

Application Of Edible Landscapes In Urban Agriculture For Food Security Intervention In Akure, Nigeria.

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Abstract

Nigeria is today dominated by food imports and exports of agricultural products, unlike a time when Nigeria produced food for its own needs. Insufficient food production is also contributed to by unpredictable climatic conditions, while on the other hand, Nigeria has sufficient resources and opportunities to achieve independent food production (food security) without major imports. Edible landscapes can emerge as transition movements of local community initiatives or other groups and individuals (bottom-up), or stem from documents of spatial planning and landscape planning. This study seeks to assess the application of edible landscape in urban agriculture for food security intervention in Akure, Nigeria. Which relate to inviting food production back to the city and reconnecting people with their local / regional food system to promote a healthier lifestyle. With the employment of random sampling method, 30 respondents were randomly selected across the study area. Data was obtained from a purposefully designed questionnaire. The data was generated and analysed with the aid of the Scientific Package for Social Sciences (SPSS). The outcome of this research was able to highlight the existing edible landscapes in the study area and resident's perception on edible landscapes as source of food. This study therefore recommends that the incorporation of edible landscapes in urban agriculture should be applied by all the residents and not just farmers as it was discovered from the results. Architects, designers and urban planning regulatory bodies should ensure proper planning and implementation of edible landscapes most especially in urban centers to solve the problem of food security.

Keywords: *Edible Landscape, Urban, Agriculture, Food, Security*

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I. Introduction

A defining feature of Nigeria's urbanization in the 21st century is the rapid and unrelenting urban agglomeration, with large cities of over one million people in virtually every state of the country, including the Federal Capital Territory. While urbanization is regarded as one of the indices of development, in Nigeria it is accompanied by a myriad of social, economic, physical, and environmental problems (Ola, 2011). The 21st century sustainable city requires the merging of urbanism with sustainable food systems. Since many cities are situated at the heart of rich agricultural areas or other lands rich in biodiversity, the extension of the urban perimeter eventually cuts further into available productive land and encroaches on important ecosystems (Obaid, 2007). As cities have occupied a good part of agricultural land, the goal now is to return food production to cities, making urban agriculture increasingly popular in all its forms (urban gardens, public orchards, food forests).

Urban agriculture has become increasingly popular and is referred to in a variety of ways, e.g., urban gardening, urban homesteading, and edible landscaping (Nolasco, 2013). Dormant lands -green fields- can be used to produce crops, and decorative landscapes can be converted into productive landscapes (edible landscape, community garden, allotment garden, rooftop vegetable garden, urban agriculture) with food and medicinal plants (Grichting & Awwaad, 2015). The challenges industrial food system separates people from their food sources. People living in urban areas often have little to no green space and are dependent upon outside sources (oftentimes hundreds of miles away) for their food (Hezik, 2016).

Edible landscaping utilizes food-producing plants in the residential landscape. It combines fruit and nut trees, berry bushes, vegetables, herbs, edible flowers, and other ornamental plants into aesthetically pleasing designs. The location and design of these gardens may vary between large agricultural landscapes, urban areas (e.g. sidewalks, rooftops, and indoors), community gardens, and one's own backyard (Mackelvie, 2014). Edible landscaping is the use of food-producing plants in the constructed landscape, principally the residential landscape. Edible landscaping, which integrates food-producing plants into ornamental plantings and conventional designs, is also put forward as a productive landscaping alternative (Kourik, 2004).

The major social challenges of Nigerian urbanization are that urban poverty, food insecurity, and malnutrition are increasing (Metu, Okeyika, & Maduka, 2016). These have led to a greater vulnerability of the country's cities to food supply stock (Fudjumdjum, Filho, & Desalegn, 2019). Thus, in recent times, food security

