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# Environmental and Economic Perception of Urban Farming in Aba, Nigeria

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**Abstract:** This study examines the economic and environmental contribution of urban farming in Aba, Abia State. Landsat 8 Satellite image was used to acquire the Land Cover of Aba. Random sampling techniques were used to select 100 individuals that are involved in urban farming. Data for the study were collected using questionnaire and interviews. Descriptive statistics, T-test, and Kruskal-Wallis were used to test for hypothesis. Result shows that most of the respondents were females, within the age of 41-50 years, married, self-employed, with household between 5 to 8, and had tertiary education. They are mainly involved in cassava and maize farming and uses urban farming to supplement their income. At a significant value of 0.05 there is a significant contribution of urban farming to the environment. Therefore, government through urban planners and environmentalist should ensure adequate policies that will enhance land use in cities to accommodate urban farming.

**Keywords:** Urban Farming, Supplement, Satellite, Household, Population, Nutrient

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## 1. Introduction

Today, cities attracts people worldwide, thus population tends to concentrate in urban centres [1], indeed, urban areas are increasing faster than any other land use [2]. As the population of cities increases, urban food insecurity also increase [3, 4], therefore the contribution of urban farming (UF) to food security and healthy nutrition is probably its important asset. According to [5, 6], UF employs 800 million urban residents worldwide, thus contributing to poverty alleviation. In Ghana, Nicaragua and Vietman approximately 80% of urban household participate in urban agriculture [7]. According to [8], traders, civil servants and artisans are finding it difficult to cope with the high cost of living in urban areas, many of them have moved into agricultural production within the vicinity of the city. Studies also suggest

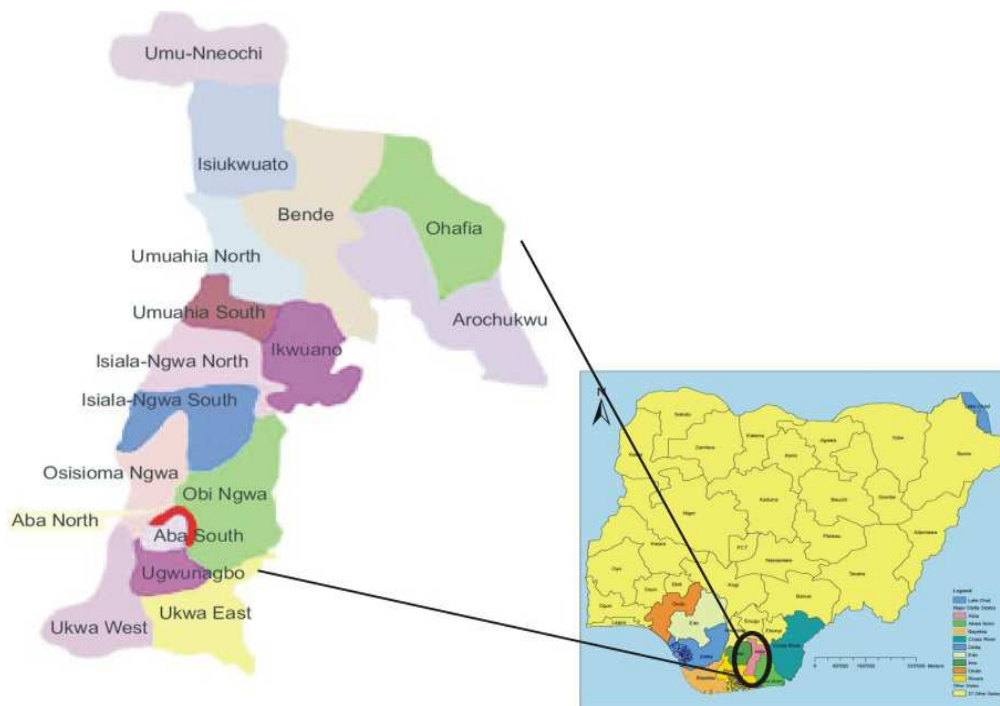
that 40% and 50% of urban dwellers in Africa and Latin America respectively are involved in some sort of agricultural activities [9, 10]. Benefits of UF are many they include: provision of adequate food, employment, supplementing income and production of important nutrition that are not normally available to low-income household [11-14]. Food procured independently through urban farming could be an effective alternative to the environmental problems arising from urbanization [15, 16], urban farming enhances biodiversity [17], regulate temperature, water and pollutant filtration, landscape management, climate and carbon mitigation and biodiversity [18, 19], regulation of nutrient cycling, flooding mitigation, water purification, carbon sequestration and climate regulation [20]. The cost of supplying and distribution of food from rural areas to urban areas or to import food for the cities are rising continually

