line as they are living below the accepted socio-economic profile. Despite persistent economic growth around the world, food insecurity, unemployment, and poverty remain pressing problems in many parts of Africa (UN Habitat, 2006; Mougeot, 2005), especially in and around the major urban centre's.

In an era of increasing urbanization, rising food prices, and with the impacts of climate change looming large, the health and quality of life of the world's urban poor are under severe threat (Baker 2008). According to Ravallion, Chen, and Sangraula (2007), one-quarter of the world's poor now live in urban areas and this proportion has been increasing over time. They further reported that between 1993 and 2002, the number of people living in absolute poverty fell by 150 million in rural areas but increased by 50 million in urban areas; nearly one billion urban residents in the cities of the developing world are poor and the next decade will witness an increased number of these urban poor if this current trend continues. This indicates that more poor people are now in urban areas than ever before. This incidence of increased poverty in urban areas is known as the Urbanization of Poverty (Mehta, 2000).

The high rate of urbanization, weakened purchasing power, high incidence of poverty, retrenchments in public and private sector and high unemployment rate have curtailed the capacity of both the urban poor and middle class to purchase all the food they need. However, increased urbanization of poverty is due to the fact that migration of people from rural areas to urban areas, which is very rampant in developing countries like in Africa, is continuous and increasing even when these urban areas, due to slow economic growth, have little or no social and economic opportunities to offer. Nigeria, for example, amidst her high revenue made from oil, still has poor infrastructures especially in the educational and health sector, epileptic power supply, lack of job opportunities, high costs of food and many more, even in the urban areas, and therefore, cannot always absorb all the additional people coming into the cities. Despite these, people are still migrating from the rural areas to urban areas.

New research on alleviating poverty in cities of the developing world points to the potentially important role that might be played by urban agriculture in alleviating the pressures of urban poverty (UNDP, 1996; Rogerson, 1997; and Mougeot, 1998). In recent times, urban agriculture seems to have gained importance especially in developing economies basically because it has been discovered to be a viable intervention strategy for the urban poor to earn extra income and therefore reduces their reliance on cash income for food by growing their own food. Most of the food consumed in cities must be purchased, and poor families can spend as much as 60 - 80 % of their income on food (Tabatabai 1993, Maxwell 1999). According to the International Development Research Centre (IDRC) 2003, they also asserted that most of the urban households spend about 40%

to 60% of their income on food each year. Nigeria. The high rate of urbanization, weakened purchasing power, high incidence of poverty, retrenchments in public and private sector and high unemployment rate have curtailed the capacity of both the urban poor and middle class to purchase all the food they need. This figure has increased given the fact that most households in Nigeria now spend an average of 50 – 80 percent of their income on food (NBS, 2006).

Despite these obvious facts of the potentials of Urban Agriculture and its presence in Nigeria, the government and policy makers have deliberately ignored this important sector of the economy (Kareem and Raheem 2012). Thus, the neglect of the government in integrating Urban Agriculture into the Nigerian urban system in a viable and sustainable way has left urban farmers in abject poverty even when they put so much effort into the practice of urban agriculture. It is therefore imperative for government and other relevant stakeholders to harness the potentialities of Urban Agriculture as a veritable strategy for the urban poor to grow their own food and earn extra income.

From the foregoing, this study, therefore, sets out to achieve the following objectives:

1. Estimate the returns from agricultural production among urban dwellers
2. Determine the level of contribution of income from urban agriculture to total household income
3. Estimate the poverty status of urban farmers.

This is expected to go a long way in enlightening the government and policymakers to capitalize on the benefits of Urban Agriculture and integrate its practice in their administrative agenda in a more viable way in order for the country to tap the potentials of urban agriculture in alleviating poverty among households in Nigeria.