has become a relevant issue, not only in Nigeria, but also across the globe in addressing urban resilience. Food security is a concept that has varying definitions. According to the Food and Agriculture Organization (FAO), food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life. There has been heightened food insecurity in Nigeria, particularly in its urban centres, owing to the overdependence of cities on rural food supplies (Mohammed & Charles, 2016), along with unabated rural depopulation, the unrelenting increase in urban populations, and the current Buhari administration's stance on reducing food imports through its recent closure of land borders to forestall food entering the country illegally. Available data indicate that total yearly wheat production fell from 100,000 tons in 2007 to 60,000 tons in 2018 (Nzeka, 2018), whereas the country's population increased by roughly 40% (UN, 2017). A study conducted in Lagos by Roberts, Osadare and Inem (2019) revealed that only 33.8% of urban households are food secure, 45.1% are food insecure without hunger, and 21.1% are food insecure with hunger. Estimates by Nzeka (2018) suggest that 80% of the available food items in urban centres is supplied by rural areas, despite their dwindling farming population. Various studies have shown that urban agriculture (UA) (the production of food in urban environments) contributes to cities' resilience by reducing the vulnerabilities

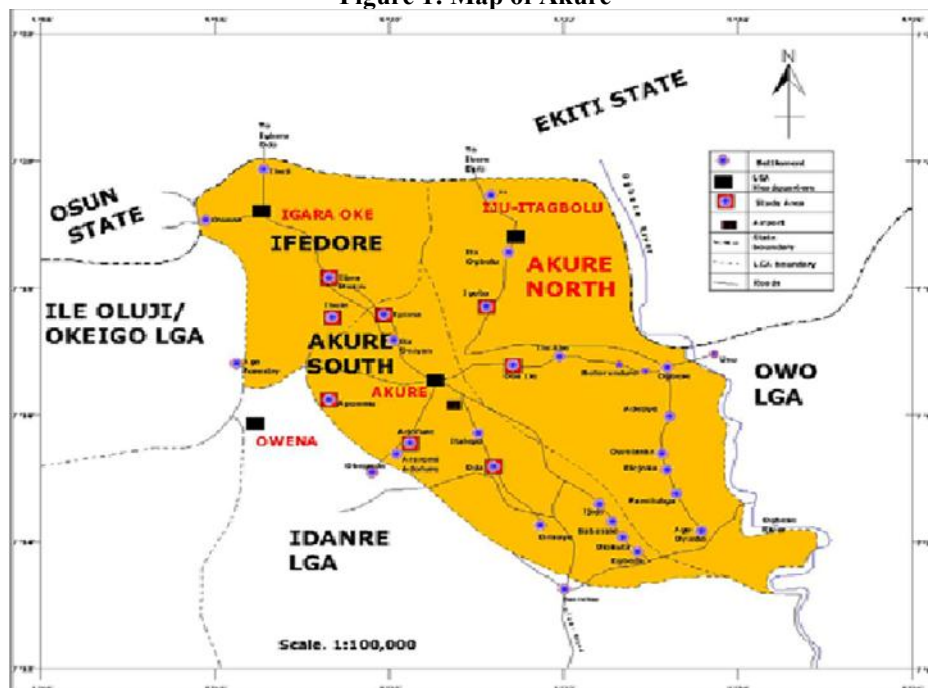
The aim of this study is to assess the application of edible landscapes in urban agriculture for food security intervention in Akure, Nigeria. This aim would be achieved with the following objectives

- To highlight the existing edible landscapes in Akure, ondo state, Nigeria
- To establish if those edible landscape serve as food security to the residents.
- To recommend suitable edible landscape practices for food security

Study Area

Akure, town, capital of Ondo state, southwestern Nigeria. It lies in the southern part of the forested Yoruba Hills and at the intersection of roads from Ondo, Ilesha, Ado-Ekiti, and Owo. Akure is an agricultural trade centre for cassava, corn (maize), bananas, rice, palm oil and kernels, okra, rubber, coffee, and pumpkins. Although cocoa is by far the most important local commercial crop, cotton, teak, and palm produce are also cultivated for export. The scope of this study will be limited to the study area which is Akure, Ondo state. Selected edible plants that are commonly found in Akure will be used for the analysis of this study.

