

ASSESSMENT OF VEGETATION DYNAMICS OF SELECTED SURROUNDING AIRPORTS FOREST IN NIGERIA

*OGUNLUSI, O.A.,¹ BASIRU, A.O.,² AKINBOWALE, A.S.,³ ADIGUN, M.A.,⁴ OGUNJINMI, K.O.,⁵ AND OLADOYE, A.O.²

¹Department of Environmental Services, Federal Airports Authority of Nigeria Murtala Mohammed International Airport, Ikeja Lagos State, Nigeria

²Department of Forestry and Wildlife Management, Federal University of Agriculture, College of Environmental Resources Management, P.M.B 2240, Alabata Abeokuta, Ogun State, Nigeria

³Department of Forestry, Federal Ministry of Environment HQ, Abuja FCT, Nigeria.

⁴Department of Crop and Animal Sciences, Ajayi Crowther University, Oyo State, Nigeria.

⁵Department of Agricultural Extension and Rural Development, College of Agricultural Management and Rural Development, Federal University of Agriculture, P.M.B 2240, Alabata Abeokuta, Ogun State, Nigeria

*Corresponding author: ogunkusio@gmail.com

Abstract

*Shortage of ecological assessment in tropical rain forest has been identified as major challenges for the forestry industries and government for sustainable forest management in terms of conservation, advocacy, carbon sequestration and policy recommendation. The study was carried out to assess tree species and vegetation dynamics of four airport surrounding forests in Nigeria. Four airports surrounding forests used for this study were: Benin, Akure, Ibadan and Lagos respectively. Alternate line transect method were used in laying and selecting 50 m X 50 m for detailed enumeration. Each transect was 1000 m in length. Sample plots were laid at every 100 m along transect. Eight (8) plots were selected per study sites while 32 sample plots in total were used for this study. In each sample plot, all living trees with Diameter at Breast Height (DBH) greater than or equal to 10 cm were measured and identified by their botanical and the family names. Data were analysed with SPSS version (13) and PAST version (30) and the results were presented using tables and figures. Results revealed that the four airports surrounding forest ecosystems contributed differently to tree species diversity. A total number of 34 families in Akure, Ibadan, Benin and Lagos were encountered. The numbers of tree species encountered were in decreasing order: Ibadan (59); Benin (51), Lagos (46) and Akure (41). The highest Simpson diversity index (0.965) was obtained in Ibadan while the lowest value (0.927) was obtained at Akure forest. Values obtained for species evenness results were 0.691 for Lagos while Akure has the least value of 0.55. Malvaceae was the dominant family in the four forest ecosystems, with Lagos and Ibadan having highest similarity index. The tree species encountered with highest IVI was *Celtis zenkeri* (11.98%) while the least was *Bateria fistulosa* (0.81%). The results of this study concluded that the four airports surrounding forest assessed were haven for biological diversity particularly Ibadan and Benin forest, therefore conservation of tree species in the surrounding forests of airports is recommended.*

Keywords: *Vegetation, Species, Density, Importance Value Index, Dynamics*

Introduction

Forest is a biological community. It is made up of the trees, shrubs, and other vegetative covers interacting with each other and their natural environment. It plays important role in human life. Forests serve important roles such as tree species diversity conservation and protection of fragile ecosystem and carbon sequestration (Nowak and Dwyer, 2007). The increasing population of Nigeria has led to a wide range of challenges which has now put lots of pressure on land, forest, and forest resources, and green spaces and exposed the city to different environmental hazards such as air pollution, wind, and water erosion and climate change are on the increase as a result of human population growth. Further, Nigeria loses more than 350,000-400,000 hectares per year (FAO, 2005) due to human activities.

Apart from the land use, climate change affects world's forest. Climate change is defined as any change in climate over time, whether due to natural variability or because of human activity. It has been observed that forests have been affected by large scale anthropogenic and natural changes due to rapid population increase (Basiru, 2016). According to Ojo (2004), better understanding of the ecological changes in natural forest depends on progress in monitoring network of tropical forest plots. Nigeria, being the most populous country in Africa, her populace exerts extreme pressures on biodiversity of the remaining forests. Trees, many plants and wildlife's are over-exploited and poached, and the natural environment faces increased degradation (USAID, 2008). This may not be unconnected to with lack of strong conservation ethics, law enforcement, corruption and extreme poverty, leading to

severe encroachment and illegal exploitation of forest tree resources, which amounted to depletion in biodiversity of the existing forests, reduced productivity and tree species extinction and contribute to greenhouse gases emission for climate change. Many research works have been done on tropical rainforest but none have carried out vegetation assessment of surrounding airport forest in Nigeria. Therefore, it is important to carry out the structure and floristic composition of this vital habitat in order to have a baseline and contribute to the National Action Plan objectives against deforestation in terms of conservation and carbon sequestration. Therefore, this study assessed the vegetation dynamics of selected surrounding airports forests in Lagos, Ibadan, Akure and Benin City respectively.

