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# ASSESSING THE EFFECTIVENESS OF TRADITIONAL PRACTICES IN GREEN LEAFY FARMING IN PERI-URBAN AREAS OF IBADAN, NIGERIA

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## Abstract

This study examined the socio-economic characteristics of green leafy farmers (GLFs) and investigated traditional approaches to green leafy farming in Ibadan peri-urban areas. The specific objectives were to assess the demographic and socio-economic profiles of GLFs, and identify traditional farming practices and associated challenges. Data were collected from 200 GLFs using a structured questionnaire in the four peri-urban local government areas of Ibadan (Egbeda, Akinyele, Oluyole, and Ido). The questionnaire covered demographic and socio-economic characteristics, farm production attributes, and green-leafy farming approaches. The data were analysed using descriptive statistics to summarise the findings. The study found that manual weeding, watering, and application of herbicides and insecticides were common practices among GLFs in the peri-urban in Ibadan. The majority of GLFs were male, aged 20-40 years, and had received no formal training before farming. Current farming practices were ineffective in production technique, time-consuming nature, and labour intensiveness. The study concludes that there is a need for regular training and re-training of GLFs through extension agents to improve productivity and ensure food security. At the same time, the government at all levels supports GLFs with training programs and access to modern farming techniques to enhance their farming practices and livelihoods.

**Keywords:** Green Leafy Farmers; Traditional approaches, Peri-urban, Socio-economic characteristics.

## Introduction

The global human population is growing by 1.1% per year and is expected to surpass 8.6 billion by the year 2030. United Nations data indicates that over half of the world's population lived in urban and peri-urban areas in 2018, with this figure projected to increase by 68% in 2050 (UN, 2019). Urban areas, characterised by high population density and developed infrastructure, are juxtaposed with peri-urban areas, serving as the rural-urban interface (Levasseur *et al.*, 2007). As of 2021, approximately 4.48 billion people reside in urban areas worldwide, while 3.52 billion are in peri-urban and rural areas (United Nations, 2021). In Nigeria, around 111.5 million people live in urban areas, compared to 90.5 million in peri-urban and rural areas (World Bank, 2021). The escalating urban population is predicted to pose challenges in infrastructure, social services, technology and agriculture (Rai *et al.*, 2019). Additionally, peri-

urban areas face reduced natural infrastructure capacity to support populations (Hutchings *et al.*, 2022). In particular, the amount of agricultural land that is depleted by dispersed and inefficient urban growth is significant (Hasse & Lathrop, 2003; Bako and Ojolowo, 2021); this has caused the land to become fragmented, dividing it into urban-peri-urban regions (Al Tarawneh, 2014). The emergence of the peri-urban region has aggravated access to healthy vegetables owing to long distance and high cost of transportation from production sources (Badmus & Yekinni, 2011). To mitigate this will mean the promotion of green leafy farming in peri-urban areas to make food and income available at the household level (Hoornweg & Munro-Faure, 2008).

Green leafy farming plays a vital role in peri-urban agriculture globally (De Zeeuw *et al.*, 2011), supporting both subsistence and commercial farming livelihoods (Van Veenhuizen and Danso, 2007).

Green leafy vegetables are rich sources of essential nutrients and antioxidants, aiding in digestion by reducing acidity and toxicity of digestion products (Shakya and Khwaounjoo, 2013). They are highly favoured by people worldwide. Green leafy farming has emerged as a crucial agricultural enterprise for income generation and employment creation in urban and peri-urban areas (Rai, et al., 2019; Mariyono (2017). As opined by Hoornweg & Munro-Faure (2008), urban vegetable production gives communities a healthy diet and a source of income, ensuring food security, nutrition, and improved livelihoods. According to Drechsel and Keraïta (2014), leafy salad green is heavily leafy and achieve the best revenues among urban farmers in Ghana.

Nigeria with a population of about 200 million, has over half residing in urban and peri-urban areas (Chigbu and Antonio, 2019). Ibadan, the capital of Oyo State in southwestern Nigeria, is a major city with an estimated population of 3,565,108 as of 2018 (WPR, 2022). Peri-urban farmers in Ibadan contribute significantly to Nigeria's food production, with about 40% of residents directly or indirectly involved in food production (Ogunniyi et al., 2017). Peri-urban agriculture is the main source of green leafy vegetables consumed globally by urban populations (Pokhrel, 2010). Thus, tremendous production pressures are put on peri-urban green leafy farmers to meet the demands of an increasing urban dwellers. However, Nigeria faces a yearly supply-demand deficit of about 13 million metric tons of vegetables, partly due to low productivity in vegetable farming attributed to constraints such as limited land and water availability, environmental pollution, rising cost of inputs and low profitability (Zhou and Staatz, 2016).

The cultivation of vegetables during the dry season in peri-urban Ibadan was studied by Kintomo et al. in 1997. The results indicated that the major crops grown were Corchorus, Amaranthus and Celosia. Adebisi et al. (2020) investigated the drivers and constraints to the adoption of organic leafy vegetable production at the household level in Nigeria and found that a mix of factors, which include institutional considerations, farmers' livelihood assets and vulnerability contexts, their livelihood activities, and gender-related variables shaped adoption decision-making.