Figure 1: Map of Akure



Source: Ondo State Ministry of Land and Survey

II. Litrature Review

Edible landscapes: What they are and what they encompass

Edible landscaping was defined as the “practical integration of food-producing plants within an ornamental or decorative setting” (Creasy, 2010), “the use of food-producing plants in the residential landscape” and “the use of food plants as design features in a landscape” (Shasta Master Gardeners 2012). It combines edible

plants such as fruit and nut trees, berry bushes, vegetables, herbs, edible flowers, and other ornamental plants into aesthetically pleasing designs, and the same design principles as for ornamental landscapes are used. Edible landscaping “doesn’t have to be all edible” (Creasy, 2010). Edible landscapes can emerge as transition movements of local community initiatives or other groups and individuals (bottom-up), or stem from documents of spatial planning and landscape planning (e.g. green infrastructure studies and strategies). Edible landscape design strategies relate to inviting food production back to the city and reconnecting people with their local / regional food system to promote a healthier lifestyle. Edible landscaping is the use of food plants as design features, both for aesthetic value as well as consumption (Çelik, 2017). Fruit trees, nuts, berry bushes, vegetables and other edible perennials, spices and herbs, edible flowers, etc. can be combined with other ornamental plants. Edible landscaping, often called foodscaping, is a progressive food systems approach that encourages all people in their homes, public spaces and workplaces to promote local food (Thompson & Sokolowski, 2016).

Edible Landscapes and Food Security

Urban residents have become distanced from the source of food (Kortright & Wakefield, 2010), and has begun to consume food without any direct engagement with food production or with food producers. Local and tacit knowledge related to agriculture has disappeared from metropolitan landscapes, creating an ‘extinction of experience’ of human–nature interaction and a collective ‘forgetting’ of how to grow food. “It is likely that the proportion of the global population not producing food will continue to grow, as will the number of middle and upper-income consumers whose dietary choices are more energy- and greenhouse gas emission-intensive (and often more land-intensive) and where such changes in demand also bring major changes in agriculture and in the supply chain”. In this context sustainability of food security is threatened by non-ecological globalised food supply systems (DeLind & Howard, 2008). Edible landscapes can play a pivotal role in sustainable food systems and re-inviting food production back into the city's life. This enables the reconnection of people with their food system and it can build knowledge about where food comes from, how to grow it, and re-connect individuals with their food and nature. “Facing the two global challenges of urbanisation and food security, “the integration of edible landscape can be used as a strategy for sustainable and resilient urban development and providing a productive green infrastructure for the future cities”. Edible landscape reduces the use of fossil fuel-based pesticides and fertilizers, limits the need for long-distance transportation, and typically requires a low level of processing, packaging, and refrigeration. Food prices play a major role in urban areas, therefore, another problem of the availability of food is the volatility in global food prices.

III. Research Methodology

30 samples were purposefully selected in order to assess the application of edible landscapes in urban agriculture for food security intervention in Akure, Nigeria. 30 questionnaires were distributed based on random sampling techniques. According to Marshall et al. (2013), referred to a sample size of 20 as being small for a grounded theory type approach to qualitative research and to 40 being a large sample size for the same type of study, and later in the same paper, authors recommended a range of 20–30 questionnaires for grounded research and 15 to 30 interviews for case studies (Marshall, Cardon, Poddar, & Fontenot, 2013). This gives a range of what sample size authors would consider appropriate in qualitative research (Boddy, 2016). In a view to properly comprehend the research findings on the assessment of the existing edible landscapes in Akure Ondo state Nigeria, a response rating of agree and disagree was used, where agree stands for 1 and disagree stands for 2. Also in order to obtain data on the assessment of edible landscape as source of food in Akure Ondo State Nigeria and assessment on recommendations of suitable edible landscape practices for food security, measurement items of the quantitative questionnaire were rated on a “1-4” Likert scale, targeting the respondents’ responses. Where 1 stands for strongly disagree, 2 stands for disagree, 3 stands for agree and 4 stands for strongly agree. The obtained data was collated and sorted, thereafter data collected were entered into SPSS where descriptive statistics was used to analyse the data. The result of the analysis was transformed into tables and charts.

