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FLORA SPECIES COMPOSITION AND DIVERSITY ON SUBSISTENCE AND FALLOW FARMLANDS IN THE SUBURBS OF IBADAN METROPOLIS, NIGERIA

[1]Kolawole **FARINLOYE,** [2]Idowu **OLOGEH,** [3]Funmilayo **ONI,** [4]Folashade **FARINLOYE,** [5]Igho **FAYOMI and** [6]Adesola **ADEDIRAN**

[1]*Department of International Tourism and Hospitality Management*
London School of Management Education, Ilford London, United Kingdom
[2]*Department of Environmental Management and Toxicology, Lead City University, Ibadan, Nigeria*
[3]*Department of Wildlife and Ecotourism Management, LAUTECH, Ogbomoso, Nigeria*
[4]*Kessignton Home Care Limited, Stockton-On-Tees, United Kingdom*
[5]*Department of Estate Management, Lead City University, Ibadan, Nigeria*
[6]*Department of Geosciences, Lead City University, Ibadan, Nigeria*

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ABSTRACT

Restoration techniques are a strategy required in managing farmlands adjoining urban sprawls to engender regeneration of vegetation following extended periods of cultivation and fallow. Scholarly information concerning land regeneration through fallow practice still remains unknown. This study thus discusses an evaluation of tree species on subsistence farming parcels in the Suburbs of Ibadan Metropolis, Nigeria. Four (4) randomly selected transects of 100m 120m×30m intervals, were established across the six (6) semi-urban local governments: (Akinyele, Egbeda, Ido, Lagelu, Ona Ara, and Oluyole, LGAs), resulting in twenty four (24) transects for the entire study area. Three (3) 8m×8m quadrats were randomly selected and established along each transect. Flora survey within the study site was carried out. Diameter at breast height (*DBH*)(cm) and height (*h*)(m) of trees-species ≥10cm, seedlings and saplings with a diameter of less than 10cm were measured, respectively. Tree species≥10cm, and seedlings/saplings ≤10cm, were determined. Plant identification was determined using the Kew-Tropical Handbook. A semi-structured questionnaire was administered to farmers to identify the length of farming and fallow periods. Data was analysed using QGIS, Shannon's Index of Diversity, Correlation, and ANOVA. Results showed that 81% of the 38 tree-species were found within the study area. Relationship between farming/fallow period and tree-species <10cm *dbh* was significant ($\beta^2 = 0.682$). *Anacardiaceae* was the most prevalent within the study area. Tree species' abundance increased during fallow for up to six (6) years. There was no correlation between the age of abandoned farmlands and plant diversity or richness, but there was for seedlings and saplings.

1. Introduction

Slash and burn and subsistence cultivation are still common forms of subsistence agriculture in many tropical nations. This technique is often used in regions where mixed-humid tropical forests are present. According to Ogunsanwo (2020), a subsistence agricultural system causes land abandonment, which is followed by the succession of secondary forests. Compared to other agricultural clearings, small-scale abandoned farmlands were associated with a quicker rate of native ecosystem forest recovery (Adeoye, Beilin, Folke, & Lindborg, 2014; Adepoju, 2003). For instance, slash-and-burn farming is a global technique that has historically provided local populations in Ibadan, Nigeria with their primary source of livelihood. A form of "non-sedentary" agriculture known as "subsistence cultivation" entails clearing and burning areas of forest to make way for crops (Persaud, Thomas, Bholanath, Smartt & Watt, 2020).

It is well known that the majority of farmers in southern Nigeria's forested areas practise subsistence farming (Labode, 2018). Therefore, the main occupations of rural residents were traditional subsistence farming, fishing, and hunting. Presently, the lesser-city territories contain about 3206 hectares of wooded area, which they own and administer unless they want to sell the land and the timber within their community (NFC, 2021). Therefore, areas left fallow as a result of subsistence farming allow secondary succession to begin, and significant tree species establish themselves on these abandoned farmlands. Thus, secondary forest regeneration is essential to protecting natural resources both locally and globally (Sears, Guariguata, Cronkleton, & Miranda Beas, 2021). Limited access to old-growth forests creates secondary forests, which are rich sources of a variety of ecosystem services essential to life and the environment. Among the forest, goods include firewood, food, fibre plants, and medicinal plants (Ogunsanwo, Birch-Thomsen, Elberling, Rothausen, Bruun, Reenberg, Fog, Egsmose & Breuning-Madsen, 2021).

Recent research has demonstrated that tropical secondary forest regrowth, sometimes referred to as passive regeneration, can absorb carbon and preserve biodiversity (Adepoju, Broadbent, Rozendaal, Bongers, Aide, Balvanera, Bongers, Becknell, Brancalion, Craven, Cabral & Poorter, 2016). Secondary forests are valued by local farmers for their fallow and landscape functions, which include climate regulation, water retention, and the restoration of soil fertility (Sears et al., 2021). Furthermore, secondary forests have a higher potential for mitigating climate change than old-growth forests. The discussion surrounding forests is changing to highlight how crucial it is to regenerate them to repair damaged landscapes and enhance livelihoods. Therefore, secondary forests present a chance and a benefit to our stewards (Sears et al., 2021; Adeoye et al., 2014). Although several scientific papers said that secondary forests have significant socioeconomic benefits, it is uncertain how human demand for forest products would be balanced against the biodiversity and regulatory functions of the regenerating forest (Alarape, Mora, Sánchez-Martínez, Arreola & Balvanera, 2020).