Identifying constraints in green leafy farming is crucial for planning intervention strategies.

Constraints include limited land availability and accessibility, poor water quality and inadequate water sources, lack of supportive government policies, limited access to credit facilities,, environmental pollution, inadequate farming infrastructure, and poor storage facilities and marketing strategies (Ruel and Levin, 2002; Emanu and Gebremedhin, 2007; Appleton et al., 2016). Addressing these challenges requires assessing traditional farming practices to identify gaps for targeted interventions by policymakers, governments, and NGOs. This study aims to profile green leafy farmers in peri-urban areas of Ibadan and investigate traditional farming approaches and associated challenges.

## Methodology

### Study Area

This study was conducted in Ibadan, Oyo State, Nigeria, situated between Latitude 7.3775° N, and Longitude 3.4670° E; and Latitude 7.3775° N and Longitude 3.5564° E in the South-West geo-political zone of the country. Oyo State spans 27,249 square kilometres with a population of 5,591,589 as per the 2006 national population census. It shares a border with Ogun State to the south, Kwara State to the north, the Republic of Benin to the west and Osun State to the east. The state experiences an equatorial climate with distinct wet and dry seasons, the former lasting from April to October and the latter from November to March. The average daily temperature ranges between 25°C and 35°C throughout the year. The state's vegetation comprises rainforest in the south and guinea savanna in the north. Ibadan, the capital and largest city of Oyo State is the third most populous city in Nigeria after Lagos and Kano, with an estimated population of 3,649,000 as of 2021. It is also the country's largest city by geographical area. Located in southwestern Nigeria, Ibadan is 128 kilometres (80 mi) inland northeast of Lagos and 530 kilometres (330 mi) southwest of Abuja, the federal capital. The city serves as a major transit point between the coastal region and the country's hinterland. Ibadan has historically been the administrative centre of the old Western Region since the early days of British colonial rule, and remnants of its ancient protective walls still exist. The city is predominantly Yoruba, with various other ethnic groups such as Igbo, Hausa, and Efik also present. Ibadan is divided into eleven local government areas, consisting of five urban local



governments(Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East and Ibadan South-West) and six peri-urban local governments (Akinyele, Egbeda, Ido, Lagelu, Ona Ara and Oluyole). Figures 1 and 2 show the peri-urban local governments of Ibadan.

### Sampling technique and sample size

This study was conducted in peri-urban areas of Ibadan, Oyo State, Nigeria. Following the methodology of Adeyemo *et al.* (2017), a multi-stage sampling procedure was employed to select the sampled farmers. In the first stage, four local government areas (LGAs) were randomly chosen using a table of random numbers. The selected LGAs were Egbeda, Akinyele, Oluyole and Ido LGAs. There was no available record of the number of green leafy farms in each selected LGA in literature or any government archives, as the majority of these farms

were unregistered. A total of 401 farmers were enumerated during the field survey as presented in Table 1. The minimum sample size required from each unknown population (each LGA) was calculated following the approach of Charan and Biswas (2013) using the following formula:

$$n = \frac{Z^2 (P)(1-P)}{c^2}$$

Where:

n = Minimum sample size required

z = standard normal deviation set at 95% confidence level (=1.96)

p = percentage picking a choice or response (Assumed to be 10% or 0.1)

c = confidence interval (at 95% confidence level =0.05)

Thus, a minimum of 138 farmers could be sampled. However, 201 (50%) farmers were sampled to