and the distribution within the cities is uneven. Consequently, food produced for the urban farms provide 15 to 20 percent of the world's food [21], nutrient content of produce from an urban garden may be higher due to decrease in time between production and consumption [22]. 30-50% nutrients loss can happen in 5-10 days it takes for vegetables to travel from farm to table [23]. Harvesting fruits and vegetables initiates the enzymatic process of nutrient degradation which especially detrimental to water soluble vitamins such as ascorbic acid and thiamine [23]. The process of blanching produce in order to freeze can reduce nutrient content slightly but not nearly as much as the amount of time spent in storage [24], harvesting produce from one's garden cuts back on storage time significantly. As the price of food increases especially in urban centres in Nigeria, there is a need to access the contribution of UF to the economy and environmental management in a fast growing city of Aba.

## 2. Study Area

This research was carried out in Aba. Aba is the main centre and the heartbeat of Abia State. It has two local

governments: Aba North and Aba South. Aba is the giant of the South East, Nigeria and Japan of Africa. It lies at latitude  $5^{\circ}7'0''N$ ,  $7^{\circ}22'0''E$  and longitude  $5.177^{\circ}N$ ,  $7.367^{\circ}E$  (WGS 84). It has a population of 534,265 (NPC, 2006). Aba is at the intersection of road leading to Port Harcourt, Owerri, Umuahia, Ikot Ekpene and Ikot Abasi [25]. It lies within the forest belt of Nigeria with temperature range between  $20^{\circ}C$  -  $36^{\circ}C$ , the vegetation is tropical rainforest, with a total rainfall between 2200mm – 1900mm. The soil fall within the broad group of ferrallitic soil. The major crops grown include: cassava, maize, vegetable, yam, palm oil. Aba has been the melting point of human activities since 1903, the city is filled with business minded folks, and all of the citizens are committed in what they do. Today, traders comes from all over the continent Ghana, Cameroon, Liberia, Togo, Democratic Republic of Congo, Equatorial Guinea and Ivory Coast to buy Aba-made goods for resale. The creativity of the artisan and tradesmen and their profound skill in developing local content of all products became a story that transcended many shores. This has in turn brought into Aba population of people especially the craftsmen and so many industries to invest in Aba.