IV. Discussion Of Findings

The results obtained from the research are discussed based on the administered questionnaire that highlights the assessment on the application of edible landscapes in urban agriculture for food security intervention in Akure, Nigeria

Characteristics of respondents

From figure 2, 9 male respondents agreed that edible landscape contribute significantly to their family food supply while 7 male respondents strongly agreed. 5 female respondents agreed that edible landscape contribute significantly to their family food supply while 3 female respondents strongly agreed. This implied that the assessment on Edible landscapes contribute significantly to one’s family food supply in the study area is

dependent upon the gender of respondents as majority of the male respondents agreed more to the fact that edible landscape contributes significantly to their family’s food supply.

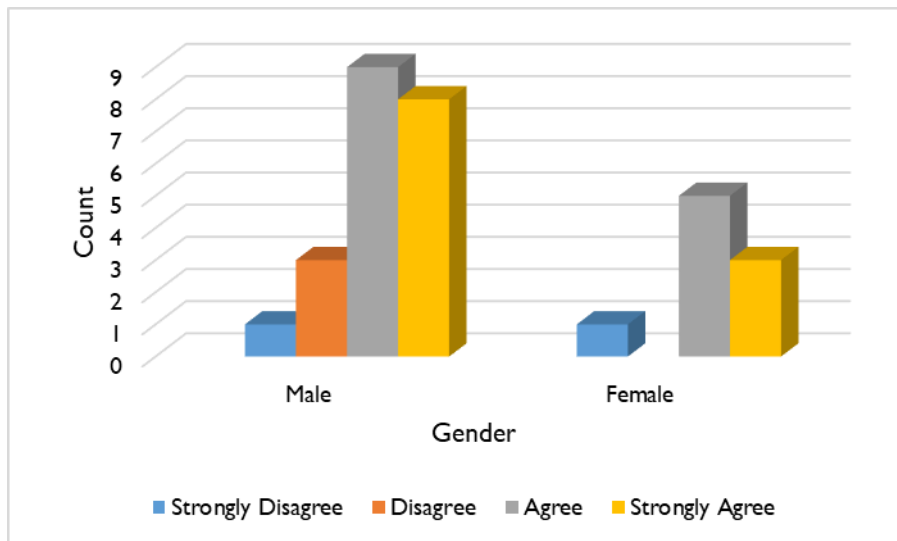


Figure 2: Cross tabulation of Gender* Edible landscapes contribute significantly to your family food supply

As seen in figure 3, 50% of the respondents below age 29 planted vegetables as edible landscape in their community, 23% of the respondents within the age range of 30-39 planted vegetables as edible landscape in their community, 19% of the respondents within the age range of 40-49 planted vegetables as edible landscape in their community, and lastly 8% of the respondents of age above 50 planted vegetables. This implied that the level of vegetable planting as edible landscape element was dependent on the age of the respondents, results showed that the older the respondents, the lesser they plant.

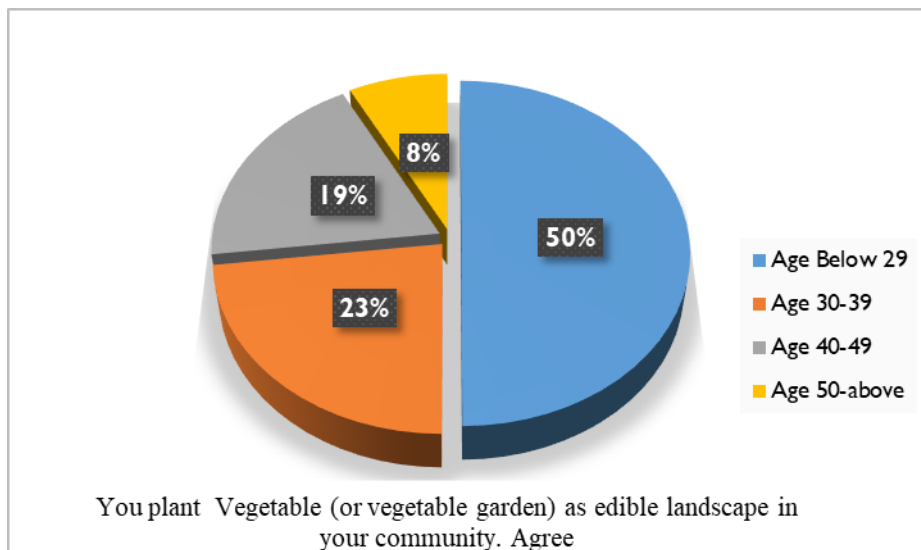


Figure 3: Cross tabulation of Age* You plant vegetable as edible landscape in your community