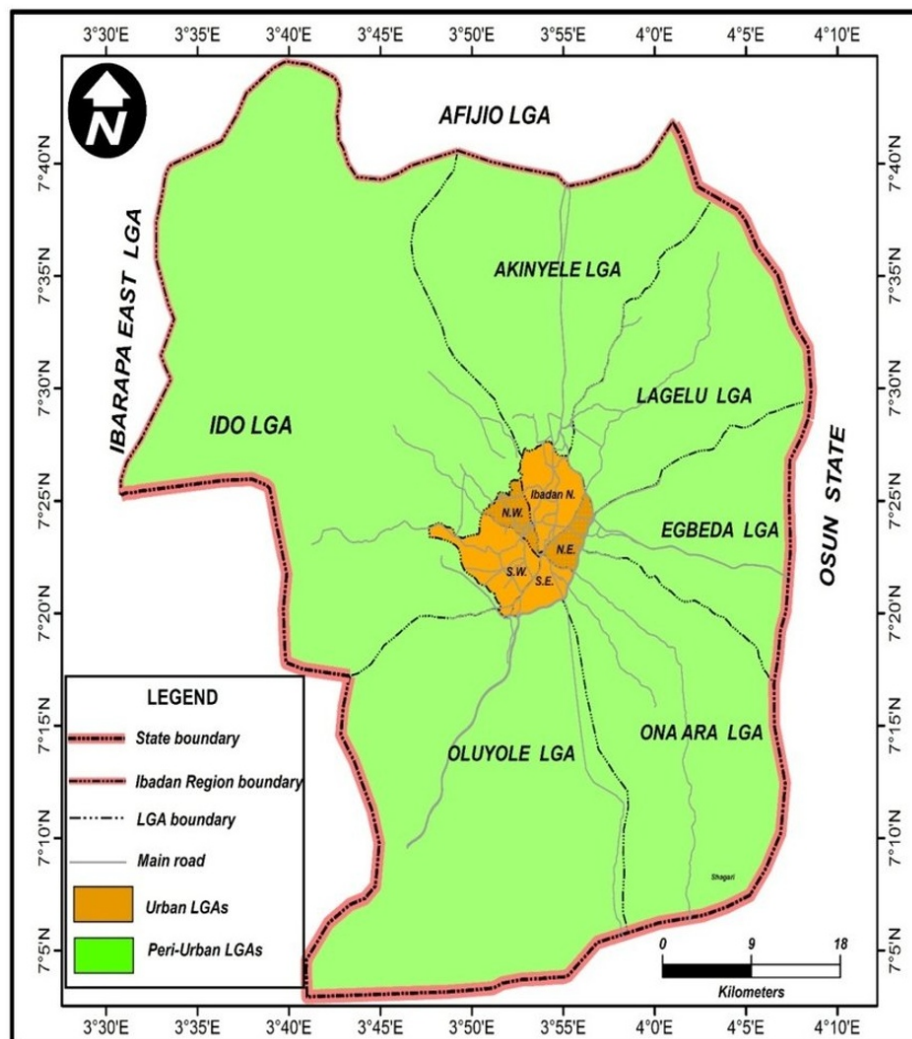
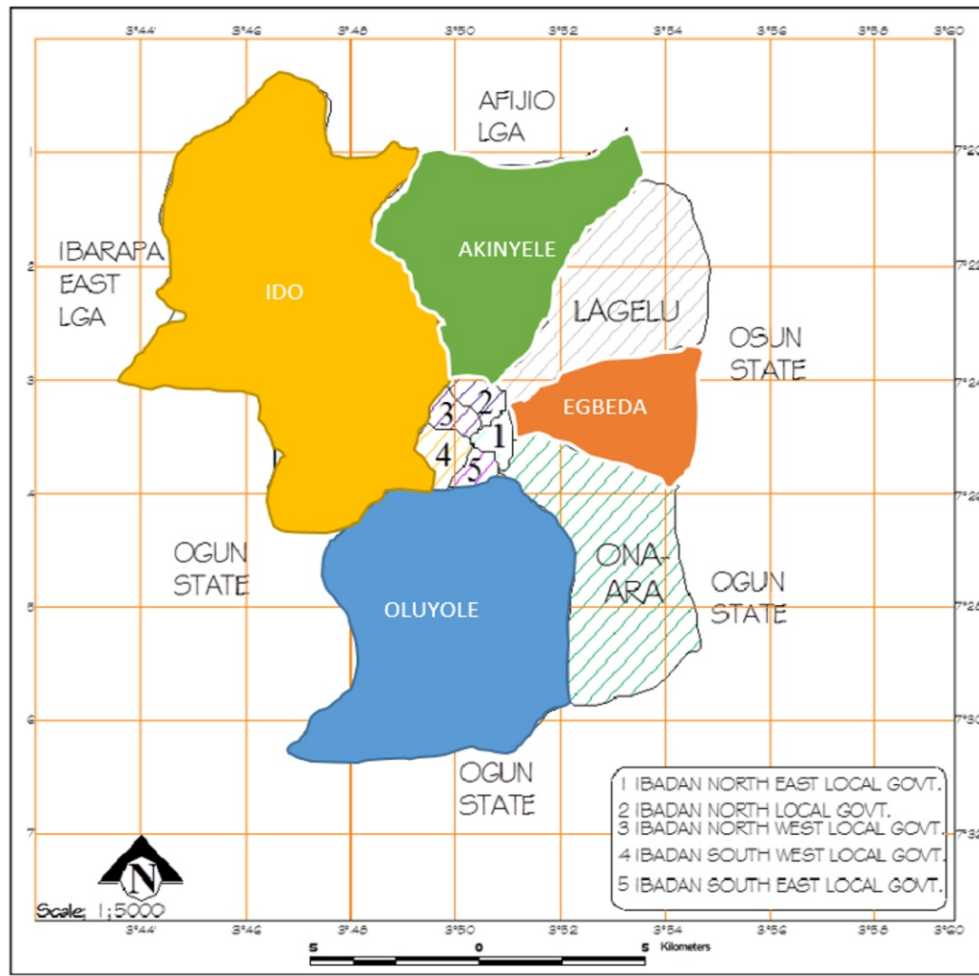


Figure 1: Map of Ibadan showing the peri-urban areas of the city



**Figure 2:** Map of Ibadan showing the four peri-urban areas used for this study

facilitate equitable representation of green leafy vegetable farmers across the LGAs. government. The number of farmers sampled from each LGA is presented in Table 1.