**Figure 1.** Location Map of the Study Area.

## 3. Methodology

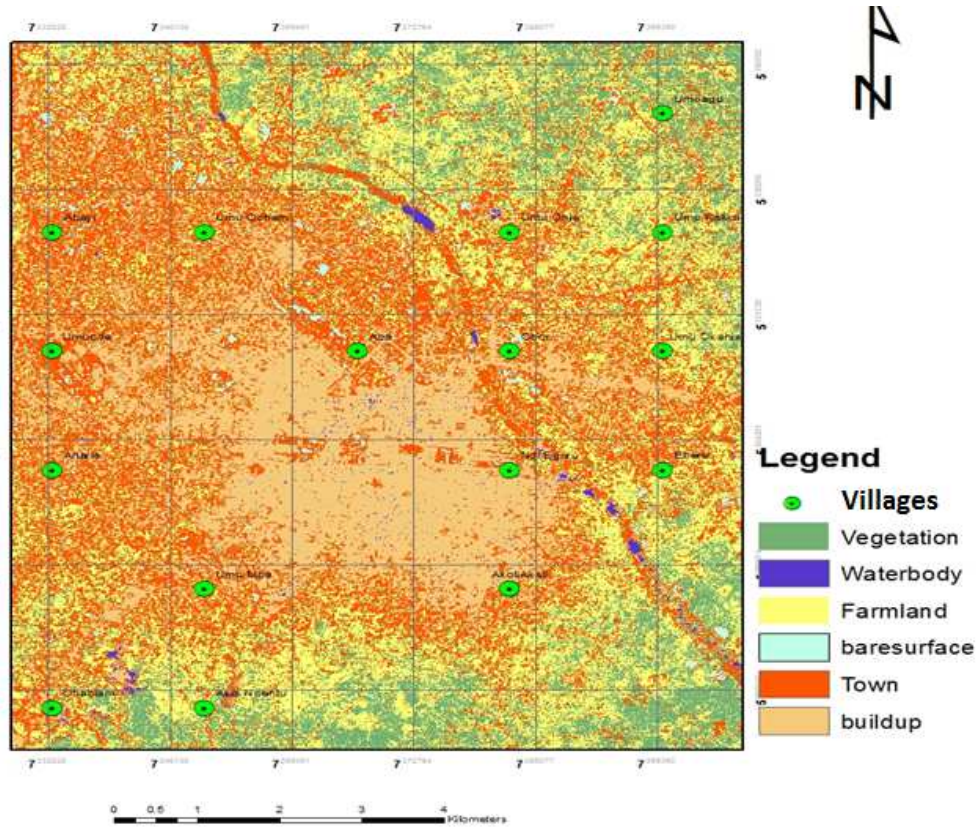
For the study, Landsat 8 satellite images of Aba were acquired, Enhance Thematic Mapper (ETM +). It was obtained from Global Land Cover Facility (GLCF) an Earth Science Data Interface, settlement map and topographic map of Aba was also obtained from Abia State ministry of land and surveyor. All data used in this study were projected to Universal Transverse Mercator (UTM). The pre-processed images are then classified by both unsupervised, supervised

classification methods. Classification method of ISODATA clustering algorithm was built in the software (Arcgis 10. 2. 1). Digital image processing was manipulated by the software. The data were stratified into 'zones' where land cover types within the zone have similar spectral properties. Six land cover classes namely: vegetation, water body, farmland, bare surface, town and built up were identified in the study area. Interviews and questionnaire were also used as a source of primary data collection, 100 copies of questionnaire were distributed randomly to individuals who have lived in Aba for more than Ten (10) years to obtain their

opinion on the subject matter. Interviews were used to gather information mainly from those who participate in urban farming that find the questionnaire difficult to express in terms of figures [26]. Descriptive statistics, T-test and

Kruskal-Wallis test techniques were used to test the hypothesis,  $H_0$ : There is no significant contribution of urban farming farm to the economy and to the environment. The results of the analyses are present in tables and bar charts.