Study Area

The study was limited to the surrounding forest around Muritala Mohammed International Airport Lagos-Ikeja Airport, Ibadan Airport, Akure Airport and Benin Airport.

Akure Airport, Akure, Ondo State

Akure airport is located in Akure North Local government area of Ondo state. The airport falls on Latitude 7.2510°N and Longitude 5.2997°E with an altitude: 337.718m° (Ogunrayi *et al.*, 2016).

Climate and Vegetation

The area has both dry and wet seasons. The dry season lasts from November to March while the wet season commences from April and ends in October with highest rainfall records between July and August. Average daily temperature ranges between 21°C and 29°C almost throughout the year. The mean annual rainfall varies from 2000mm in the southern area to 1500mm in the Northern

area with relative humidity of 80-85% annually experienced in the Southwest (Ogunrayi *et al.*, 2016).

Geology and Topography

The ferricluvisol soils are formed as a result of continuous weathering of the crystalline rock which feature mostly in the typical uplands soils in many parts of Southwestern is present. The relief pattern is low lying elevation ranges from 216m to 504m. The underlying rock is crystalline and gneiss. It is slightly neutral; pH of 6.7 – 7.3 and sandy-loam in nature. The soil of the area supports the growth of many tree species (Ogunrayi *et al.*, 2016).

Ikeja Airport, Lagos State

Murtala Muhammed International Airport is an international airport located in Ikeja Local Government area of Lagos State, Nigeria, and is a major airport serving the entire state. The area falls between Latitude and Longitude of 6.5818°N and 3.3211°E with an altitude of 41.148m respectively (Ogundele, 2012).

Climate and Vegetation

Lagos metropolitan area has a humid tropical climate (Koppen climate classification Aw) bordering a monsoon tropical climate (Koppen climate classification Am) (Peel *et al.*, 2007) thus characterized by two wets (April to July and October and November) and dry (August and September and December to March) seasons (Ogundele, 2012). Mean annual rainfall varies between 1381.7 mm and 2733.4 mm with an average of 2500 mm while monthly rainfall ranges between 25 mm to over 400 mm (Ogundele, 2012). Maximum temperature ranges between 29⁰C and 34⁰C and minimum ranges between 24⁰C and 28⁰C (Ogundele, 2012).

Geology and Topography

The topography of the state is of gentle rolling lowland in the south, rising to a plateau of about 40meters. The state is well drained with rivers flowing from the upland in the North-South direction. (Ojo *et al.*, 2014).

Ibadan Airport, Ibadan Oyo State

Ibadan Airport is an airport located in Egbeda Local Government, Ibadan, the capital city of Oyo State, Nigeria. The Airport is located at Alakia and falls between Latitude: 7.3584°N and Longitude: 3.9751°E with an altitude of 221.894m respectively (Ojo *et al.*, 2014).

Climate and Vegetation

Oyo State has an equatorial climate with dry and wet seasons and relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25°C 77.0°F) and 35°C 95.0°F, almost throughout the year. The vegetation pattern of Oyo State is that of rainforest in the South and Guinea Savannah in the North. Thick forest in the South gives way to grassland interspersed with trees in the North. (Ojo *et al.*, 2014).

Geology and Topography

Oyo State is underlain by three lithological units of crystalline basement complex comprising: (i) Migmatite-Gneiss Complex (quartzite, gneissic rocks; (ii) Low to medium grade metasediment (Green schists facies, namely quartz schist and mica schists. (iii) The Pan African Granitoids (older granites) which are synonymous to late tectonic intrusions (Ojo *et al.*, 2014).

Benin Airport, Benin City Edo State

Benin Airport is located in Oredo Local government in Benin, the capital of Edo State, Nigeria, with an area of 112,622 km² (43,484 sq.m). Benin, a narrow, key-

shaped, north-south strip of land in West Africa, lies between the Equator and the Tropic of Cancer. The area falls between Latitude and Longitude of 6.3172°N and 5.6037°E respectively (Balogun *et al.*,2023).

Climate and Vegetation

The Benin City lies on 86m above the sea level and has a tropical climate. In winter, there is much less rainfall than in summer. The Köppen-Geiger climate classification Aw. The average annual temperature is 26.1°C 79.0°F in Benin City. About 2025 mm, 79 inches of precipitation falls annually. The driest month is January with 9mm 04 inches of rainfall. Most precipitation falls in

September with an average of 338mm, 13.3 inches. The warmest month of the year is April with an average temperature of 27°C, 81.5°F. In July, the average temperature is 24.5°C 76.1°F. It is the lowest average temperature of the whole year (Balogun *et al.*, 2023).

Geology and Topography

Some areas in the southern fringes of Edo State swampy mangrove forest with numerous creek and rivers dissecting the land area. In the southwest, there are sandy plains with many rivers and streams. This portion which is the Benin Lowlands has a hill and the land is drained by the Ikpoba, Orihionmwon and Osse (Balogun *et al.*, 2023).