**Table 1:** Number of farms and farmers sampled from each Local government area (Sample size)

Local Government Area	Number of farmers	Number of Sampled farmers
Egbeda	122	61
Akinyele	116	58
Oluyole	86	43
Ido	77	39
<b>TOTAL</b>	<b>401</b>	<b>201</b>

Quantitative data including the age of respondents, the number of years of formal education, farm size, yearly revenue, water source, type of green leafy species cultivated, and production pattern, as well as qualitative data on traditional approaches (innovations on the farm) were collected from

respondents using structured interview schedule with both open and closed-ended questions. The primary aim was to obtain information on the demographic and socio-economic characteristics of respondents, farm and production attributes, and traditional approaches to green leafy farming.

To assess the frequency of application of these approaches, a Likert scale measurement was employed, where:

*Always:* The specified practice is applied at least 80% of the time in a production cycle.

*Occasionally:* The specified practice is applied about 40% of the time in a production cycle.

*Rarely:* The specified practice is applied less than 20% of the time in a production cycle.

*Never:* The specified practice is applied 0% of the time in a production cycle.

Data on socio-economic and demographic characteristics of respondents included age, sex,



marital status, highest level of education, nature of training received in green leafy farming (if any), experience in green leafy farming, farm size, method of obtaining land for green leafy farming, production pattern (all-year, dry or wet season pattern) and primary sources of water for farming operations. Additionally, data on the frequency of adoption of traditional practices such as manual weeding, manual watering, use of sewage water, and application of pesticides were collected. Moreover, data on challenges associated with current production, irrigation, storage, transportation, and marketing methods were collected based on their efficiency, time-consuming nature, labour intensity, impact on the quality of produce, and cost.

### Data Analysis

Data analysis was conducted using IBM SPSS Statistics 20, employing descriptive statistical methods such as tables, charts, percentages and the calculation of means and standard deviations. These analysis were used to summarise and present the data effectively. One farmer chose not to respond, thus 200 questionnaires in all were collected and analysed.

## Results and Discussion

### *Socio-economic characteristics of green leafy vegetable farmers in peri-urban locations of Ibadan*

The analysis of the socio-economic characteristics of green leafy vegetable farmers in the peri-urban areas of Ibadan, presented in Table 2, indicates a male dominance in the agricultural sector. The study encompassed four local government areas: Egbeda, Akinyele, Oluyole and Ido. It was observed that the majority of green leafy vegetable farmers in these areas were male consisting 96% of the farmers, while only 4% were female. this aligns with findings by Bamire and Oke (2003), who noted a similar predominance among vegetable farmers in southwestern Nigeria. The gender in green leafy farming in Nigeria is largely attributed to women's limited access to land and financial resources (Levasseur *et al.*, 2007).

When women do have access to land, their plots are often smaller and have poorer soil conditions or watering facilities compared to those of men (Kessler *et al.*, 2004). Limited access to credit further hinders women from engaging in commercial vegetable production. However, women frequently contribute to farming activities in their husband's fields, participating in activities such as sowing,

**Table 2:** Socio-economic characteristics of green leafy vegetable farmers in peri-urban locations of Ibadan

Variables	Egbeda LGA (n=61)	Akinyele LGA (n=58)	Oluyole LGA n=43	Ido LGA (n=38)	Total (n=200)
<b>Gender</b>					
Male	58	55	41	37	192 (96%)
Female	3	2	2	1	8 (4%)
<b>Age</b>					
<21	3	5	4	2	14 (7%)
21-30	15	10	7	11	43 (21.5%)
31-40	29	30	24	19	102 (51%)
41-50	11	11	6	4	32 (16%)
51-60	2	2	1	2	7 (3.5%)
>60	1	0	1	0	2 (1%)
<b>Education</b>					
SSCE	38	30	21	15	104 (52%)
NCE	9	7	5	4	25 (12.5%)
ND	8	11	7	5	31 (15.5%)
HND	4	6	7	5	22 (11%)
BSc	2	3	2	6	13 (6.5%)
Masters	0	1	1	3	5 (2.5%)
PhD	0	0	0	0	0 (0%)
<b>Marital Status</b>					
Single	11	7	9	6	33 (16.5%)
Married	48	49	31	28	156 (78%)
Divorced	2	1	3	3	9 (4.5%)
Widow/widower	0	1	0	1	2 (1%)

transplanting, small-scale irrigation, harvesting, and transport. Despite their contributions, the income generated is typically retained by the husband (Obuobie *et al.*, 2006). As a result, women often play a significant role in the marketing of vegetable products, either as wholesalers or retailers (Levasseur *et al.*, 2007). Regarding age distribution among green leafy farmers in the study area, the majority fell within the 31–40 age range (51%), followed by 21–30 years (21.5%), 41–50 years (16%), <21 years (7%), 51–60 years (3.5%), and >60 years (1%).