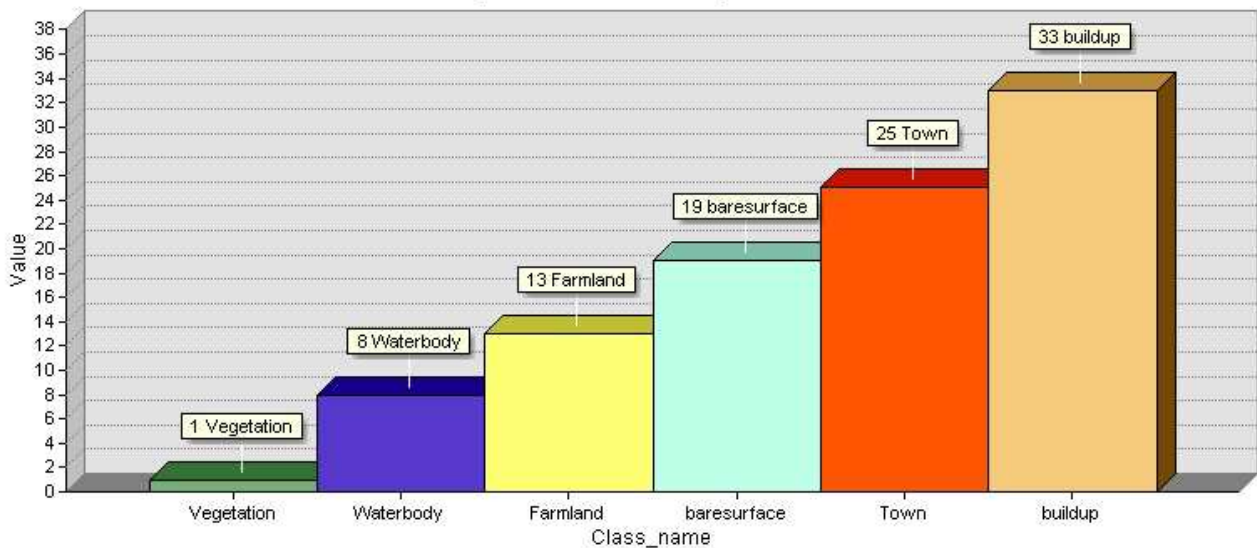
### 4. Results and Discussion



Source: Field Survey, 2016

Figure 2. Aba Image Classification.

Graph of Classified image of Aba



Source: Field Survey, 2016

Figure 3. Graph of Classified Image of Aba.

Figure 3 shows a classified image of Aba, built up area occupies 33%, followed by town 25%, bare surface 19%, farmland 13%, water body 8% and vegetation 1%.

**Table 1. Gender Status of Respondent.**

Gender	Frequency	Percentage
Male	42	44.68
Female	52	55.32

Table 1 show that 44.68% of the respondents were males while 55.32% were females.

**Table 2. Marital Status of Respondent.**

Marital status	Frequency	Percentage
Single	19	20.21
Married	46	48.93
Widow/divorce/separated	29	30.85

Table 2 shows that 20.21% of the respondents were single, 48.93% were married while 30.85% were widowed, divorced or separated.

**Table 3. Educational Background of Respondent.**

Educational Status	Frequency	Percentage
Informal	26	27.65
Primary	7	7.45
Secondary	30	31.92
Tertiary	31	32.98

Table 3 shows that 32.98% of the respondents have tertiary institution education, 31.92% have secondary education qualification, 7.45% have primary education qualification, while 27.65% have no formal education.

**Table 4. Age Bracket of the Respondent who are engaged in Urban Farming.**

Age (years)	Frequency	Percentage
20-30	6	6.38
31-40	29	30.85
41-50	33	35.11
51-60	25	26.60
61- above	1	1.06

Respondents within the age bracket of 20-30 years were 6.38%, 30.85% were within the age of 31-40 years, 35.11%

were within the age range of 41-50 years, 51-60 years represent 26.60% while years range between 61 and above were 1.06%.

**Table 5. Occupation of the Respondent.**

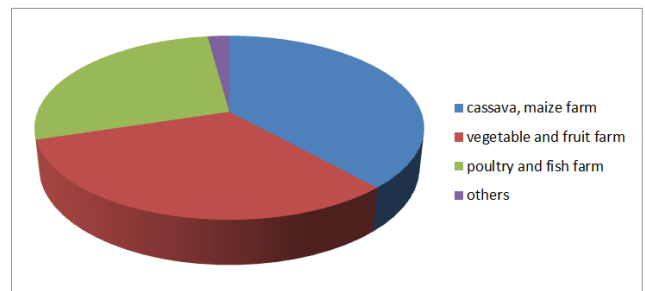
Occupation	Frequency	Percentage
Student	5	5.31
Civil servant	30	31.92
Unemployed	17	18.09
Self-employed/business/craftsmen	42	44.68

Table 5 shows that 5.31% of the respondents were student, 31.92% were Civil servant, 18.09% were unemployed, while 44.68% were self-employed, businessmen and craftsmen.