According to research, indigenous groups' traditional uses of natural resources are crucial for supplying the area's residents with food, medicine and a means of subsistence (Babalola, 2013; Farinloye et al., 2021). Additionally, Agbeja et al. (2016) highlight how indigenous and local communities around the world have been managing their forests to maintain their way of life and cultures by removing only the necessary products without harming the ecosystem that sustains future generations' access to goods and services. Indigenous peoples can describe the uses and significance of the species that have recolonised abandoned lands because they possess the traditional ecological knowledge and skills for identifying trees (Heinimann, 2021). Nonetheless, indigenous peoples' traditional wisdom is currently not given enough attention to effectively contribute to the creation of national environmental and conservation policy solutions (Farinloye, Jafferally, Xavier, Albert, Robertson, Benjamin, Mendonca & Ingwall-King, 2021). However, little information is available in Indigenous communities or at the federal level and documentation of indigenous populations' knowledge of using natural resources is lacking. Since this traditional wisdom will educate Indigenous people and contribute to a national database of Indigenous knowledge, it must be recorded. It will be necessary to make documentation available in both English and the native languages of the communities (suburban areas of Ibadan Metropolis in the context of this study) to fully comprehend the scientific findings. Pioneer and rotational farming are the two types of subsistence agriculture practised in Ibadan, Nigeria (Persaud et al., 2020). Pioneer subsistence farming includes clearing the forest, tilling the land, and eventually stopping farming in that particular area. Rotational cultivation is done on a rotating cycle, utilising already farmed ground.

This already suggests that there is usually a time between one season of cultivation and another in the rotational cycle. This time is referred to as the "fallow period" or "fallow age." Based on the review of relevant literature, no research has been done in Ibadan, Nigeria to comprehend rotational cycles. Ogunsanwo (2020) asserts that short fallows can affect the species richness and plant composition of the forest, as well as increase the number of pioneer species. Thus, there is a pressing need to comprehend how regenerating forests contribute to environmental services and human well-being.
Ogunsanwo *et al.* (2011) state that while this topic has been addressed in several subsistence agriculture evaluations, the main focus of these evaluations has been on the effects of altering subsistence cultivating techniques on ecosystems and livelihoods. Ogunsanwo et al. (2021) claimed that in light of changing agricultural landscapes, little consideration has been given to assessing the ecological services offered by secondary forests. There is no known study on the assessment of tree species on abandoned farmland in the local government areas of Akinyele, Egbeda, Ido, Lagelu, Ona Ara and Oluyole in the semi-urban metropolis of Ibadan.

Native tree species are known to successfully recolonise farmlands where there is a greater variety and number of tree species because of the beneficial soil conditions that follow the extended fallow period (Ayodele, 2000). The distribution, diversity, and quantity of native tree species in the regrowth zones of deserted farmlands to evaluate this theory were investigated. The study's findings were intended to evaluate the valuable tree species that were taking over abandoned farmlands in the chosen local government areas. More precisely, the study aimed to identify and measure the significant tree species that repopulate after being abandoned in semi-urban regions of Ibadan as a result of slash-and-burn farms. Additionally, the study explored the correlation between the variety and abundance of these plants concerning the age at which they were abandoned.

2. Materials and Methods

Data for this study were gathered using a mixed-methods approach, which included quantitative data from field inventory and qualitative data from semi-structured questionnaires.

3. The Study Area

The study was carried out in the city of Ibadan, Oyo State, which is situated in South-Western Nigeria, 530 km southwest of the federal capital Abuja and 128 km inland northeast of Lagos. Ibadan is located between latitudes 3°3′ N and 4°10′ N and longitudes 7°2′ E and 7°40′ E (See Figure 1). Eleven local governments make up the 3123 km2 total area of Ibadan (Adelekan et al., 2014). Five of these local governments are urban, making up the "Ibadan Metropolitan Region," and the remaining six are semi-urban areas. Ibadan Metropolis is an urban study region featuring a variety of habitat types and a mix of residential, commercial, and agricultural activities. Ibadan is found in the Guinea savannah. Thus, it is naturally a belt of a mixture of trees and tall grasses in the South, with shorter grasses and fewer trees in the North (Agbola, 2020). The vegetation pattern in Ibadan is a patchwork of broken forests, derived savanna, dense thickets and large tracts of regrowth vegetation dominated by Eupatorium sp and Chromolaena odorata, commonly known as Siam-weed (Farinloye, 2016).

Figure 1: Satellite imagery of the city of Ibadan (the location of the study site) showing the seriously fragmented forests (green colour depicts vegetation cover and farmlands)

Source: www.googlemaps.com

3.1 Climate of Ibadan

Tropical wet and dry weather (Köppen climatic classification Aw) characterizes Ibadan, with a long wet season and year-round, reasonably consistent temperatures. The wet season in Ibadan lasts from March to October, with a little dip in precipitation in August (Santa Rosa, 2022). The wet season is split into two distinct wet seasons by this lull. Ibadan's dry season, which runs from November to February, is when the city suffers the characteristic West African harmattan. Over 123 days, Ibadan experiences an average of 1,230 millimetres, or 48 inches, of rainfall (See Figure 2). The two months with the most rainfall are June and September. 26.46 °C, or 79.63 °F, is the average day temperature; the average minimum temperature is 21.42 °C, or 70.56 °F; and the relative humidity is 74.55% (NFC, 2021).