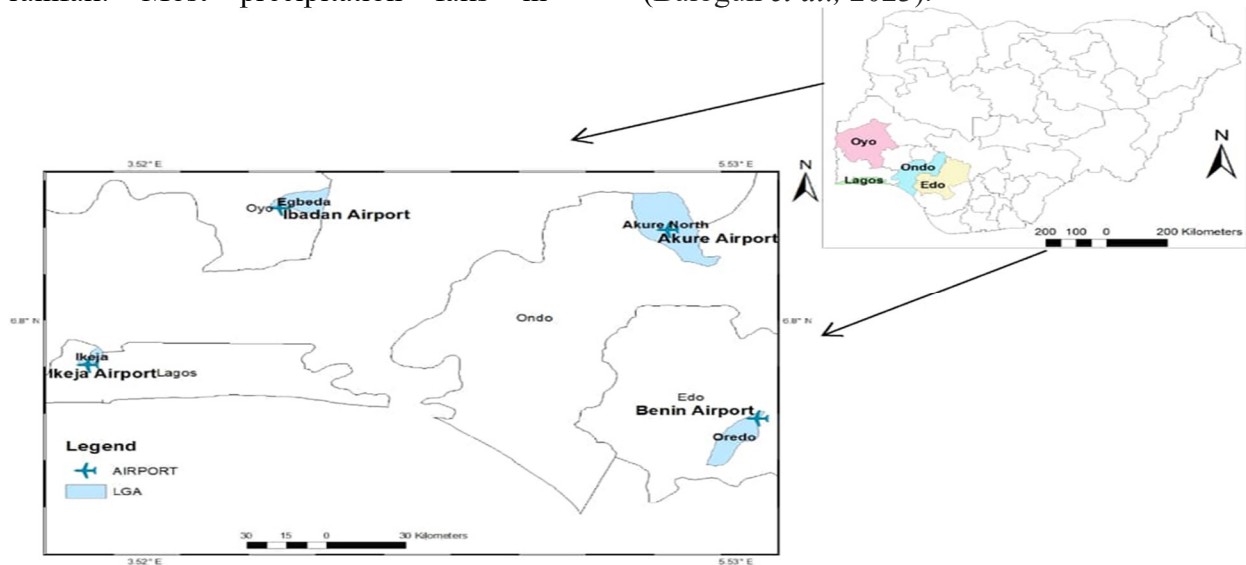


Fig. 1: Map of Nigeria showing the states and Local Government of the study areas.

Materials and Methods

Data Collection

Tree growth Variables

The tree growth variables were measured. Tree variables that were recorded include: Species availability, Total number of species, Total number of stems, Diameter at breast height (DBH) of each tree, diameter at the base (db), diameter at the top Dt), diameter at the

middle Dm) diameter at the base Dt) and Total tree height. In each sampling plot, all trees ≥ 10cm in DBH were measured with the aid of diameter tape and total height with Spiegel Relaskop following the method described by Oladoye *et al.* (2020). Within each plot, all live woody vegetation were identified. Breakdown of total number of Thirty-two (32) plots used for the data collection from the study sites

were: Eight (8) plots from Benin, Akure, Ibadan and Lagos. 50m X 50m plots were laid in alternate position along each transect at 100m interval on the first and third transects and two plots were also laid on the second transect to make up a total 32 plots for the study (Oladoye *et al.*, 2020).

Data Analysis

The data were entered and analyzed by Paleontological Statistics Software Package (PAST) (version 3) for the density, frequency, abundance, relative density (R.D), relative frequency, relative dominance and important value of index (IVI) of the species. Similarity and diversity indices were also computed to study interrelationship between the species and the sites.

RESULTS

Floristic Composition and Structure of Tree Species in the Study Area

A total of 646 trees representing 95 species from 34 families were encountered during the study (Table 3). Malvaceae had the highest number of species (14) followed by Meliaceae (10). (Table 1). The breakdown of number of

species presents per study location area ranged from 1-176 species/location. Akure, Benin, Ibadan, and Lagos had 176, 132, 175 and 165 species respectively. The least number of species was found in Benin mainly with high frequency in *Funtumia elastica* (24), *Mansonia altissima* (10) and *Sterculia rhinopetala* (16) (Table 2). Among the identified tree species in the study area, *Maesopsis eminii*, *Celtis mildbraedii* and *Sterculia tragacantha* are the species with high frequency of 54, 48 and 38 each. The least frequency (1) was found in *Allanblackia floribunda*, and *Bateria fistulosa* and other 25 species. (Table 2). The mean stocking density of dominant trees species/ha in the study area ranged from 0.25tree/ha to 14.00 trees/ha. *Celtis zenkeri* had the highest Relative Density (RD) of 14.00, followed by *Mansonia altissima* (13.5) while *Allanblankia floribunda*, *Bateria fistulosa* and other 26 species had the least RD (0.25) and relative importance value (IVI) ranging from 0.81 to 11.98 respectively. Highest IVI of (11.98) and density of 14.00 tree/ha was found in *Celtis zenkeri* followed by *Mansonia altissima* (11.02; 13.50 trees/ha) (Table 2).