Methodology

Study Area

The study was carried out in the South West Zone of Nigeria. The choice of the study area was due to fact that the Zone has been usually neglected in the Nations development plans because of the belief that it is one of the zones with least poverty incidence, yet some of the states in the Zone fare worse than some of the states within the Zone with high poverty incidence. The South-Western part of Nigeria represents a geographical area covering between Latitude 50^{0} and 90^{0}N and has a land area of approximately 114,271 km^{2} representing 12% of the country's land mass and comprises of six States Ekiti, Oyo, Osun, Ogun, Ondo and Lagos. The South west of Nigeria falls on Latitude 60 to the North and Latitude 40 to the South. It is marked by Longitude 40 to the West and 60 to the East. The total population of the Zone is 25,386,723 and more than 96% of the population is Yorubas (NPC, 2006).

Sampling Technique and Sampling Size

Multi-stage sampling technique was employed in the selection of the respondents. Stage one is the purposive selection of Ibadan metropolis being the largest city in Nigeria and the third largest in Africa. The second stage was the selection of two blocks in the Oyo State

Agricultural Development Programme that are in the Urban Centers while the third stage was the selection of four cells from each of the block while the last stage was the selection of 30 respondents from each of the cells to make a total of 240 respondents. A total of 209 questionnaires were retrieved which served as the sample size for the study.

Analytical Techniques

Descriptive Statistics: the descriptive analytical measures employed are frequency, percentage, mean, tables and charts. This was used to profile the socio-economic characteristics of the respondents, the contribution of proceeds from urban agriculture to total household income and to present the result of other analysis.

Budgetary Analysis: this was used to estimate the returns from agriculture among urban households. The gross margin (GM) analysis was used to estimate profit for urban agriculture. The gross margin of farm activity is the difference between the gross income earned and the variable costs incurred (Makeham and Malcolm, 1986). The average annual GM was determined and a comparison with the total income from other sources was made. GM was calculated using the following formula:

$GM = \Sigma P_y Y - \Sigma Px$

Where;

P_y=Price of urban agricultural products

P_x= Price of inputs used in urban agriculture per unit

Y and X= Quantities of output and inputs respectively

Σ= Summation of

For vegetable production, the common variable cost includes seedlings, manures, herbicides, and pesticides among others while for poultry production, the common variable cost is cost of feeds, medication, wood shavings, birds among others.

Multidimensional Poverty

Since its inception (Zadeh: 1965) the theory of fuzzy sets has advanced in a variety of ways and in many disciplines. Theoretically, a multidimensional concept of poverty analysis requires the identification of some indicators of poverty. The multidimensional approach introduces and analyzes a vector of variables and attributes retained as indicators of some form of exclusion, deprivation or poverty. The study used the fuzzy set earlier proposed by Zadeh 1964 and applied by Costa (2002, 2003) to poverty analysis.

A household is identified as multi-dimensionally poor if and only if, it is deprived in some combinations whose weighted sum exceeds 30 percent of deprivation.

The degree of poverty of the i^{th} household measured as a weighting function of the m attributes x_{ij} specifies the poverty ratio of $\mu_B a_i$ of the i^{th} household.

$$\mu_B (a_i) = \sum_{j=1}^{m} x_{ij} w_j / \sum_{j=i}^{m} w_j \qquad (1)$$

The intensity of the deprivation of xij is captured with the weight wj attached to the jth attribute. This is identical to that proposed by Ceroli and Zhan (1990) in the expression

$$w_j = \log[n/\sum_{i=1}^{n} x_{ij}\, n_i] \geq 0 \qquad (2)$$

The weighted average of the poverty ratio of the the ith household $\mu_B(a_i)$ measures the multidimensional poverty ratio of the population μ_B.

$$\mu_B = \sum_{i=1}^{n} \mu_B\ (a_i)\ n_i / \sum_{i=1}^{n} n_i \qquad (3)$$

Health
Child Mortality: Deprived if any child has died in the family.
Nutrition: Deprived if any adult or child for whom there is nutritional information of malnourishment.
Place of Delivery: Deprived if mother delivered did not give birth in a hospital

Education
Years of Schooling: Deprived if at least one household member has not completed five years of schooling.
Child Enrollment: Deprived if any school aged child is not attending the school in years 1 to 8.