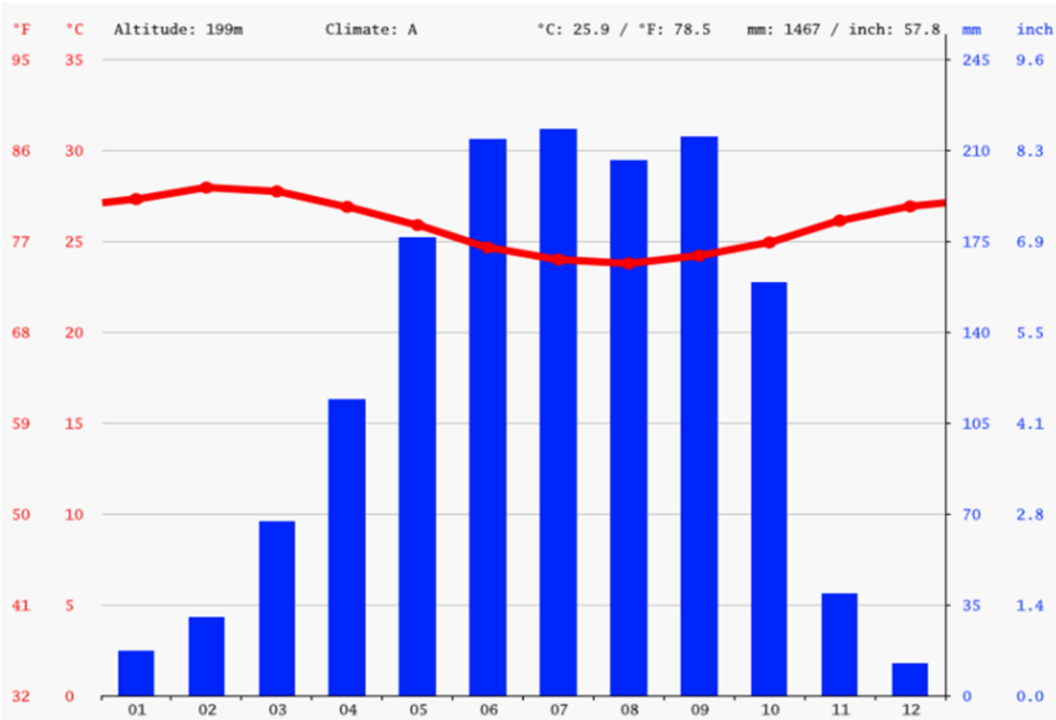

Figure 2: Climatic information in relation to the altitude of the study area

Source: Field data collection, 2023

3.2 Farming Activities in Ibadan Semi-urban Areas

Ibadan held the title of largest city in Sub-Saharan Africa in terms of surface area until 1970 (Babalola, 2012). The overall estimated area of the city in 1952 was around 103.8 km2 (Olatoye, 2020). Still, just 36.2 km2 were developed. Accordingly, non-urban resources such as farmlands, river floodplains, forest reserves, and aquatic bodies occupied the remaining 67 km2. The built-up area grew from 40 km2 to 250 km2 in the 1990s, indicating a notable underestimation of the city's overall growth.

Subsistence activities such as hunting, fishing, farming and acquiring non-timber forest products for domestic use make up the majority of economic activity. Mostly, the farmers engage in subsistence farming and sell their produce in neighbourhood markets, community markets and fruit markets. The bulk of the farmers in the region are semi-literate, and they practice ancient farming practices like slash and burn, which involves clearing trees and burning them to create new fields. Some locals are known to engage in backyard gardening, where they grow coconuts, bananas, plantains, citrus fruits, papayas, and guavas. These plants are then used domestically, with any excess occasionally being sold in day markets nearby. However, some farmers were also known to grow cassava, maize, yams, and some leafy and fruit vegetables.

4. Survey Data

A semi-structured questionnaire was designed for the study. The study period covered from 15 March to 21 April 2023. The questionnaire contained two sections: Section 1 provided demographic data, whereas Section 2 concentrated on how natural regeneration and fallow period were perceived quantitatively. The following things made up the second section: 1) the number of years after the establishment of farmland; 2) the recolonization of these farms by tree species; and 3) the traditional knowledge-based uses of the identified species. The questionnaire was administered to selected subsistence farmers of Akinyele, Egbeda, Ido, Lagelu, Ona Ara and Oluyole local government areas in the semi-urban metropolis of Ibadan. Respondents were chosen randomly from within the LGAs, and volunteered participants among those selected were engaged in Focus Group Discussion (FGD). These were done only after the researchers had presented the research topic and sought residents' approval to conduct the study in their community.

Farmers' traditional knowledge aids in identifying the types of trees that grow in their fields and the plants that were used before the field survey. Babalola (2013) classifies plants into two categories: 1) domestic logging, which refers to a plant used for commercial purposes in the study site, and 2) traditional uses, which includes species that supply food (fruits, vegetables), medicine, crafting materials (strappings, paddles, paste, and tanning), building materials (for local construction, tool handles, and canoes), and firewood to the indigenous suburbs of Ibadan Metropolis (Figure 2). Kew Tropical Plant Families Identification Handbook (2015) was used to identify tree species enumerated within the study area.

5. Field Sampling Design and Data Collection

Four (4) randomly selected transects of 100 m width at 120 m and a 30 m interval were established across the study site, namely: (Akinyele, Egbeda, Ido, Lagelu, Ona Ara, and Oluyole, LGAs), resulting in twenty-four (24) transects for the entire study area. Three 8 m × 8 m quadrats were randomly selected and established along each transect. The diameter at breast height (DBH) (cm) and height (m) of tree species with a diameter greater than 10 cm were measured. The records also include photos and geographic locations of the recognised species. Seedlings and saplings with a diameter of less than 10 cm were identified and counted in one 1 m × 1 m sub-plot. Verification of plant use was facilitated by consultation with the local population and the Kew Tropical Plant Families Identification Handbook (2015).

6. Data Analysis

Microsoft Excel was used to develop descriptive statistics. The abundance and the diversity were calculated for each fallow (since farming ceased). The Shannon Index of Diversity was used to separately calculate the species diversity of woody tree species based on the data from the quadrats and subplots, according to the age of the fallows. The following formulae calculated the Shannon index of diversity:

$H=\sum s-i=1pi \ln (pi)$

Where:

H = Shannon Index of Diversity,

Pi = the proportion of individuals found in the ith species

ln = the natural logarithm,

s = the number of species in the community

The normality distribution of the data gathered in each case before performing the linear regression analysis was confirmed using Statistix 10 software. The number and diversity of valuable tree species were then compared to the age of farmland using linear regression to see if any correlation could be found by classifying every single person into an age group as a categorical variable (Bada *et al*., 2016).