**Table 6. Household Size of Respondent.**

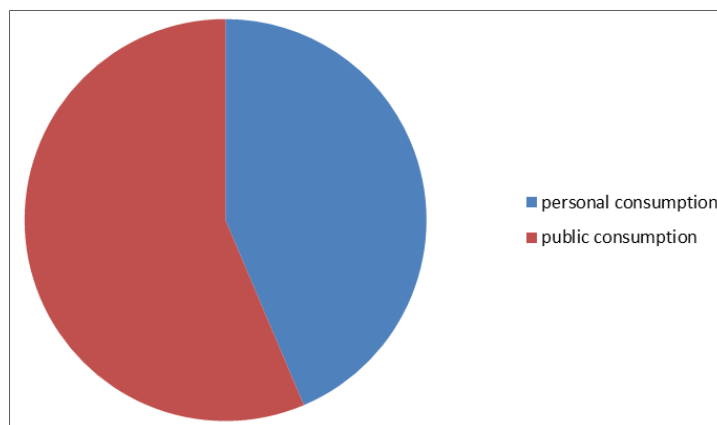
Household size	Frequency	Percentage
1-2	11	11.70
3-4	19	20.21
5-8	31	32.98
9-10	28	29.79
11- above	05	5.32

Respondents with household size between (1-2) represent 11.70%, (3-4) represent 20.21%, 5-8 represent 32.98%, 9-10 represent 29.79% while 11 and above were 5.32%.



**Figure 4. Types of Farm of Respondent.**

Figure 4 shows that 38.30% plant cassava, and maize farm, 31.91% of the respondent are engaged in vegetable farming, 27.66% have fishery and poultry farm while 2.13 are involved in other type of farming activities.



**Figure 5. Farm Product Utility.**

Figure 5 show that 43.62% of the respondents produce foods for their personal consumption while 56.38% of the respondent produces food for public consumption.

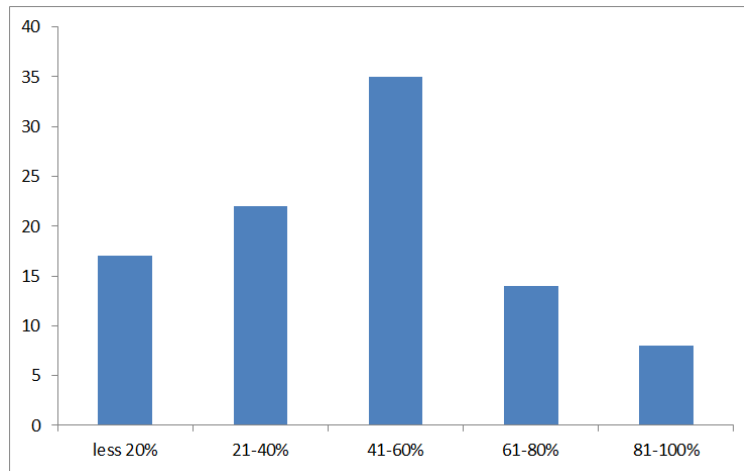


Figure 6. Estimated Income of Respondent.

The result shows that 6.38% of the respondent spend less 20% of their income on food, 31.91% of the respondent spend between 21-40% of their income on food, 45.74% spend between 41-60% of their income on food, 11.70% of the respondent spend between 61-80% of their income on food while 4.26 of the respondent spend between 81-100% of their income on food.

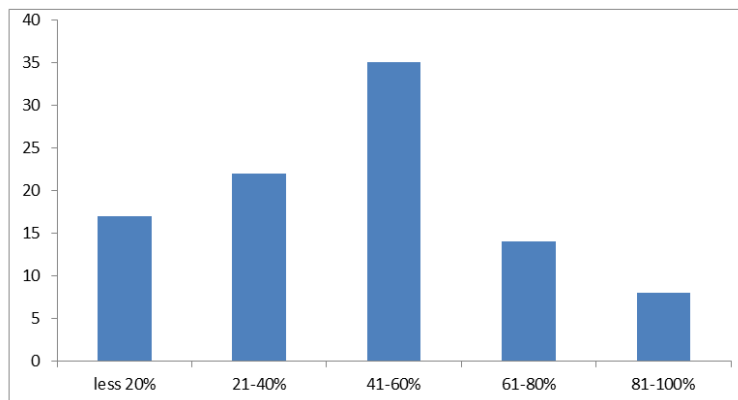


Figure 7. Percentage Estimate of the Contribution of Urban Farming to Respondent Income.

