

# The Okomu Forest Reserve in the Niger Delta Region of Nigeria: Evaluating its Services to Ecosystem and Small Holder Crop Farmers

Frank OROKA\* , Nelly UREIGHO 

Delta State University, Department of Agronomy, Forestry and Wildlife, Asaba Campus, Delta State, NIGERIA

\*Corresponding Author: [orkfra@yahoo.com](mailto:orkfra@yahoo.com)

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## Abstract

*Aim of study:* The basis for sustainable conservation of any protected forest area is determined by the services it provides to the ecosystem and immediate communities. This study seeks to evaluate the services provided by the Okomu Forest Reserve that should warrant its conservation.

*Area of study:* The study was conducted in Okomu Forest Reserve in Edo State, Southern Nigeria. The major practices of farmers in the surrounding communities are sole cassava and intercropping cassava with maize, melon and groundnut.

*Material and methods:* The function system was used to evaluate the Okomu Forest Reserve, using a questionnaire containing a checklist of ecosystem functions. Respondents for the rural survey were crop farmers, while the urban survey were tourists from urban centres.

*Main results:* Results showed that rural dwellers' important functions were food/nutrition, fuel energy, and fishing with mean values of 2.81, 2.49 and 2.04 respectively, while the urban dwellers' important functions were recreation/tourism, educational/scientific information and nature protection with mean values of 2.82, 2.76 and 2.72 respectively.

*Highlights:* The order of importance of forest functions as perceived by the urban respondents from the highest was carrier, information, regulation and least with production. The rural dwellers' perception from the highest was carrier, production and information functions as least.

**Keywords:** Okomu Forest Reserve, Ecosystem Functions, Nigeria

## Nijerya'nın Nijer Delta Bölgesindeki Okomu Orman Rezervinin Ekosisteme ve Küçük Ölçekli Çiftçilere Olan Hizmetlerinin Değerlendirilmesi

### Öz

*Çalışmanın amacı:* Herhangi bir korunan orman alanının sürdürülebilir korumasının temeli, ekosisteme ve yakın topluluklara sağladığı hizmetler tarafından belirlenir. Bu çalışma, Okomu Orman Koruma Alanı tarafından sağlanan ve korunmasını garanti altına alan hizmetleri değerlendirmeyi amaçlamaktadır.

*Çalışma alanı:* Çalışma, Güney Nijerya, Edo Eyaletindeki Okomu Orman Koruma Alanı'nda gerçekleştirildi. Çevreleyen topluluklardaki çiftçilerin başlıca uygulamaları tek manyok ve manyokun mısır, kavun ve yer fıstığı ile karıştırılmasıdır.

*Materyal ve yöntem:* Fonksiyon sistemi, ekosistem fonksiyonlarının bir kontrol listesini içeren bir anket kullanılarak Okomu Orman Rezervini değerlendirmek için kullanıldı. Kırsal ankete yanıt verenler mahsul çiftçileri iken, kentsel anket kent merkezlerinden turistlerdi.

*Temel sonuçlar:* Sonuçlar, kırsal kesimde yaşayanların önemli işlevlerinin sırasıyla 2.81, 2.49 ve 2.04 ortalama değerlerle gıda / beslenme, yakıt enerjisi ve balıkçılık olduğunu, kent sakinlerinin önemli işlevlerinin ise rekreasyon / turizm, eğitim / bilimsel bilgi ve doğa olduğunu göstermiştir. Sırasıyla 2.82, 2.76 ve 2.72 ortalama değerlerle koruma.

*Araştırma vurguları:* Kentsel katılımcılar tarafından en yüksekte algılanan orman işlevlerinin önem sırası, taşıyıcı, bilgi, düzenleme ve en az üretimle idi. Kırsal kesimde yaşayanların en yüksek algısı taşıyıcı, üretim ve en az bilgi işlevleri idi.

**Anahtar Kelimeler:** Okomu Orman Koruma Alanı, Ekosistem Fonksiyonları, Nijerya



## Introduction

The natural physical environment that sustainable development seeks to protect can be classified into two: natural resource base and the environmental resource base. The natural resource base is recognized by economists as necessary factors of production including non-renewable minerals and renewables such as forests, while the environmental resource base provides services not only for the immediate human consumption but also for use in consumption processes. The former services sustain the biological basis of human life and well-being and as well provide for the enjoyment of natural resources by people, while the latter services are derived mainly from the absorptive capacities of the physical environment and as such contribute to human wellbeing. In essence, an environmentally sustainable system should be able to maintain a stable natural resource base by avoiding over exploitation of renewable natural resources and depleting of non-renewable resources (Aku, 2003). This is to allow for maintenance of biodiversity, atmospheric conditions and other ecosystem functions.