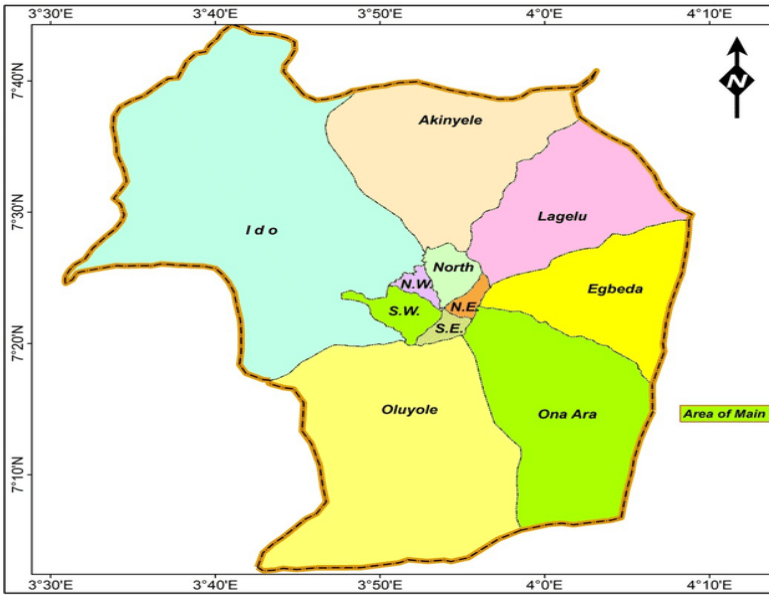

Figure 3: The Selected Local Government Areas for the study
Source: www.googlemaps.com

7. Results

Relative Abundance of Identified Tree Species

Table 1: Summation of the relative abundance of identified tree species types in the study areas

Family	Species	Common name	Local name	Origin	Freq	%
Fabaceae	*Afzeliabella*	Afzelia	Apa	Indigenous	54	2.1
Apocynaceae	*Albizia lebbeck*	East Indian walnut	Ayunre	Exotic	57	3.6
Meliaceae	*Anacardium occidentale*	Cashew	Kaju	Exotic	56	3.1
Leguminoceae	*Azadirachta indica*	Neem	Dogonyaro	Exotic	54	2.1
Myrtaceae	*Delonix regia*	Flame of the forest	Panseke	Exotic	512	6.2
Irvingiaceae	*Elaeisguinensis*	Palm tree	Ope	Indigenous	555	7.2
Meliaceae	*Ervingiagabonensis*	Bush mango	Ooro	Indigenous	56	3.1
Meliaceae	*Khaya grandifolia*	African mahogany	Oganwo	Indigenous	510	5.2
Verbanaceae	*Khaya senegalensis*	African mahogany	Oganwo	Indigenous	59	4.6
Anacardiaceae	*Gmelina arborea*	White teak	-	Exotic	515	7.7
Fabaceae	*Lanneaegregia*	Lannea	Opon	Exotic	57	3.6
Moraceae	*Leucaena leucochephala*	Leaucaena	-	Exotic	514	7.2
MorGmelinaceae	*Milicia Excelsa*	Iroko	Iroko	Indigenous	514	2.5
Pinaceae	*MorGmelina oleifera*	MorGmelina	Ewe-igbale	Indigenous	56	3.1
Mangiferaceae	*Minus caribeae*	Pitch pine	Aho-yaayaa	Exotic	55	2.5
Sapotaceae	*Mangifera indica*	Mango	Mangoro	Exotic	59	4.6
Arecaceae	*Chrysophyllum albidum*	African white star apple	Agbalumo	Indigenous	54	2.1
Sterculiaceae	*Roystonea regia*	Royal palm	-	Exotic	55	2.5
Combretaceae	*Tectonia grandis*	Teak	Ewe eko	Exotic	58	4.1
Combretaceae	*Terminalia catapa*	Tropical almond	Furuntu	Indigenous	512	6.2
Terminalia	*Terminalia africana*	White afara	Idigbo	Indigenous	510	5.2