Table 1: Tree species and their families encountered in the study area

Plant species	Family
<i>Allanblankia floribunda</i>	Clusiaceae
<i>Alstonia boonei</i>	Apocynaceae
<i>Anonidium manii</i>	Annonaceae
<i>Anthoclesta vogelli</i>	Gentianaceae
<i>Baphia nitida</i>	Sapindaceae
<i>Bateria fistulosa</i>	Passifloraceae
<i>Blighia sapida</i>	Sapindaceae
<i>Brachystegia eurycoma</i>	Fabaceae
<i>Buchholzia coriacea</i>	Capparaceae
<i>Canarium schweinfurthii Engl.</i>	Burseraceae
<i>Ceiba pentandra</i>	Malvaceae
<i>Celtis africana</i>	Ulmaceae
<i>Celtis philipensis</i>	Ulmaceae
<i>Celtis mildbraedii</i>	Cannabaceae

<i>Celtis occidentalis</i>	Ulmaceae
<i>Celtis zenkeri</i>	Ulmaceae
<i>Chrysophyllum albidum</i>	Sapotaceae
<i>Chrysophyllum pulpucrum</i>	Sapotaceae
<i>Cleistopholis patens</i>	Annonaceae
<i>Cola acuminata</i>	Malvaceae
<i>Cola exasperata</i>	Malvaceae
<i>Cola gigantea</i>	Malvaceae
<i>Cola heterophylla</i>	Malvaceae
<i>Cola hispida</i>	Malvaceae
<i>Cola nitida</i>	Malvaceae
<i>Cordia milenii</i>	Boraginaceae
<i>Daniella orgia</i>	Fabaceae
<i>Desplasia subericarpa</i>	Malvaceae
<i>Diospyros insculpta</i>	Ebenaceae
<i>Diospyros crassiflora</i>	Ebenaceae
<i>Diospyros dendo</i>	Ebenaceae
<i>Diospyros mespilifomis</i>	Ebenaceae
<i>Diospyros mobutensis</i>	Ebenaceae
<i>Drypetes gildani</i>	Putranjivaceae
<i>Entadrophragma cylindrica</i>	Meliaceae
<i>Entadrophragma angolense</i>	Meliaceae
<i>Entadrophragma utilises</i>	Meliaceae
<i>Eugenia stipitata</i>	Myrtaceae
<i>Fagara leprieurii</i>	Rutaceae
<i>Fagara macrophylla</i>	Rutaceae
<i>Ficus exasperata</i>	Moraceae
<i>Funtumia elastica</i>	Apocynaceae
<i>Garcinia cola</i>	Clusiaceae
<i>Guarea cydiata</i>	Meliaceae
<i>Guarea thompsinii</i>	Meliaceae
<i>Gubourtea uhii</i>	Moraceae
<i>Hildergardia barterii</i>	Meliaceae
<i>Hylodendron gabunense</i>	Fabaceae
<i>Hylodendron pabe</i>	Fabaceae
<i>Ixora guinnesis</i>	Rubiaceae
<i>Khaya grandifoliola</i>	Meliaceae
<i>Lagerstroemia reginae</i> Roxb.	Lythraceae
<i>Lannea welwitschii</i> (Hiern)	Anacardiaceae
<i>Lecaniodiscus cupanioides</i>	Sapindaceae
<i>Macaranga barteri</i> Mull-Arg	Euphorbiaceae
<i>Maesopsis eminii</i>	Rhamnaceae
<i>Malacanta alnifolia</i>	Sapotaceae
<i>Mansonia altissima</i>	Malvaceae
<i>Microdesmis puberula</i>	Pandaceae
<i>Milicia excelsa</i>	Moraceae
<i>Miragyna ciliata</i>	Rubiaceae
<i>Monodora myeristica</i>	Annonaceae
<i>Musanga cecropioides</i>	Urticaceae