The study revealed that about 80% of the farmers can be categorized as youth and middle-aged. The present report agrees with the findings of Adeyemo *et al.* (2017) and Bamire and Oke (2003), who reported that the majority of green leafy farmers in Ibadan, Oyo state and in Ilesa, Osun State, respectively, were male between the ages of 31 to 40 years. Furthermore, Rai *et al.* (2019) reported that 75% of green leafy farmers in Nepal were between the age group of 30–60 years.

In terms of educational qualifications, about half (52%) of the farmers only had SSCE certificate, while about 28% had either NCE or ND certificates. Further, about 17.5% of the farmers had either HND or BSc certificates, while only 2.5% had postgraduate qualifications. The preponderance of farmers with SSCE certificate in the present study agrees with the findings of Adeyemo *et al.* (2017), Bamire and Oke (2003) and Oluwalana, *et al.* (2016), who found that more than 50% of green leafy farmers in Oyo, Osun and Ogun states, respectively, only had basic secondary school education. Higher level of education facilitates greater adoption of innovations in sustainable good agricultural practices (Bamire and Oke, 2003). Thus, governmental policies geared towards the adoption of innovations in sustainable good agricultural practices should target improvement in the level of education among green leafy vegetable farmers. This could increase their chances to obtaining and understanding better information on improved farm practices, leading to enhanced production. In terms of marital status, the analysis revealed that overwhelming majority (78%) of the farmers were married, while only about 16.5% were single. This conforms with the findings of Oluwalana *et al.* (2019), who also reported that about 85% of green leafy vegetable farmers in Ogun State were married.

Farm and production characteristics of green leafy vegetable farmers across Egbeda, Akinyele, Oluyole and Ido Local Government areas of Ibadan are presented in Table 3. The study revealed that green leafy vegetable farmers in Akinyele LGA had the highest mean experience in green leafy vegetable farming (8.55 years), followed by farmers in Egbeda LGA (6.47 years), Oluyole LGA (4.33 years), and Ido LGA (3.81) with the least average experience in green leafy farming. Furthermore, a similar trend was also observed for farm sizes. Mean farm sizes (acres) were found to be highest in Akinyele LGA (2.11 acres), while farm sizes in Oluyole LGA (1.04 acres) were found to be smallest. The higher years of experience in green leafy vegetable farming and larger farm sizes in Akinyele and Egbeda LGAs could be due to the fact that these two LGAs comparatively have lower population densities compared with Oluyole and Ido LGAs and thus experience lower competition for resources like land.

In terms of the means of acquisition of land for farming, the majority of farmers inherited the land (65.5%), 3.5% bought the land, while 31% of green leafy vegetable farmers obtained the land by lease. Contrary to the present findings, Rai *et al.* (2019) reported that about 94% of green leafy farmers in Nepal have leasehold farmland. For water source, it was discovered that rainwater (60%) was the dominant source of water for green leafy vegetable farming in the area, while stream and lake (1.5%) were the least. Other notable sources of water for green leafy vegetable farming included rivers (17.5%), well water (12 %) and borehole water (18%).

In terms of production pattern, the analysis showed that the majority of green leafy vegetable farmers (60.5%) only cultivate during rainy season, while 27% produced all-year-round and 12.5% only produced during the dry season. In terms of the number of green leafy vegetable species cultivated per season, the study revealed that about half (51%) of green leafy vegetable farmers across the four LGAs cultivate only 1 green leafy vegetable per production season, while 45.5% cultivated 2–5 vegetables. Only 3.5% of farmers indicated that they usually cultivate 6–10 vegetables, while none cultivated more than 10 vegetables per production season.

**Table 3:** Farm and production characteristics of green leafy vegetable farmers in peri-urban locations of Ibadan

Variables	Egbeda LGA n=61	Akinyele LGA n=58	Oluyole LGA n=43	Ido LGA n=38	Total n=200
Experience in GLV farming (years)	6.47	8.55	4.33	3.81	
Farm size(acres)	1.70	2.11	1.04	1.28	
Land for GLV farming					
Inheritance	42	43	28	18	131 (65.5%)
Bought the land	0	1	2	4	7 (3.5%)
Lease	19	14	13	16	62 (31%)
Source of water					
Borehole	2	4	3	9	18 (9%)
River	17	13	4	1	35 (17.5%)
Stream/lake	0	2	1	0	3 (1.5%)
Rain water	39	34	29	18	120 (60%)
Well water	3	5	6	10	24 (12%)
Production pattern					
All-year	13	16	11	14	54 (27%)
Rainy season	40	35	26	20	121 (60.5%)
Dry season	8	7	6	4	25 (12.5%)
<b>Number of GLV cultivated per season</b>					
1	26	29	25	22	102 (51%)
2-5	33	28	18	12	91 (45.5%)
6-10	2	1	0	4	7 (3.5%)
>10	0	0	0	0	0 (0%)