africana	**Total**	5194	100.0

Source: Field Survey, 2023

Socio-Economic Characteristics of Variables

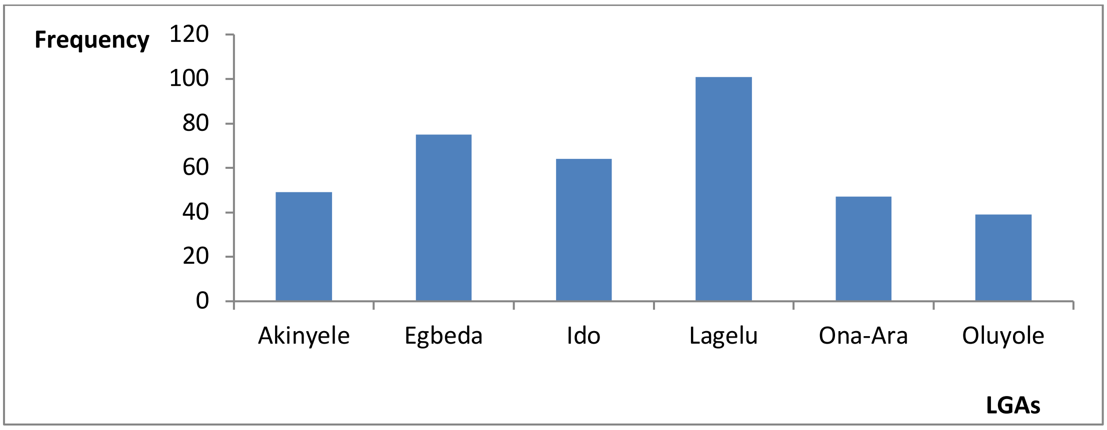

Figure 4: Frequency Distribution of respondents in LGAs

Source: field survey, 2023

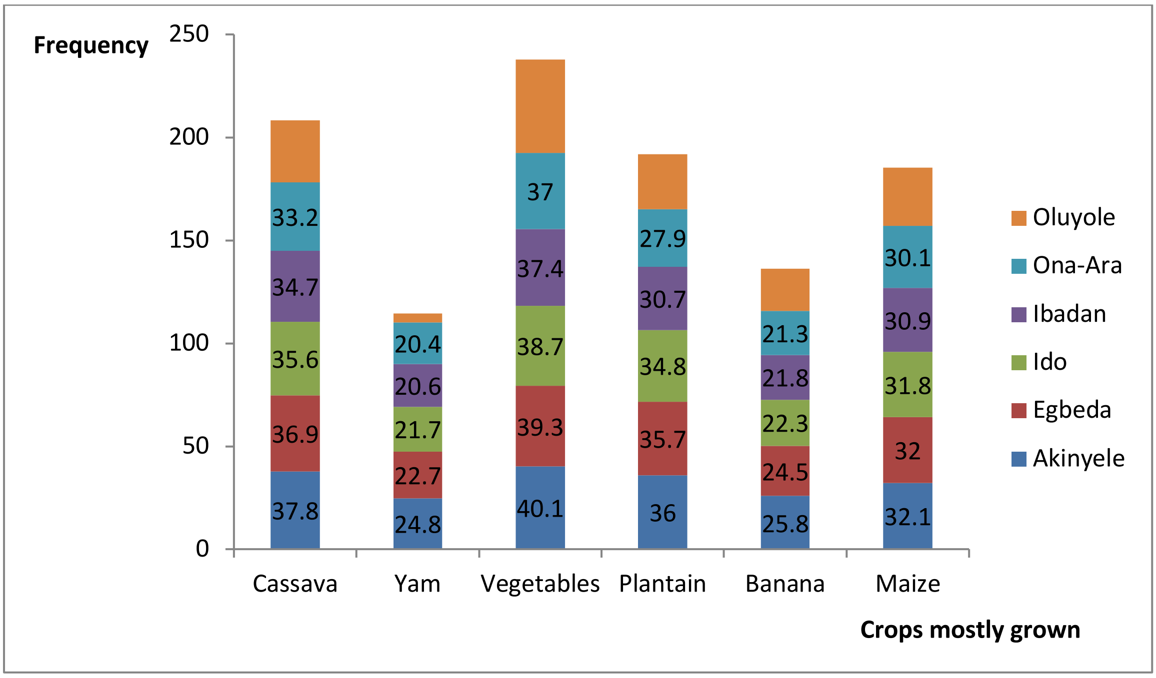

Figure 5: Comparisons between variables of farmland and crops mostly grown by the respondents