The result shows that 18.09% of the respondent estimate that UF contributes less than 20% of their income, 23.40% of the respondent estimated that UF contributes between 21-40% of their income, 35.11% of the respondent estimated that UF contributes between 41-60% of their income, 14.89% of the respondent estimated that UF contributes 61-80% of their income while 8.51% of the respondent estimated that UF contributes between 81-100% of their income.

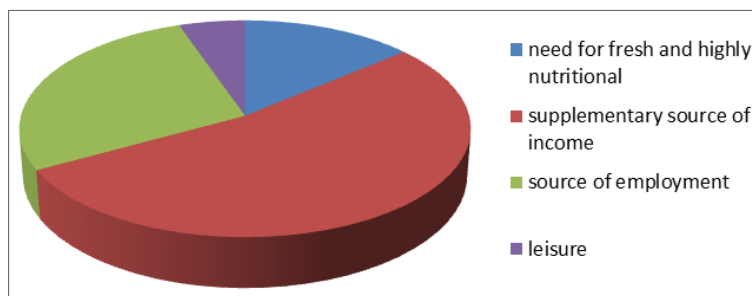


Figure 8. Reasons for Urban Farming.

The result shows 53.19% respondent attributed that UF serves as a supplementary source of income, 27.66% of the respondent attributed that it serves as a source of employment, 13.83% of the respondent are involved in UF for their need for

fresh and highly nutritional food source while 5.32% of the respondent are involved in UF as a leisure.

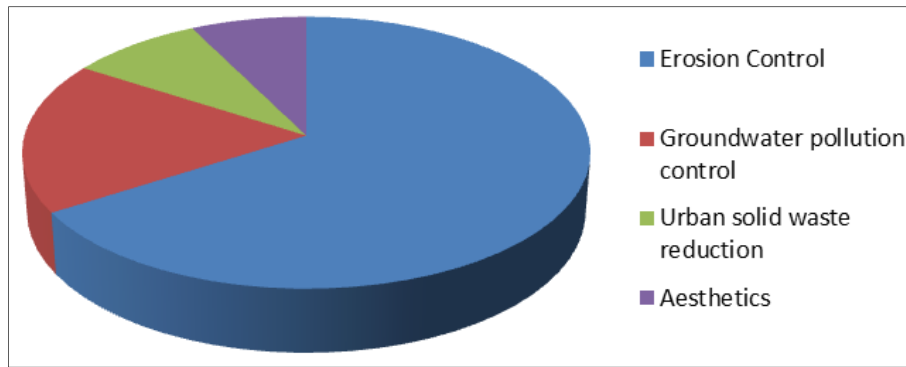


Figure 9. Impacts of Urban Farming in the Environment.

The result indicate that 65.96% of the respondent believed that the UF helps in the control of erosion, 18.09% indicated that it helps to reduce groundwater pollution, 8.51% of the respondent indicates that UF helps in urban solid waste management while 7.45% of the respondent indicted that UF is for aesthetic of the city.