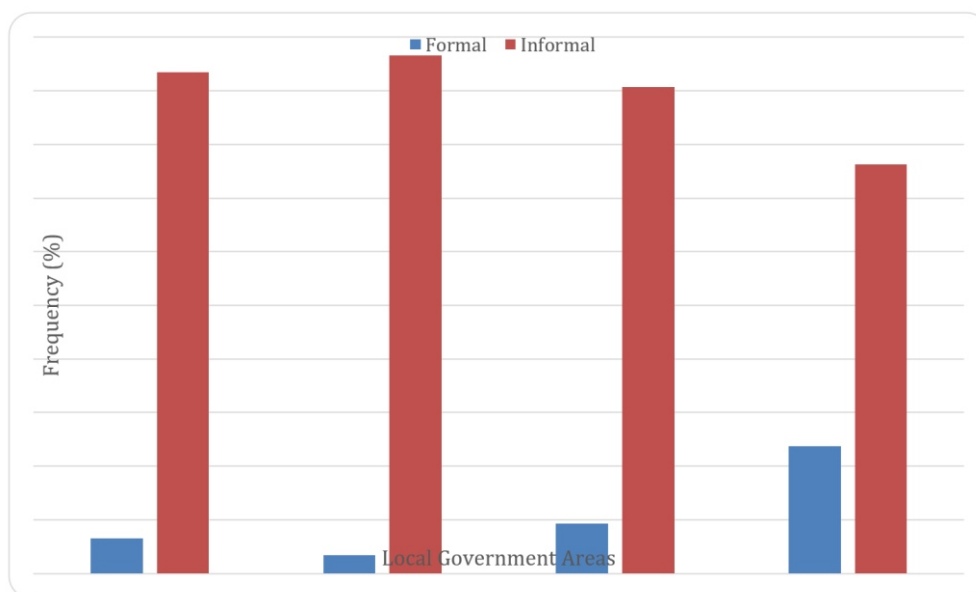
#### ***Traditional approaches to green leafy farming and their challenges in peri-urban locations of Ibadan***

The nature of the training received by green leafy vegetable farmers across four local government areas in Ibadan is presented in Figure 3. The study revealed that consistently across the four LGAs, the majority of green leafy vegetable farmers (>70%) received informal training, and only a minority received formal training. In Egbeda, Akinyele and Oluyole local government areas, the analysis showed that the proportion of green leafy vegetable farmers that received formal training was less than 10%. However, more than 20% of farmers in Ido Local Government received formal training before farming.

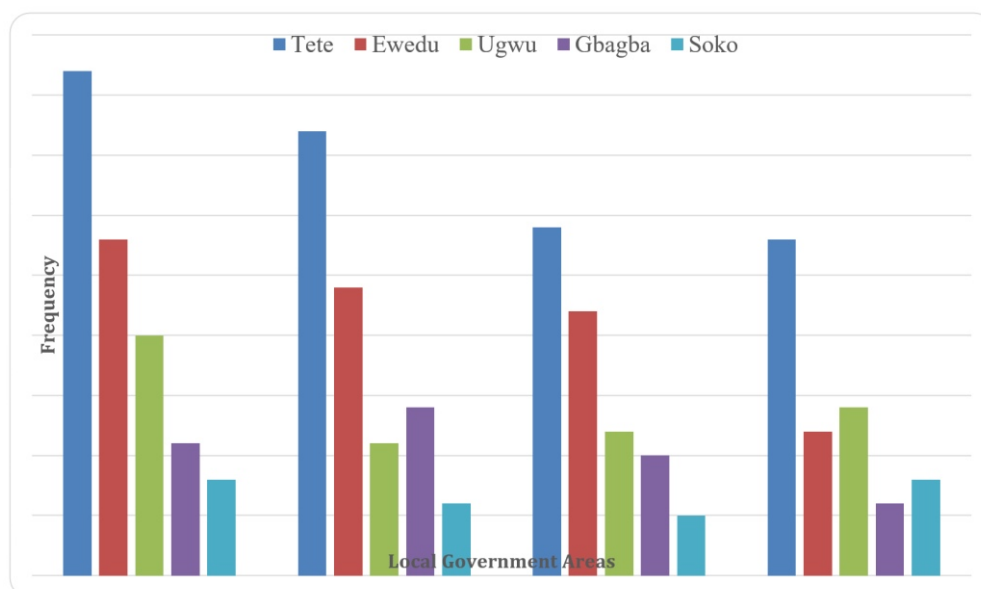
The predominant green leafy vegetables cultivated by farmers in Egbeda, Akinyele, Oluyole and Ido local government areas of Ibadan are presented in Figure 4. The analysis showed that African Spinach (*Amaranthus cruentus*) (*Efo Tete*) was the most cultivated vegetable across the four local government areas. In Egbeda LGA, the study revealed that Jute leaves (*Corchorus olitorius*) (*Ewedu*) were the most cultivated vegetable after African Spinach, followed by Fluted Pumpkin Leaves (*Telfairia Occidentalis* Ugu) (*Ugwu*), African eggplant (*Solanum macrocarpon*) (*Efo Gbagba*) and Green amaranth (*Amaranthus retroflexus*) (*Efo Soko*), in that order. A similar trend was also observed in Oluyole LGA.