Source: Field Survey, 2023

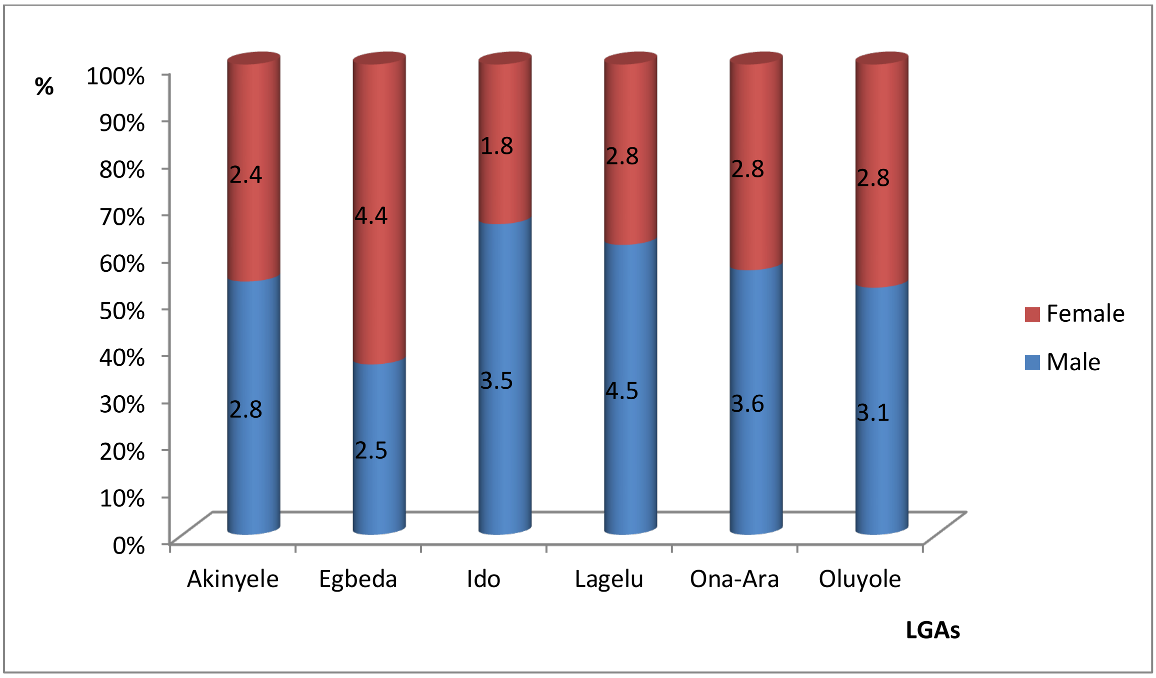

Figure 6: Gender comparisons of the respondents within the study area

Source: Field Survey, 2023

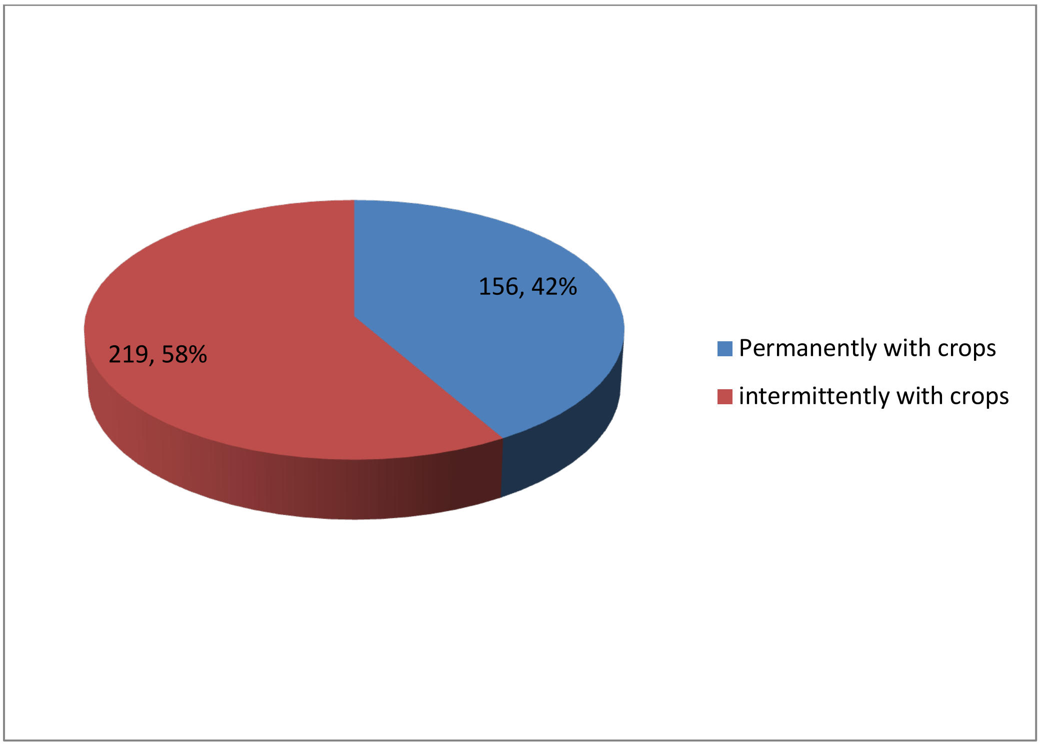

Figure 7: Mode of farming system prevalent among the respondents

Source: field survey, 2023

Table 2: Summation of the relative use of identified tree species within the study areas

Family	Uses
Fabaceae	Food, Firewood, Building material
Apocynaceae	Firewood, Medicine, Building material
Leguminoceae	Firewood, Building material, Domestic logging
Myrtaceae	Food, Firewood, Medicine, Building material, Domestic logging
Euphorbaiceae	Food, Firewood, Medicine, Craft, Building material
Irvingiaceae	Food, Craft
Meliaceae	Medicine
Verbanaceae	Firewood, Craft, Building material, Domestic logging
Anacardiaceae	Food, Firewood, Medicine, Craft, Building material, Domestic logging
Moraceae	Firewood, Medicine, Craft.
MorGmelinaceae	Building material, Domestic logging
Pinaceae	Firewood, Medicine, Building material
Mangiferaceae	Craft
Sapotaceae	Medicine
Arecaceae	Firewood
Sterculiaceae	Firewood, Medicine, Craft, Building material, Domestic logging
Combretaceae	Food, Medicine, Craft

Source: Field survey, 2023

A total of 375 farmers participated in the FGD (see Figure 2 for the distribution among the LGAs). This resulted from some farmers being small-holders of farmland size or less than an acre of land. Twenty-two farms were abandoned for a period of 1-6 years, 16 for a period of 7-10 years, six for a period of 11-20 years, and thirteen for 21-60 years. Farmers reportedly allow farms to go fallow based on crop production, soil fertility, and weed invasion into the fields. Because of the response from residents about the fallow time, the age classes ranged from 1-6 years, which was the youngest fallow time. The sample size of the youngest age class determined the distribution of the subsequent age classes. In each fallow class, the number of fallow fields was 1, 2, 3, 4, 5, and 6 years old, respectively. Finally, spatial distribution maps of the native tree species identified during the study were overlaid into an NDVI image using QGIS version 3.18.1 software.

7.1 Valuable Tree Species Identified

The survey yielded 13 different ages of abandoned farmlands from information provided by respondents before the field assessment. Based on this information, we identified three ages of farm abandonment: 1) 1 year (15 farms), 2) 2 years (14 farms), and 3) 3 years (14 farms). This data allowed for grouping the farms into three age classes. Farms were randomly selected based on abandonment age classes of 1, 2, 3, 4, 5, and 6 years, respectively. Subsequently, three subsets of farms of varying ages were chosen randomly from each age class, resulting in nine farms for the study being sampled, respectively. About seventeen (17) locations, including areas of varying successional stages, were equally sampled. Six hundred eighty-nine (689) plants, comprising 22 species from 21 families, were recorded. The most abundant family was *Mimosaceae*, consisting of four species: *Guttiferae, Chrysobalanaceae, Anacardiaceae, Annonacea, Caesalpiniaceae,* and *Palmae*. All of the species found were native to the study area.

7.2 Valuable Tree Species and Their Uses

The abandoned farmlands had thirty species. These species offer six useful purposes (see Table 2). Traditional use and domestic logging in the community were assigned two categories associated with one or more plants sampled in this study. Traditional uses included food, firewood, medicine, crafts, paste, bows, fans, and tan), building materials (local construction, tool handles, paddles, and canoes), as well as strappings. Twenty plant species have building material utility, compared to 17 plant species identified for medicinal purposes.

Table 3: Analysis of Variance ANOVA

Model	Sum of squares	Df	Mean square	F	Sig.
1 regression	.729	5	.146	0.682	.000
Residual	.570	30	.019		
Total	1.299	35			

a. Predictors: Headship farming Styles and Techniques (Constant),
b. Dependent Variable: Tree species
Source: Field survey, 2023