<i>Myrianthus arborea</i>	Urticaceae
<i>Nauclea diderichii</i>	Rubiaceae
<i>Nesogordonia papaveriferera</i>	Sterculiaceae
<i>Newbouldia laevis</i>	Bignoniaceae
<i>Nochocarpus sericeus</i>	Leguminosae
<i>Pentaclethra macrophylla</i>	Fabaceae
<i>Picralima nitida</i>	Apocynaceae
<i>Pseudospondia microcapa</i>	Anacardiaceae
<i>Pterocarpus mildraedii</i>	Fabaceae
<i>Pterocarpus osun</i>	Fabaceae
<i>Pterygota macrocarpa</i>	Malvaceae
<i>Pycnanthus angolensis</i>	Myristicaceae
<i>Ravenala madagascariensis</i>	Strelitziaceae
<i>Ricinodendron heudelotii</i>	Euphorbiaceae
<i>Rothmania globosa</i>	Rubiaceae
<i>Spondiathus preussii</i>	Euphorbiaceae
<i>Sterculia rhenopetala</i>	Malvaceae
<i>Sterculia tragacantha</i>	Malvaceae
<i>Sterculia oblongata</i>	Malvaceae
<i>Strombosia postulata</i>	Olacaceae
<i>Terminalia ivorensis</i>	Combretaceae
<i>Terminalia superba</i>	Combretaceae
<i>Tetrapleura tetraptera</i>	Fabaceae
<i>Treculia africana</i>	Moraceae
<i>Trichilia heudelotii</i>	Meliaceae
<i>Trichilia monadelphica</i>	Meliaceae
<i>Trichilia welwitschii</i>	Meliaceae
<i>Trilepisium madagascariensis</i>	Moraceae
<i>Triphochiton scleroxylon</i>	Malvaceae
<i>Uacarpa studtii (Stilt root)</i>	Phyllanthaceae
<i>Zanthoxylum utile</i>	Rutaceae
<i>Zanthoxylum zanthoxyloides</i>	Rutaceae

Table 2: Density, Frequency, IVI of all the trees encountered in all the four surrounding airport forests

Species	Density	Occurrence	FREQ	RD	RF	Dominance	Rdo	IVI	No of Individual
<i>Allanblankia floribunda</i>	0.25	1	25	0.15	0.51	0.17	1.18	1.83	1
<i>Alstonia boonei</i>	2.75	4	100	1.66	2.02	0.08	0.53	4.22	11
<i>Anonidium manii</i>	7.75	3	75	4.69	1.52	0.16	1.11	7.31	31
<i>Anthoclesta vogelli</i>	1	2	50	0.61	1.01	0.22	1.49	3.11	4
<i>Baphia nitida</i>	1.5	3	75	0.91	1.52	0.32	2.16	4.58	6
<i>Bateria fistulosa</i>	0.25	1	25	0.15	0.51	0.03	0.19	0.85	1
<i>Blighia sapida</i>	0.75	3	75	0.45	1.52	0.13	0.89	2.86	3
<i>Brachystegia eurycoma</i>	0.25	1	25	0.15	0.51	0.1	0.65	1.3	1
<i>Buchholzia coriacea</i>	3.5	4	100	2.12	2.02	0.18	1.18	5.32	14
<i>Canarium schweinfurthii</i> Engl.	0.25	1	25	0.15	0.51	0.22	1.51	2.17	4
<i>Ceiba pentandra</i>	1.75	4	75	1.06	1.52	0.27	1.78	4.36	4