However, Fluted Pumpkin Leaf was the most predominant green leafy vegetable after African Spinach, followed by Jute leaves, Green amaranth and African eggplant, in that order. In Akinyele LGA, Jute leaves were also the most cultivated vegetable after African Spinach followed by African eggplant, Fluted Pumpkin Leaves and Green amaranth, in that order. This agrees with the findings of Ejoh and Samuel (2016) who reported that the most cultivated green leafy vegetables in southwestern Nigeria were African Spinach and Jute leaves.

The diversity of current green leafy vegetable farming practices by farmers in peri-urban locations of Ibadan is presented in Figure 5. The analysis revealed that the most widely practised traditional farming practices included manual weeding, manual watering, and the application of herbicides and pesticides. Furthermore, more than 90% of farmers indicated that they manually weed their farms. A similar trend was also observed for manual watering, with more than 80% of farmers indicating that manual watering is a regular agricultural practice on their farms. The application of herbicides and pesticides was also a common farm practice, as more than 50% of green leafy farmers indicated that they usually apply herbicides and pesticides. Conversely, more than 60% of respondents had never used sewage water or treated sewage water for planting.



**Figure 3:** Distribution of green leafy vegetable farmers in peri-urban locations of Ibadan based on nature of training received

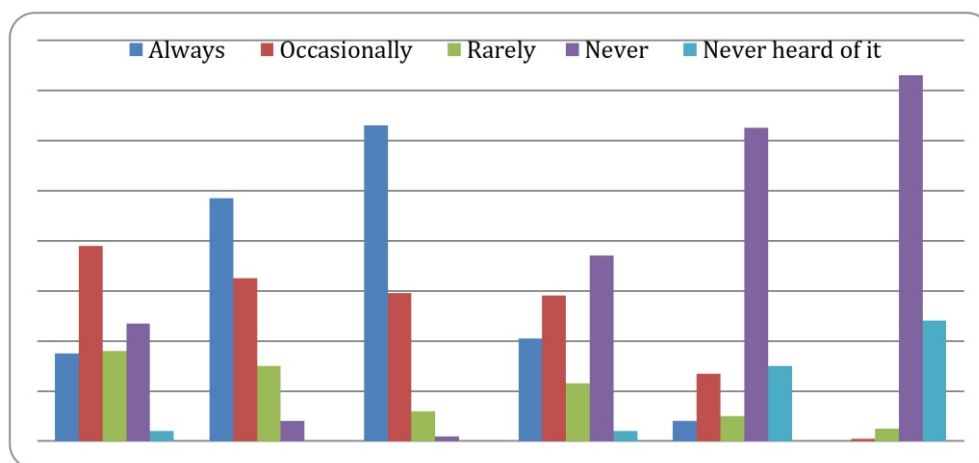


**Figure 4:** Predominant green leafy vegetables cultivated by farmers in peri-urban locations of Ibadan

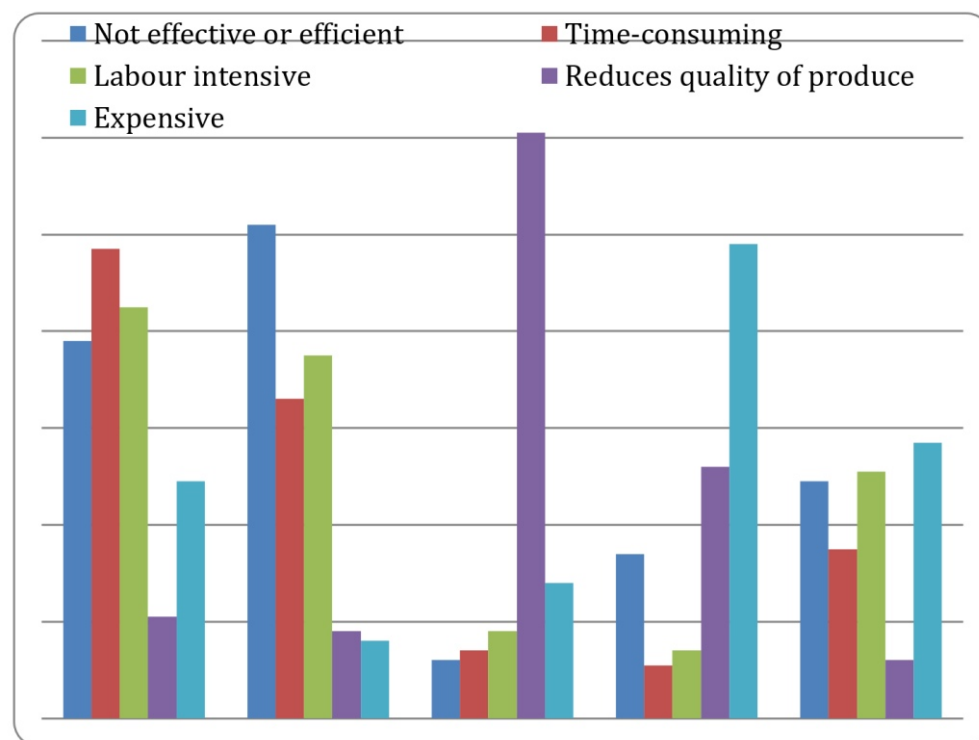
The perceived challenges in the current production, irrigation, storage, transportation and marketing methods by green leafy vegetable farmers in peri-urban locations of Ibadan are presented in Figure 6. The analysis showed that respondents identified the time-consuming nature as their greatest challenge in the production method, followed by the labour intensiveness, inefficiency, expensive nature, and reduction in the quality of produce, in that order. For irrigation methods, inefficiency was identified as the greatest challenge, with irrigation methods closely followed by labour intensiveness. Further, the study