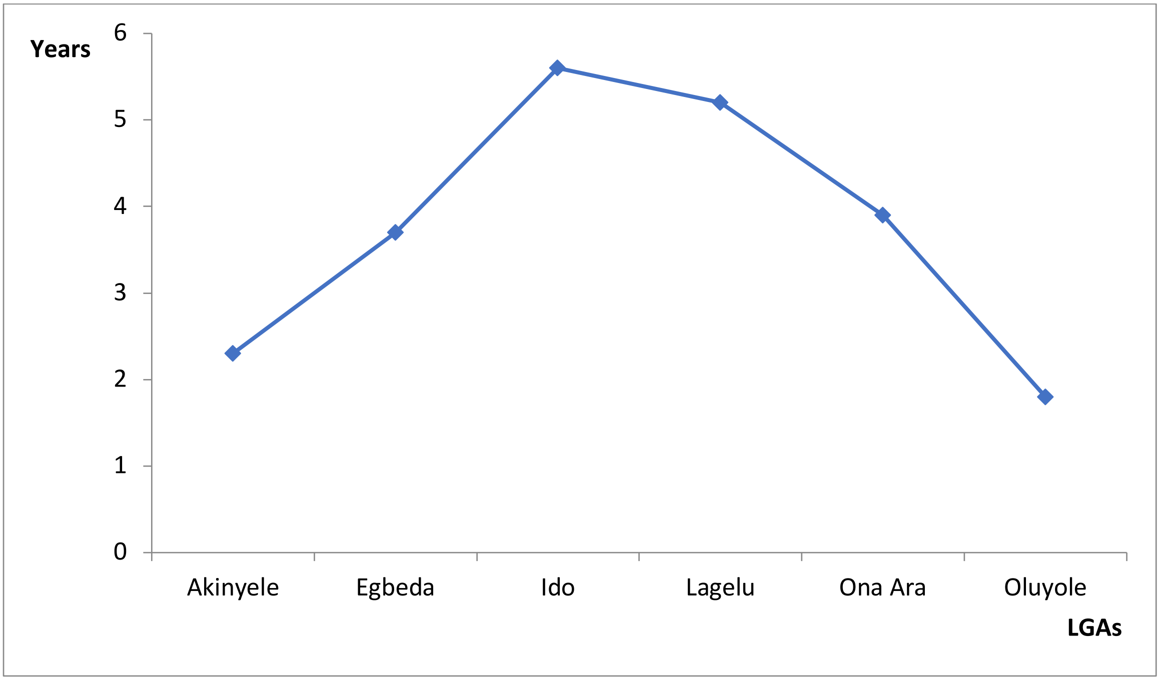

Figure 8: Ages of abandoned farmlands within the study area.

Source: Field survey, 2023

7.3 Abundance and Diversity of the Valuable Tree Species

The results showed that for tree species greater than 10cm *dbh*, species abundance increased from over one to five years of fallow time. The 10-year plot displayed the highest species abundance, while the one-year plot showed the lowest number. Likewise, in years 1 and 3, species abundance for plants below 10 cm *DBH* also increases during the fallow time. The year with the highest species abundance was 10, while the year with the lowest was 1. On the other hand, for 1–6 year plots, species diversity for plants greater than ten cm *dbh* decreased with fallow time. The older fallow time recorded an increase and a decline. The 1-year-old plot had the highest diversity, while the 5-year-fallowed Plot had the lowest. Similarly, plants < 10 cm *dbh* recorded a decrease in species diversity for the 1-6year plot. The eight and 5-year-old plots reported the lowest species diversity, whereas Plot 9 recorded the highest.

7.4 Relationship between the Abundance and Diversity of Valuable Woody Species

The ANOVA showed the relationship between the age of farm abandonment and the abundance and diversity of valuable woody species > 10 cm. The results showed a weak relationship for abundance (X^2 = 0.682). Similarly, diversity to age also showed a weak relationship. The analysis showed no relationship between the age of farm abandonment and the abundance and diversity of woody species < 10 cm *dbh*.

7.5 Spatial Distribution of the Identified Valuable Tree Species

The distribution of tree species showed a clumped distribution for each plot assessed. The Normalized Difference Vegetation Index (NDVI), which ranges from −1 to +1, displays vegetation health. Bright red indicates healthy vegetation.