From figure 4, 5 single respondents disagreed and strongly agreed respectively that edible landscape contribute significantly to their family income while 7 married respondents agreed that edible landscape contribute significantly to their family income and 5 married respondents strongly agreed that edible landscape contribute significantly to their family income. This implied that the assessment on Edible landscapes contribute significantly to one’s family income in the study area is dependent upon the marital status of respondents as majority of the married respondents agreed more to the fact that edible landscape contributes significantly to their family’s income.

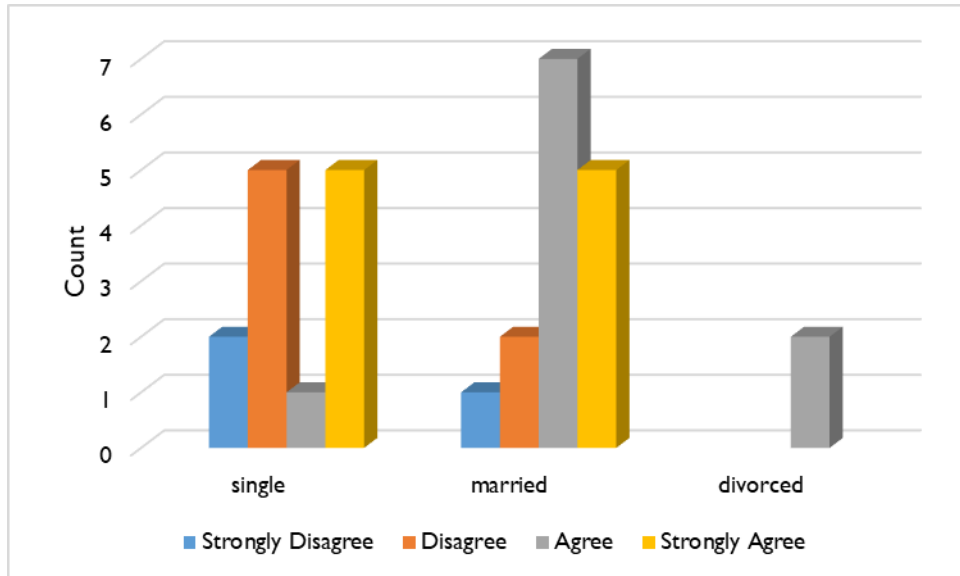


Figure 4: Cross tabulation of Marital status* Edible landscapes contribute significantly to your family income

As seen in figure 5, 2 respondents of household size 4-6 strongly agreed and disagreed respectively on the assessment on you consume all the food you get from edible landscapes in your home, while 3 and 2 respondents of household size 1-3 and 4-6 disagreed respectively on the fact that they consume all the food they get from edible landscapes in their home. Also, 5 respondents of household size 1-3 agreed and 10 respondents of household size 4-6 agreed on the fact that they consume all the food they get from edible landscapes in their home. This implied that the assessment on those that consume all the food they got from edible landscapes in their home is dependent upon the household size of the respondents as majority of respondents of household size 4-6 agreed more to the fact that they consume all the food they got from edible landscapes in their home.