<i>Celtis africana</i>	1	2	50	0.61	1.01	0.12	0.83	2.44	4
<i>Celtis philipensis</i>	1	3	75	0.61	1.52	0.15	1.02	3.15	10
<i>Celtis mildbraedii</i>	3.5	4	75	0.61	1.52	0.36	2.41	4.53	48
<i>Celtis occidentalis</i>	2.5	3	75	1.51	1.52	0.32	2.14	5.17	4
<i>Celtis zenkeri</i>	14	4	100	8.47	2.02	0.22	1.48	11.98	5
<i>Chrysophyllum albidum</i>	1	1	25	0.61	0.51	0.59	3.96	5.07	19
<i>Chrysophyllum pomiferum</i>	1.25	2	50	0.76	1.01	0.27	1.81	3.57	2
<i>Cleistopholis patens</i>	4.75	2	50	2.87	1.01	0.16	1.09	4.97	2
<i>Cola acuminata</i>	0.5	2	50	0.3	1.01	0.18	1.22	2.53	14
<i>Cola exasperata</i>	0.5	2	50	0.3	1.01	0.14	0.92	2.24	8
<i>Cola gigantea</i>	3.5	3	75	2.12	1.52	0.16	1.07	4.7	3
<i>Cola heterophylla</i>	2	2	50	1.21	1.01	0.09	0.61	2.83	1
<i>Cola hispida</i>	0.75	2	50	0.45	1.01	0.34	2.3	3.76	1
<i>Cola nitida</i>	0.25	1	25	0.15	0.51	0.04	0.26	0.91	1
<i>Cordia milenii</i>	0.25	1	25	0.15	0.51	0.26	1.78	2.43	1
<i>Daniella orgia</i>	0.25	1	25	0.15	0.51	0.07	0.47	1.13	1
<i>Desplasia subericarpa</i>	0.25	1	25	0.15	0.51	0.08	0.55	1.2	1
<i>Diospyros inculpta</i>	0.25	1	25	0.15	0.51	0.13	0.88	1.54	9
<i>Diospyros crassiflora</i>	0.25	1	25	0.15	0.51	0.15	1.01	1.67	7
<i>Diospyros dendo</i>	2.25	3	75	1.36	1.52	0.04	0.3	3.18	2
<i>Diospyros mespilifomis</i>	1.75	3	75	1.06	1.52	0.04	0.29	2.86	1
<i>Diospyros mobutensis</i>	0.5	2	50	0.3	1.01	0.05	0.35	1.66	8
<i>Drypetes gildani</i>	0.25	1	25	0.15	0.51	0.1	0.67	1.33	3
<i>Entandrophragma cylindrica</i>	2	2	50	1.21	1.01	0.55	3.72	5.94	4
<i>Entandrophragma angolense</i>	0.75	2	50	0.45	1.01	0.22	1.48	2.95	1
<i>Entandrophragma utilises</i>	1	1	25	0.61	0.51	0.04	0.28	1.39	2
<i>Eugenia stipitata</i>	0.25	1	25	0.15	0.51	0.29	1.93	2.59	1
<i>Fagara leprieurii</i>	0.5	2	50	0.3	1.01	0.08	0.57	1.88	17
<i>Fagara macrophylla</i>	0.25	1	25	0.15	0.51	0.06	0.43	1.09	33
<i>Ficus exasperata</i>	4	3	75	2.42	1.52	0.04	0.27	4.21	1
<i>Funtumia elastica</i>	8.25	4	100	4.99	2.02	0.04	0.28	7.29	1
<i>Garcinia cola</i>	0.25	1	25	0.15	0.51	0.04	0.26	0.92	1
<i>Guarea cydiata</i>	0.25	1	25	0.15	0.51	0.05	0.35	1	1
<i>Guarea thompsinii</i>	0.25	1	25	0.15	0.51	0.09	0.6	1.25	3
<i>Gubourtea uhii</i>	0.25	1	25	0.15	0.51	0.04	0.26	0.91	21
<i>Hildergardia barterii</i>	0.25	1	25	0.15	0.51	0.08	0.57	1.22	2
<i>Hylodendron gabunense</i>	5.25	3	75	3.18	1.52	0.09	0.59	5.28	1
<i>Hylodendron pabe</i>	0.5	2	50	0.3	1.01	0.07	0.46	1.77	3
<i>Ixora guinnessis</i>	0.25	1	25	0.15	0.51	0.33	2.25	2.91	1
<i>Khaya grandifoliola</i>	0.75	3	75	0.45	1.52	0.17	1.12	3.09	4
<i>Lagerstroemia reginae</i> Roxb.	0.25	1	25	0.15	0.51	0.04	0.27	0.93	1
<i>Lannea welwitschii</i> (Hiern)	1	2	50	0.61	1.01	0.02	0.15	1.76	7
<i>Lecaniodiscus cupanioides</i>	0.25	1	25	0.15	0.51	0.11	0.72	1.38	2
<i>Macaranga barteri</i> Mull-Arg	1.75	3	75	1.06	1.52	0.12	0.78	3.35	16
<i>Maesopsis eminii</i>	0.5	2	50	0.3	1.01	0.01	0.09	1.41	54
<i>Malacanta alnifolia</i>	4	4	100	2.42	2.02	0.17	1.13	5.57	1