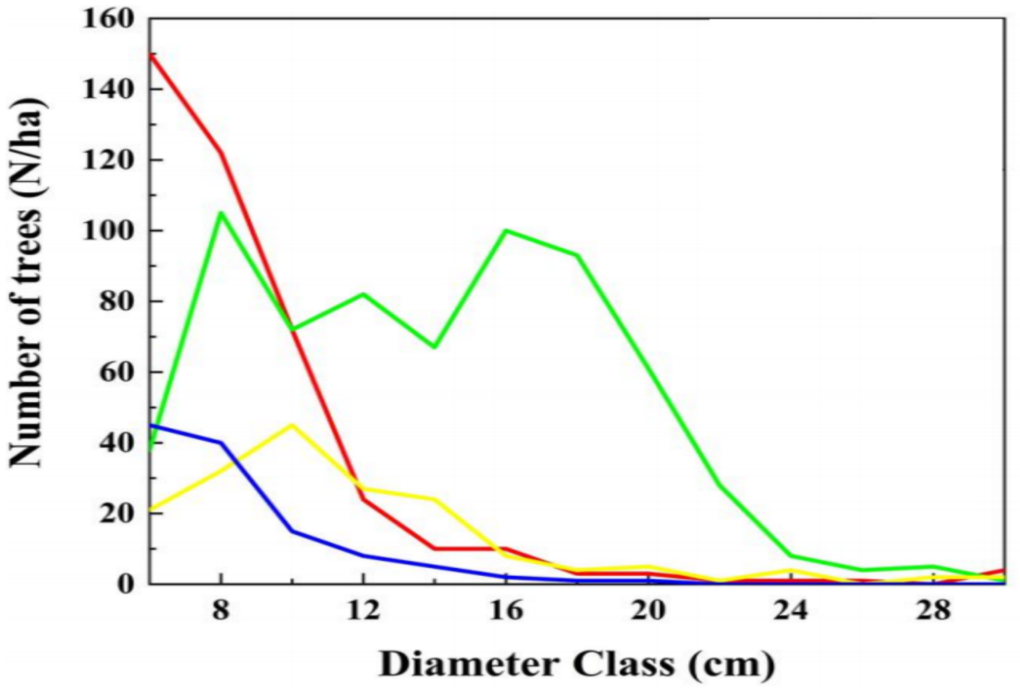

Figure 9: Spatial distribution of species growing in active farmlands

Source: Field survey, 2023

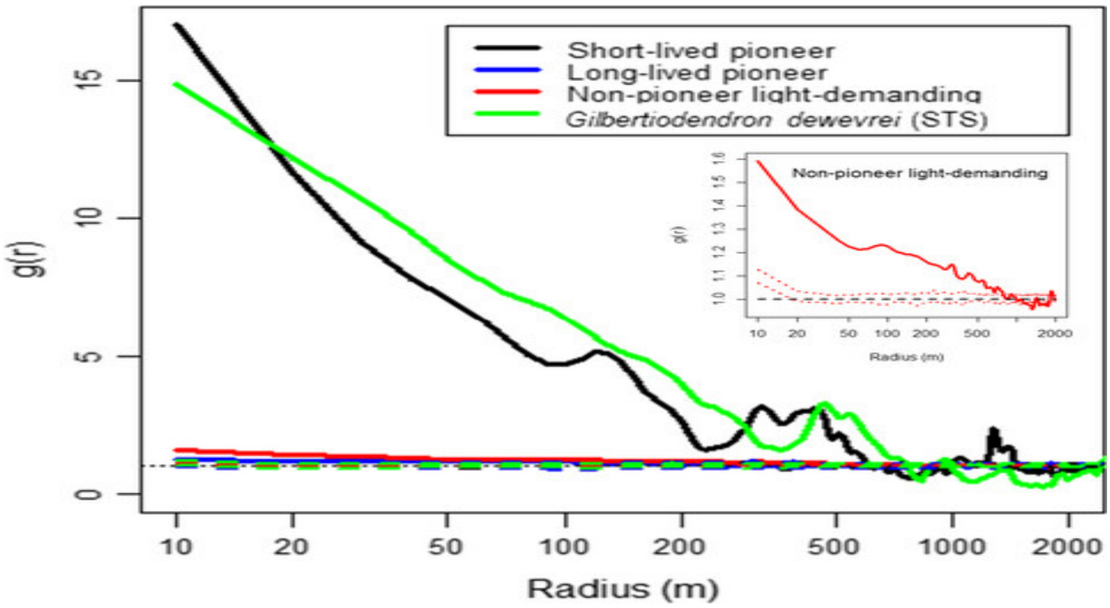

Figure 10: Spatial distribution of valuable tree species growing in abandoned farmlands overlay on Normalized Difference Vegetation Index (NDVI)

Source: Field survey, 2023

8. Discussion

Regarding the distribution of plants with higher traditional values, the study recorded two key findings. First, every plant in the plots examined had significant uses related to food, building materials and medicinal herbs. Farmlands within the study area were distributed in clumps by the plant. Second, in the selected LGAs, farmers have long utilized a range of tree species, some of which also possess advantageous traits that could aid in the regeneration of secondary forests. For instance, the *Anacardiaceae* family's *Gmelina arborea* was the main dominating species discovered in the abandoned farmland, indicating the species' high degree of environmental adaptability in the research location. Because they are early successional species or pioneers, tree species like *Gmelina arborea*are crucial for forest regeneration (Ayodele *et al*., 2003). Furthermore, the presence of more carbon in its roots may point to a greater potential for storing carbon, which would enable seedlings to withstand low light levels and adjust to limited light availability (Dos Santos Pereira *et al*., 2019).

Sivasailam and Babalola (2017) propose that the proximity of valuable plants allows indigenous peoples to expend less effort in acquiring plants that sustain their subsistence, in addition to the ecological traits of the colonisers. The findings indicated that the two primary applications of important tree species were domestic logging and traditional use. Mismanagement of these species will eventually have an impact on the viability of indigenous populations and forest ecosystems, claim Babalola and Read (2016). Results indicated that there were fluctuations in both the diversity of species and the quantity of tree species. The majority of species are used as building materials, according to the findings. Therefore, the primary cause of the decline in woody species variety may be the harvesting of forest products and the disturbances that go along with it. The abundance and diversity of animals can fall as a result of overuse. Significantly smaller but functionally similar species that are in decline can help to replace those declining species within the study area (Adejuyigbe *et al*., 2015). According to reports from other researchers, one possible obstacle to the establishment of tree seedlings and saplings is the substantial invasion of shrubs into open fallows (Kolade *et al*., 2020).

In the major plots, there was a weak correlation between plant quantity and variety and the age of farmland. Nevertheless, no correlation between the age of the fallow and the subplots was discovered. In Oluyole LGA, for instance, fallow periods as short as one to three years boosted species diversity before eventually declining. Because different species fight with one another for a few resources, species diversity is typically significant in early successional plots. On the other hand, species abundance increased during the 2–6 year period after being low during the planting seasons. These results could be explained by the fact that pioneer woody species out-competed weedy species. Pioneer tree species seeds eventually found their way into the soil seed bank. In the region, *Gmelina arborea* dominated fallows that ranged in age from 1 to 6 years. But early settlers like *Gmelinasp*, whose growth rates were comparatively higher than those of other woody tree species, would have made it easier for soil nutrients to recover and created microhabitats where shade-tolerant species might reappear (Ayodele *et al*., 2003). Bada & Li's (2013) research indicates that species diversity rises with fallow age. A few studies concluded that there was no difference between age groups, while other data indicated an increase at the beginning of succession followed by a decline in levels later on.

9. Conclusion

Of the 138 valuable woody species that the respondents recognised, *Anacardiaceae* was the dominant family found in abandoned farmlands. 81% of these species are found in the sampling area, according to field verification. Before diminishing in the later years, species abundance rose with fallow up to five (5) years. In the main plots, there was no correlation between the age of abandoned farmlands and plant diversity or abundance, but there was in the subplots.

10. Recommendation

Based on the findings, more research is necessary to determine how other Indigenous communities make use of the tree species that are taking over abandoned farmlands in their areas, as well as to look into the relationship between Indigenous people and fallow succession. Additionally, better documentation of the silvicultural traits of the dominant is needed, as there aren't many species that occur in the study area that share similar traits.

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