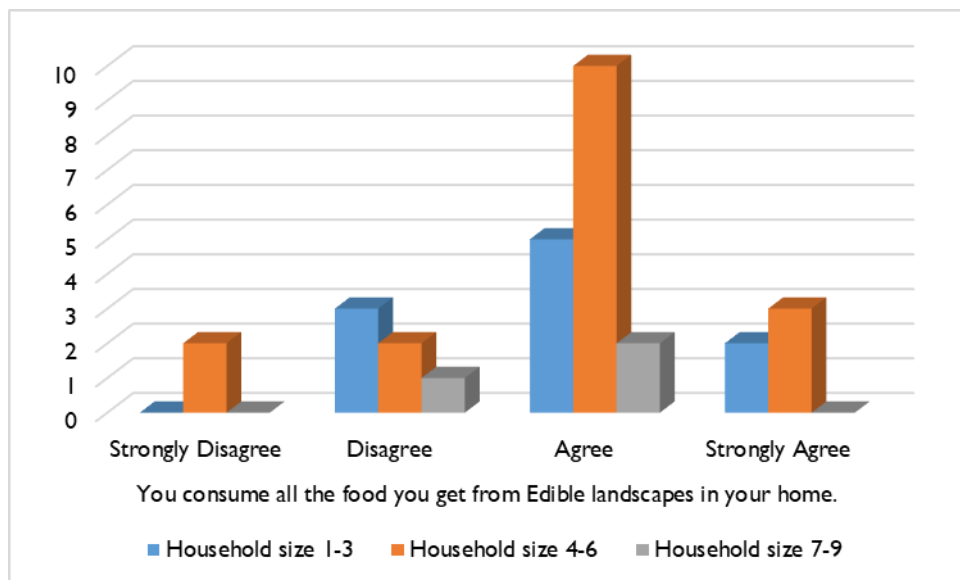


Figure 5: Cross tabulation of Household size* you consume all the food you get from edible landscapes in your home

As seen in figure 6, 10 respondents were farmers and they agreed to the fact that they plant fruit trees as edible landscape in their community, 6 respondents were public servant and they planted fruit trees as edible landscape in their community, while 5 respondents were traders and students respectively and they also planted fruit trees. The result from this analysis showed that the planting of fruit trees as edible landscapes depended on the occupation of the respondents as farmers had the highest frequency unlike other occupation.

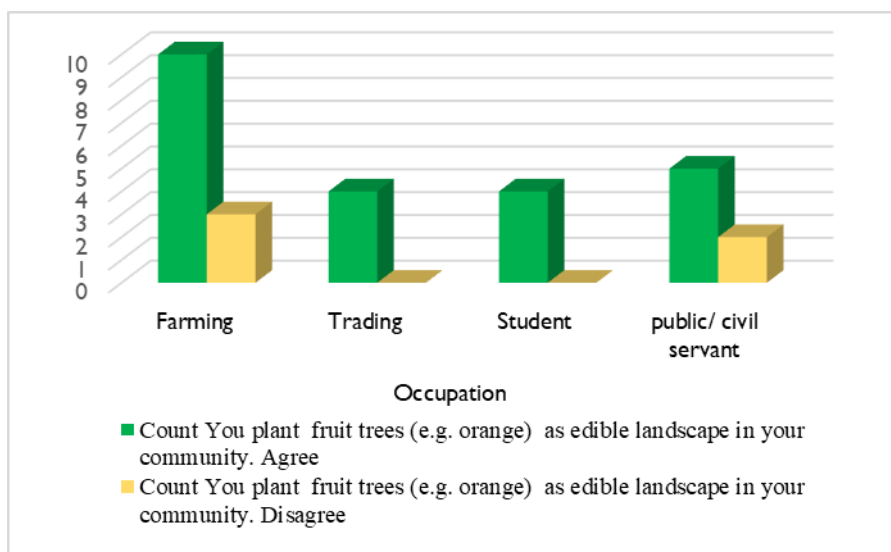


Figure 6: Cross tabulation of Occupation* You plant fruit trees as edible landscape in your community

Assessment of The Existing Edible Landscapes in Akure Ondo State Nigeria

In assessing the rating of people’s perception on the existing edible landscapes in Akure Ondo State Nigeria, there was need to determine the adequacy of the variables using agree and disagree response. The Rating of level of perception had a weighted score of 1 and 2 where Agree stands for 1 and disagree stands for 2. It can be observed from table 1 that 86.7% of the respondents planted vegetables, 83.3% of the respondents planted melon and fruit trees as edible landscapes respectively. While 80% of the respondents planted edible landscapes in private courtyards and 73.3% of the respondents planted edible landscapes outside their residents. It can be deduced that vegetables and fruit trees are majorly planted in Akure, which means that these vegetables and fruit trees can be introduced by architects during landscaping to form edible landscapes in a decorative manner within the study area. Also, the results also implied that residents in the study area planted edible landscapes in private courtyards instead of other locations like the roofs and balcony.