<i>Mansonia altissima</i>	13.5	4	100	8.17	2.02	0.12	0.83	11.02	4
<i>Microdesmis puberula</i>	0.25	1	25	0.15	0.51	0.03	0.23	0.89	5
<i>Milicia excelsa</i>	1	2	50	0.61	1.01	0.1	0.65	2.27	1
<i>Miragyna ciliata</i>	1.25	2	50	0.76	1.01	0.1	0.68	2.45	7
<i>Monodora myeristica</i>	0.25	1	25	0.15	0.51	0.02	0.15	0.81	9
<i>Musanga cecropioides</i>	1.75	3	75	1.06	1.52	0.08	0.57	3.14	3
<i>Myrianthus arborea</i>	2.25	3	75	1.36	1.52	0.07	0.44	3.32	4
<i>Nauclea diderichii</i>	0.75	3	75	0.45	1.52	0.12	0.77	2.74	2
<i>Nesogordonia papaveriferera</i>	1	2	50	0.61	1.01	0.03	0.17	1.79	2
<i>Newbouldia laevis</i>	0.5	2	50	0.3	1.01	0.04	0.29	1.6	1
<i>Nochocarpus sericeus</i>	0.5	2	50	0.3	1.01	0.04	0.27	1.58	3
<i>Pentaclethra macrophylla</i>	0.25	1	25	0.15	0.51	0.04	0.27	0.93	8
<i>Picralima nitida</i>	0.75	3	75	0.45	1.52	0.08	0.55	2.52	1
<i>Pseudospondia Microcapa</i>	2	2	50	1.21	1.01	0.3	2	4.22	3
<i>Pterocarpus mildraedii</i>	0.25	1	25	0.15	0.51	0.16	1.06	1.71	9
<i>Pterocarpus osun</i>	0.75	2	50	0.45	1.01	0.42	2.8	4.26	8
<i>Pterygota macrocarpa</i>	4.25	3	75	2.57	1.52	0.05	0.33	4.42	9
<i>Pycnanthus angolensis</i>	2.25	3	75	1.36	1.52	0.7	4.71	7.59	7
<i>Ravenala madagascariensis</i>	1.75	3	75	1.06	1.52	0.03	0.19	2.76	2
<i>Ricinodendron heudelotii</i>	0.5	2	50	0.3	1.01	0.14	0.91	2.22	5
<i>Rothmania globosa</i>	1.25	2	50	0.76	1.01	0.14	0.94	2.71	8
<i>Spondiathus preussii</i>	11.5	4	100	6.96	2.02	0.17	1.12	10.09	4
<i>Sterculia rhenopetala</i>	1	2	50	0.61	1.01	0.18	1.22	2.84	3
<i>Sterculia tragacantha</i>	0.75	3	75	0.45	1.52	0.1	0.67	2.64	38
<i>Sterculia oblongata</i>	2	4	100	1.21	2.02	0.6	4.03	7.26	8
<i>Strombosia postulata</i>	0.75	2	50	0.45	1.01	0.22	1.45	2.91	3
<i>Terminalia ivorensis</i>	3.25	4	100	1.97	2.02	0.12	0.8	4.79	13
<i>Terminalia superba</i>	0.25	1	25	0.15	0.51	0.62	4.18	4.84	1
<i>Tetrapleura tetraptera</i>	0.25	1	25	0.15	0.51	0.15	1.02	1.68	1
<i>Treculia africana</i>	3.5	3	75	2.12	1.52	0.09	0.59	4.23	14
<i>Trichilia heudelotii</i>	1	2	50	0.61	1.01	0.48	3.21	4.83	3
<i>Trichilia monadelpha</i>	0.5	1	25	0.3	0.51	0.03	0.19	0.99	1
<i>Trichilia welwitschii</i>	0.75	1	25	0.45	0.51	0.08	0.54	1.5	2
<i>Trilepisium madagascariensis</i>	7.5	4	100	4.54	2.02	0.17	1.12	7.68	3
<i>Triplochiton scleroxylon</i>	1.25	1	25	0.76	0.51	0.11	0.72	1.99	30
<i>Uacarpa studtii</i> (Stilt root)	0.5	1	25	0.3	0.51	0.09	0.58	1.37	5
<i>Zanthoxylum utile</i>	0.25	1	25	0.15	0.51	0.05	0.35	1	2
<i>Zanthoxylum zanthoxyloides</i>	0.5	1	25	0.3	0.51	0.11	0.75	1.56	1
	167.75	200	4950	100	100	14.87	100	300	646

Legend: RD- Relative Density
RF-Relative Frequency
Rdo- Relative dominance
IVI- Importance Value Index

Tree Species Similarities and Diversity Indices between the study locations

The average diversity index (Simpson) for all the locations was (0.945). Simpson’s diversity indices revealed high diversity values in Ibadan (0.9654) and the least was found in Akure (0.9276) which was dominated by *Anonidium manii*, *Celtis zenkeri*, *Mansonia altissima* and *Triplochiton scleroxylon*. Both Ibadan and Lagos were more dominated by other species as reflected by Simpson’s and Evenness values (Table 3). Dominance was generally low in all the study location with average of 0.21. However, relatively the dominance was high in Akure (0.07), (with species such as *Anonidium manii*, *Celtis zenkeri*, *Mansonia altissima* and *Triplochiton scleroxylon*) and Benin (0.06) which contains *Funtumia elastica*, *Mansonia altissima* and *Sterculia*

rhinopetala, the lowest was found in Ibadan (0.03), species distributions was evenly distributed above 50% with Lagos and Ibadan (0.69 each respectively).

Table (4) and Figure 2 showed that the species similarities (Simpson’s similarities indices) between the study locations, from 0% to 93% for all the location. Ibadan and Lagos have a high similarity index of 93%, Ibadan and Akure (59%), while Ibadan and Benin recorded (55%) similarities. The higher the value of the similarity indices between the plots, the more related they are in species composition. This implies that Ibadan and Lagos are more related floristically than Akure and Benin locations. It was observed that the farther the study locations to each other, the lower the species similarities indices of the location studied.