#### 4.1. Discussion of Findings

Based on the findings; greater number of women participate in the UF more than the men. The result conforms to Oseric *et al.*, (2013), and Brumfield and Ozkan (2016), that women are heavily involved in the production of both stapled (food) crops and cash crops, the agricultural value chain and livestock production. FAO's 2010 indicate that 70 percent of women participate in agriculture especially in least developed countries. Therefore UF offers women the opportunity to contribute to household food availability amidst other domestic responsibilities, thus providing advancement in economic and social lives of their families. Salau and Attah (2012), reports that women are majority in UF worldwide, as a result of cultural norms of the society. Most of the respondents are married, their participation in UF enable them to ensure food security and other need of their families. Greater percentage of people engaged in UF have formal education, therefore there is a promising harvest of UF in Aba. This is in line with Nsikakabasi *et al.*, (2010), educated farmers tend to have higher yields and income from cultivated areas, thus highly educated farmers imply there is a high opportunity for improving harvests in the study area. In the study area, ages between 41-50 years are mostly engaged in UF. Adeoti *et al.*, (2012), observed the mean age for male in UF as 39.4 years, while females are more elderly with a mean age of 49.8 years. UF in Aba is primarily done by individuals that are self-employed. The results follow Salau and Attah (2012), most farming activities in urban areas are carried out on part time basis by people that are engaged in their business. Idowu *et al.*, (2012), observed that UF is undertaken by individuals that have larger household number generally to augment household real income. This emphasizes the need for appropriate policies to advance urban crop production to aid producers to effectively access

food and income for other necessities. Survey by Phil (2013), most urban farmers receives very low income, with a monthly income of US\$ 135, US\$0.64 per person per day which is below the accepted one dollar per person per day. From the result obtained in this work 56.38% of urban farmers more than half of them produces crop for public consumption. Income obtained from the sales of the produce is primarily for acquiring basic necessities rather than luxury. This shows that urban farmers in the study area are poor, appropriately half of them consume their produces indicating that UF enhances food security. According to Pedzisai *et al.*, (2014), UF makes food cheaper hence improves food availability which is the key mainstay of food security. UF has continued livelihood of urban dwellers in developing countries for many years. Hence it is predominant among urban low income earners primarily due to lack of formal jobs and as a means of adding up to household income. Soil erosion is among the hazard of UF in the study area. Erosion degrades soil ecosystem and leads to reduced crop yields, threatening food security and farmers income. When soil is eroded by water it can carry pollutants into waterways, which causes harm to the aquatic environment. From the study, most of the respondents confirm that implementation of UF protects the soils against erosion, encourages environmental sound agriculture and maintains soil organic matter and soil structure. This agrees with Crossman *et al.*, (2013), and Gomez-Baggethun *et al.*, (2013).

#### 4.2. Determination of the Contribution of UF to the Economy and Environment

T-test was used to determine the contribution of UF to the economy

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$sp = \sqrt{\frac{(n_1 - 1) s_1^2 + (n_2 - 1) s_2^2}{n_1 + n_2 - 2}}$$

At critical value:  $\alpha = 0.05$ ;  $t_{cal} = 0.1653 < t_{tab} = 2.31$ ,

therefore the null hypothesis ( $H_0$ ) is accepted and conclude that there is no significant contribution of UF to the economy.

Kruskal-Wallis test were used to ascertain the contribution of UF to the environment.

At critical value  $\alpha=0.05$  and degree of freedom  $2-1=1$

$$H = \frac{12}{N(N+1)} \left( \frac{R_1^2}{n_1} + \frac{R_2^2}{n_2} \right) - 3(N+1) \text{ where } N = 8, R_1 = 18, R_2 = 18, n_1 = n_2 = 4$$

$H = 0.0054$ , therefore  $H_0$  is accepted since the test value is greater than the critical value. There is a significant contribution of UF to the environment.

## 5. Conclusion

In Nigeria, Agricultural activity is mainly regarded primarily as a rural activity due to the increasing high demand for food and lack of employment for many urban dwellers, it became necessary for urban households to embark on urban farming as a means of filling the food demand and to increase their income. Based on the findings, greater number of female, married with tertiary education, within the age of 41-50 years, self-employed with size hold size between five to eight are engaged in UF. Cassava, maize and vegetable crops are primarily cultivated in Aba. These crops are for civic consumption, they are used to supplement their income of the urban gardeners. UF mainly helps to control erosion in the city. Therefore UF in Aba contributes substantially to the food needs of the perishable food products that are not transported to the city. Government through the urban planners should ensure proper planning by running polices that will ensure areas in the city are reserved for urban farming.

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