Table 1: Assessment of The Existing Edible Landscapes in Akure Ondo State Nigeria

	Agree	Disagree
	Row N %	Row N %
You plant Vegetable (or vegetable garden) as edible landscape in your community.	86.7%	13.3%
You plant Melon as edible landscape in your community.	50.0%	50.0%
You plant fruit trees (e.g. orange) as edible landscape in your community.	83.3%	16.7%
You plant grain crops (e.g. corn) as edible landscape in your community	83.3%	16.7%
You plant root and tuber crops (e.g. yam) as edible landscape in your community.	63.3%	36.7%
You plant spices (e.g. pepper and tomato) as edible landscape in your community.	83.3%	16.7%
You plant Cash crop as edible landscape in your community	46.7%	53.3%
Edible landscapes are located on the balcony	36.7%	63.3%
Edible landscapes are located on the windowsill	23.3%	76.7%
Edible landscapes are located on the roof	16.7%	83.3%
Edible landscapes are located on Private courtyard	80.0%	16.7%
Edible landscapes are located on outside residence	73.3%	23.3%

Assessment of Edible Landscape as Source of Food in Akure Ondo State Nigeria

In assessing the rating of people’s perception on edible landscape as source of food in Akure Ondo State Nigeria, there was need to determine the adequacy of the variables using a Likert Scale measurement calculation. Likert Scale Measurement of Rating of level of social interaction, the weighted score of 1 to 4 was allocated to the rating options of adequacy based on the perception of the respondents regarding the variable measured; Strongly Disagree 1, Disagree 2, Agree 3, Strongly Agree 4. It can be observed from table 2 that 56.7% of the respondents agreed to the fact that they consume all the food they get from edible landscapes and 56.7% of the respondents agreed that edible landscapes reduce dependence on global food markets. The results also showed that 46.7% of the respondents agreed that edible landscapes contribute significantly to your family food supply. This implied that an average percentage of the respondents assessed edible landscape as source of food in the study area and an average percentage do not sell some of the produce from edible landscape as they are mostly for family consumption.

Table 2: Assessment of edible landscape as source of food in Akure Ondo State Nigeria

	Strongly Disagree	Disagree	Agree	Strongly Agree
Edible landscapes contribute significantly to your family food supply	6.7%	10.0%	46.7%	36.7%
Edible landscapes contribute significantly to your family income.	10.0%	23.3%	33.3%	33.3%
You consume all the food you get from Edible landscapes in your home.	6.7%	20.0%	56.7%	16.7%
You sell some of the produce from edible landscape	6.7%	53.3%	36.7%	3.3%
It helps to fill the pre harvest food gap.	6.7%	26.7%	33.3%	30.0%
Edible landscape is healthier than those gotten from the market	3.3%	30.0%	43.3%	23.3%
Edible landscape reduces dependence on food from rural communities	3.3%	20.0%	40.0%	36.7%
Edible landscape contributes to sustainability in terms of food production	0.0%	10.0%	50.0%	40.0%
Reduces dependence on global food markets	0.0%	6.7%	56.7%	36.7%

V. Conclusion And Recommendation

This study portrayed edible landscape in urban agriculture as a tool for food security. Edible landscapes can be included as sustainable components of urban planning and urban design projects. It is common for families to cement their unused portion of land within their compound for weed control and aesthetics and leave a small portion for planting flowers. The practice of cementing the compound should be discouraged and areas should be demarcated for planting of fruits, vegetables and flowers in such a way that aesthetics can be maintained. This practice needs to be encouraged by the government through extension services, community leaders and health workers. The results of the study clearly indicated that the edible landscapes can be a part of residential landscape, community garden and urban green areas. They can also reduce dependence on global food market and also enhance household food consumption. This study therefore recommends that every household should have edible landscapes, they should be planted in a decorative manner, People should be sensitized on edible landscaping practices. Architects, designers and urban planning regulatory bodies should ensure proper planning and implementation of edible landscapes most especially in urban centers to solve the problem of food security.

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