Standard of Life
Electricity: Deprived if the household has no electricity.
Drinking Water: Deprived if the household has no access to clean drinking water.
Sanitation: Deprived if they do not have an improved toilet or if their toilet is shared.
Flooring: Deprived if the household has dirt, sand and dung floor.
Cooking Fuel: Deprived if they cook with wood, charcoal, and dung.
Assets: Deprived if the household does not own radio, TV, telephone, and bike.

Table One: Mode of Categorization of Households

Categories	Variables
Rich	Fp (a_i) = 0
Non-poor	0< Fp (a_i) < 0.3
Not so poor	Fp 0.3 ≤ (a_i) ≤ 0.5
Very poor	Fp (a_i) > 0.5

Source: Author's Computation 2017

Result and Discussion
Socio-economic Characteristics of Respondents
The result of the analysis of the socio-economic characteristics of the respondents is presented in Table two. The result reveals that majority of the respondents are between the ages of 31to 50 years of age with a mean age of 43.18±13.07. This implies that majority of the

respondents are still in their productive age and at this age they engage in productive economic activities that can improve their standard of living. The mean household size is 5.34±2.94. This is likely to positively encourage the participation of households in urban agriculture in order to meet the nutritional requirement of the households and they can also serve as farm labourers. Table one further shows that majority of the respondents went beyond secondary school with mean years of formal education of 14.98±2.03. This indicates that the respondents have some literacy level and have the ability to understand basic agricultural management ability which is expected to enhance their technical know how. The mean year of experience in agriculture of the respondents is 6.01±3.24. This is expected to enhance their level of efficiency in agriculture. The result of the analysis of the socio-economic characteristics of the respondents in Table 3 further shows that most of the respondents (60.1%) are married and the income realized from urban agriculture could be used to support the household expenditures. Most of the respondents are members of social organization (59.8%) as shown in table 3. This is likely to improve their information on opportunities in agriculture among urban dwellers. In addition, the type of urban agriculture that majority (57.9%) of the respondents are engaged in is poultry production.

Table 2: Descriptive Statistics of Continuous Variables

Variables	Mean	Standard Deviation
Age	43.18	13.07
Household Size	5.34	2.94
Years of formal education	14.98	2.03
Experience in Agriculture	6.01	3.24

Source: Field Survey 2017

Table 3: Descriptive Statistics of Categorical Variables

Variables	Frequency	Percentage
Marital Status		
Single	24	11.5
Married	126	60.3
Widow/Divorced	59	28.2
Membership of Social Organization		
Yes	125	59.8
No	84	40.2
Types of Agricultural Activities		
Vegetable Production	88	42.1
Poultry production	121	57.9

Source: Field Survey Computation 2017

Returns from Urban Agricultural Production Activities

The cost and returns from Agricultural Activities engaged in by urban farmers is presented in Table 4. The result from the analysis shows that for respondents that are into vegetable production the total cost incurred is ₦656,030and the total revenue incurred from the total output of 1988 kg is ₦1,391,600 at the rate of ₦700 per Kg. The total profit

realized from the sales of the vegetable is ₦735,570 with a mean profit of ₦370/kg. Cost of organic manure contributes the highest percentage (33.9%) to the total cost of vegetable production.

For Poultry production, the total cost spent by poultry farmers is ₦66,674,770 with the cost of feeding contributing the highest to total cost of production. The total revenue realized from poultry enterprise is ₦68,420,000 for a total of 62,200 Kg bird with a total profit of ₦22,815,230 and mean profit of ₦733 per bird. This reveals that poultry production seems to be command higher proceeds that vegetable production.