Table 3: Tree species diversity of the study areas

	Ibadan	Lagos	Akure	Benin
Taxa_S	58	44	44	49
Individuals	179	156	184	141
Dominance_D	0.03461	0.04487	0.07237	0.06232
Simpson_1-D	0.9654	0.9551	0.9276	0.9377
Shannon_H	3.685	3.415	3.111	3.311
Evenness_e^H/S	0.6867	0.6916	0.5099	0.5596

Table 4: Similarity indices of the study area

	Ibadan	Lagos	Akure	Benin
Ibadan	1			
Lagos	0.93182	1		
Akure	0.59091	0.38636	1	
Benin	0.55102	0.47727	0.43182	1

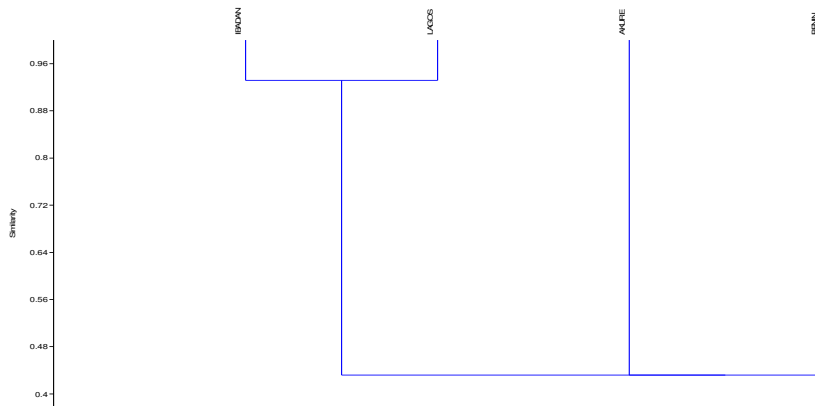


Fig. 2: Graphical representation of species similarity in the study location

Discussion

Forest tree species composition and distribution across the study locations

Vegetation dynamics of this study was carried out in four selected airport surrounding forests covering Southwest and South-south geopolitical zones of Nigeria documented an aggregate of 646 trees from 95 species belonging to 34 families. In Akure, 41 trees species belonging to 32 families, Benin with 51 trees species belonging to 21 families, Ibadan with 59 tree species belonging to 31 families and Lagos has 46 tree species belonging to 25 families respectively. The differences in the number of tree species recorded in the studied location may be due to variations in ecological factors and other habitat conditions which favored lower more tree growth, diversity and distribution (Aigbe and Omokhua, 2015). In the Akure airport surrounding forest, out of the 41 trees belonging to 32 families; the most frequently encountered family was the Malvaceae. This is not extraordinary since trees associated to the family Malvaceae are commonly in abundance in the wet Southwest region and contribute significantly in the social and economic existence of the populace

(Olaoti-laaro, 2020). The dominance of these families in the Akure surrounding airport forest could be as a result of their rapid reestablishing capacity, connected with symbiotic attributes (Deka *et al.*, 2012). Out of the 51 trees belonging to 21 families encountered in the Meliaceae family encountered in Benin airport surrounding forest agrees with Komolafe and Ige (2020) observation on tree species diversity and tree damage assessment in IITA Forest, Ibadan, Nigeria. The family Malvaceae also had the most dominant tree species in Ibadan airport surrounding forest (Agbelade *et al.*, 2022; Sanwo *et al.*, 2015). The result for the Lagos airport surrounding forest also followed the same trend with Akure and Ibadan where the dominant families was Malvaceae, followed closely with Meliaceae and Euphorbiaceae. An aggregate of 646 trees from 95 species belonging to 34 families in the study area is similar to reports in other biodiversity hotspots of the tropical rainforests' biome (Lu *et al.*, 2010).

The species richness results achieved in this study is moderate compared to the values reported by Adekunle *et al.* (2004) for a tropical lowland rainforest in Southwest Nigeria. Higher species

richness values in the four studied locations could be ascribed to the accomplishment of conservation endeavors as well as the current prohibition in lumbering and unlawful removal of forest resources by the Federal Airport Authority of Nigeria, consequently, it shows an indication of healthy ecosystems.

Overall, the IVI of the species were generally low, only 3 species have IVI value above 10% and this included *Celtis zenkeri*, *Mansonia altissima* and *Spondiathus preussii*. Their relative frequency contributed to IVI more than other components. The low IVIs may also imply that most of the species in this forest are rare (Mishra *et al.*, 2012) as reflected in the distribution of trees according to Raunkaier's classification scheme while species similarity (Simpsons) indicated the more related they are in species floristic composition.

Conclusion and Recommendation

Vegetation dynamic assessment of structure and floristic composition of tree species some airports surrounding forests in Southwest and South-south geopolitical zones were studied. Presence of high species diversity and richness indicated uniqueness and potentiality of these four surrounding airport forests for conservation of ecosystem in totality. The floristic richness of this study sites could also be attributed partly due to strong contribution coming from different vegetative typologies. The potentials of these environments in conserving biodiversity, providing necessary services towards climate change mitigation and environmental management of the airports forests was revealed in the investigation. The study provided baseline information on the contributions and benefits of

airports surrounding forest resources present in Nigeria. The selected areas have helped in the conservation of different timber tree species and fruit trees. Indigenous tree species are more abundant showing the high level of regeneration due to conservation efforts put in place around the study areas.

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