showed that current storage methods were deemed to reduce the quality of farm produce, while transportation methods were identified to be expensive. In terms of marketing, the inefficiency of the method, labour demands, and the cost of marketing methods were the greatest identified challenges.

The comparative yearly gross margin of green leafy vegetable farmers in peri-urban locations of Ibadan based on the nature of the training received is presented in Figure 7. The study revealed that green leafy farmers who received formal training



**Figure 5:** Current green leafy farming traditional practice by farmers in peri-urban locations in Ibadan



**Figure 6:** Identified challenges with current practices in green leafy farming by farmers in peri-urban locations of Ibadan

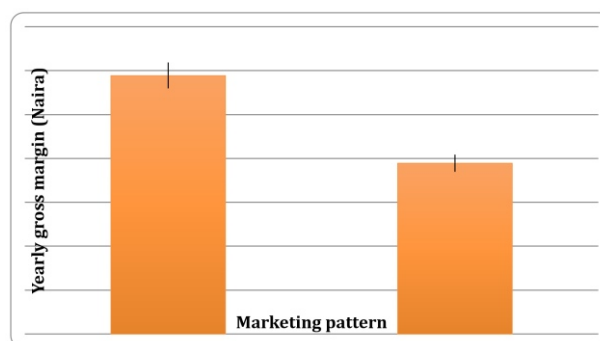
significantly had a higher yearly gross margin than farmers who received informal training. Furthermore, as presented in Figure 8, the comparative yearly gross margin of green leafy farmers in peri-urban locations in Ibadan based on their marketing pattern showed that farmers who market their produce synchronously with other farmers in groups had a higher yearly gross margin than farmers who market their produce individually. The comparative yearly gross margin of green leafy

farmers in peri-urban locations in Ibadan based on their production pattern is presented in Figure 9. The analysis showed that farmers who cultivate green leafy vegetables during the dry season marginally had a higher gross margin than farmers who cultivate all year round, while farmers who cultivate only during the rainy season had the least. This could be because prices of produce are usually higher during the dry season. Dry-season production enhances the net income of producers, raises the producer's standard

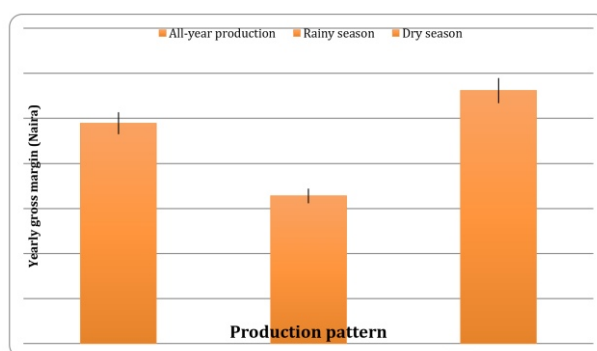




**Figure 7:** Comparative yearly gross margin of green leafy farmers in peri-urban locations in Ibadan based on nature of training received



**Figure 8:** Comparative yearly gross margin of green leafy farmers in peri-urban locations in Ibadan based on their marketing pattern



**Figure 9:** Comparative yearly gross margin of green leafy farmers in peri-urban locations in Ibadan based on their production pattern

of living, and ensures a year-round supply of vegetables to consumers (Bamire and Oke, 2003).

### Summary of Findings and Conclusion

The study focused on four peri-urban local government areas of Ibadan (Egbeda, Akinyele, Oluyole and Ido LGAs) and gathered data from 200 green leafy vegetable farmers. The findings revealed that the majority of these farmers were male, married and had SSCE as their highest qualification. They had varying experience in green leafy farming with most inheriting the land they farm on. Traditional farming practices like manual weeding and watering, as well as the application of herbicides and pesticides, were prevalent.

in conclusion, the study found that the majority of green leafy farmers in the study area are male, predominantly aged 20-40 years, and lack formal training before farming. They typically inherited their farming land, relied on rainwater for irrigation, and mostly farmed during the rainy season. The main challenges they faced included manual ineffective productive production techniques, the time-consuming nature of farming activities and labour intensiveness. Based on these findings, it is recommended that government at all levels, through extension agents, provide regular training and re-training for GLF on improved production practices and marketing systems. This approach can increase productivity, enhance food security and improve the livelihoods of these farmers.



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