Table 4: Cost of Production of Vegetable and Poultry

Vegetable Production			**Poultry Production**		
Cost item	Amount(₦)	Percentage	Cost item	Amount(₦)	Percentage
Seedlings	97,680	14.9	Birds	5,168,000	36.7
Land	203,720	31.1	Feeding	19,378,690	59.9
preparation	94,160	14.3	Medication	307,630	1.2
Weeding	222,640	33.9	Wood shaving	81,460	0.7
Organic manure			Labour	768,990	1.5
Inorganic manure	37,830	5.8			
Total	656,030	100	Total	25,704,770	100

Source: Authors Computation from Field Survey 2017

Total Revenue from Vegetable Production
Total Output *Average Price/kg
1988Kg*₦700 = ₦1,391,600
Profit = TR- TC
₦1,391,600 - ₦656,030 = ₦735,570
Mean profit =₦735570/1988
= ₦370/kg

Total Revenue from Poultry Production
Total Output *Average Price/kg
61,200Kg*1100 = ₦67,320,000
Profit = TR –TC
₦67,320,000 - ₦25,704,770
= ₦41,615,230
Mean profit = ₦22,815,230 /
₦679.99 per Kg

Contribution of Urban Agriculture to Household Income
The result of the analysis shows that on the average, remittance from urban agriculture contributes 46.9% to the total household income. With majority of the respondents having urban agriculture contributing between 25-50% of the household income while only 10.1% of the respondents having income from urban agriculture contributing between 75-100%

of their total household income. This implies that the households are involved in other income generating activities and the realized from such activities seems to contribute more to the total household income than income generated from urban agriculture. The reason for this might be due to the fact that most of the respondents are into urban agriculture on a secondary basis. Also, coupled with the fact that returns on investment in the agricultural sector are usually characterized by low productivity and low return to investment.

Table 5: The Contribution of Income from Urban Agriculture. To total Income

Contribution of Income from Urban Agric. To total Income	Frequency	Percentage
> 25%	41	19.6
25-50%	118	56.4
51-75%	29	13.9
> 75%	21	10.1

Source: Field Survey Computation 2017

Poverty Status of Urban Farming Households

The result of the poverty analysis reveals that most of the respondents (39.7%) belong to the very poor poverty group while only 27.3% of the respondents belong to the non-poor group. This shows that poverty is a menace among households in urban centers which need to be addressed. This therefore empirically confirms that poverty is becoming an urban problem and there is the need for intervention programmes by all stakeholders. The decomposition of poverty status into the type of agricultural activity further shows that respondents that are into livestock production fared better off than respondents that are into crop production with only 18.2% of them belonging to the very poor group. This might be due to the fact that returns to livestock production seem to be higher than that of crop production which invariably seems to increase the household mean per capita expenditure.

Table 6: Categorization of Respondents Based on Poverty Status

Categories	Variables	Frequency	Percentage
Rich	$Fp\ (a_i) = 0$	0	0
Non-poor	$0 < Fp\ (a_i) < 0.3$	57	27.3
Not so poor	$Fp\ 0.3 \leq (a_i) \leq 0.5$	69	33.0
Very poor	$Fp\ (a_i) > 0.5$	83	39.7

Source: Field Survey Computation 2017

Table 7: Decomposition of Respondents by Type of Urban Agricultural Activity

		Urban Crop farmers		Urban Poultry farmers	
Categories	Variables	Frequency	Percentage	Frequency	Percentage
Rich	Fp (a_i) = 0	0	0	0	0
Non-poor	0< Fp (a_i) < 0.3	9	10.2	48	39.7
Not so poor	Fp 0.3 ≤ (a_i) ≤ 0.5	18	20.5	51	42.2
Very poor	Fp (a_i) > 0.5	61	69.3	22	18.2

Source: Field Survey Computation 2017

Conclusion and Recommendation

This study examined the contribution of urban agriculture to the total household income of urban households. Urban agriculture was empirically confirmed to contribute to the total household income though at varying degree. Urban Agriculture should, therefore, be included as a component for income generation in cities. The study also established that poverty exists among urban households that are into agriculture. The study discovered that poverty incidence is higher among urban households that are into vegetable production when compared with urban households that are into poultry production. In order for urban agriculture to reach its potential in alleviating poverty among households, government and other stakeholder's needs to intervene in the provision of inputs especially manure for vegetable farmers and feed for poultry farmers. This is as a result of the fact that cost of manure and feeds contribute the highest to the total cost incurred in vegetable and poultry production respectively so as to increase the profit realized from these agricultural production activities.

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