Forest degradation in Nigeria is alarming. Deforestation and forest degradation has immediate consequences for the local population in terms of increased fuel scarcity, reduced supply of fodder and leaf litter manure. Global deforestation hastens the depletion of the ozone layer. In the 1980s about 400 hectares of forest and woodland out of every 1000 hectares suffered from deforestation in Nigeria, while only 26 hectares were reforested on an annual basis (Otegbeye & Onyeausi, 2006).

Efforts at reducing environmental degradation have been in two forms: reactive and proactive approaches. The reactive approach to environmental degradation as noted by Aregbeyen & Adeoye (2006) is characterized by increased clean-up activities. However, in recent times, the proactive approach which is gradually gaining prominence is based on the design of projects and policies that will help anticipate and reduce environmental degradation to the minimal level.

Protection of the environment has now become the major objective of development.

The concept of *people-centred development* emphasizes that meaningful development must be people-based or human-centred, since development entails the full utilization of a nation's human and material resources for the satisfaction of various human needs (UNDP, 2006). One of the World Bank's 2004 Forest Strategy and Operational Policy is protecting local and global environmental values by establishing protected areas (World Bank, 2004). The establishment of protected areas is perhaps the longest study, most practised, and best-funded approach to maintaining forest environmental services. Evidence suggests that such areas can reduce deforestation even in weak institutional settings. Their effects on livelihoods are less documented, but they have been negative when people have been excluded from protected areas that they relied on for forest products (Chomitz et al., 2007).

Attempts at environmental management in Nigeria started at about 1939, during the colonial era. About 9.6 million ha of land (a little more than 10% of the country's land area exists under forest reserves. This includes the 1.7% or so of the country's land area protected specifically for wildlife conservation (game reserves, park and inviolate plots) (IUCN, 1988).

Most of the present nature reserves are remnants of what they used to be. Poor monitoring and management in the past have led to widespread encroachment and illegal harvesting of natural products. In the last two decades, however, concerted efforts have been made to rehabilitate and develop the reserves. These initiatives can be sustained only by raising peoples' awareness of the need for natural resource conservation and environmental protection, by making the local people the chief beneficiaries of conservation programmes in their localities. The functions of a protected area such as a forest reserve can be categorized as follows based on de Groot (1992): regulation functions, carrier functions, production functions and information functions. With the increasing demand for forestland in a developing country like Nigeria, the government and donor agencies must provide economic as well as environmental justifications for establishing, and promoting

the establishment of these forest reserves. There is competing demand for scarce land, including extraction of forest products, clearing of forests for farming (Kramer et al., 1994), and also to pay compensation to those who have property rights were necessary. Earlier studies have identified the roles of forest reserves to include: high biodiversity value (von Hellermann, 2011), protection of significant cultural, spiritual and natural places (Kuipper, 1997; Imasuen *et al.*, 2013). This study is therefore aimed at answering the question: What are some of the functions of the Okomu Forest Reserve that should warrant its conservation? Useful information on the functions of a forest reserve such as the Okomu Forest Reserve located in the Niger Delta Region of southern Nigeria will be a way of integrating the immediate community into the conservation programme. Appropriate information on decision making can be provided to government and donor agencies.

## Material and Methods

Okomu Forest Reserve is one of the most prominent protected areas in the Niger Delta Region of Nigeria in Edo State, Southern Nigeria. The area is located within latitudes 6.08° and 6.30°N and longitudes 5.01° and 5.27°E (Figure 1). It occupies about 108,200 hectares of land and is representative of the lowland rainforest ecosystem of southern Nigeria. The forest reserve contains plant and animal species unique to this part of West Africa. The white-throated monkey (*Cercopithecus albogularis*), several endangered species such as the African forest elephant (*Loxodonta cyclotis*), dwarf crocodile, bush cow, a variety of donkeys, leopard, variety of monkeys and a variety of birds and other animals are found in this forest (Akinsorotan et al., 2011; Enaruvbe, 2018). Commonly found birds are the eagle, a variety of hornbills, kites and hawks, egrets and many species of water bird. The flora is rich, consisting of dense undergrowth and tall timber trees such as mahogany (*Terminalis spp.*), *Chlorophora spp.*, and many others (NCF, 1996).



Figure 1. Location of Okomu Forest Reserve in Nigeria and world maps

As is the case with all forest reserves in the country, farming, forest product collection and hunting are strictly prohibited. The native language of the immediate community is *Bini* and the economy is agriculturally based, with most of the households into cassava cultivation, being the major crop in the area. Other crops cultivated in mixtures with cassava are maize, melon and groundnut.

The Okomu Forest Reserve (OFR) is a host to fifteen communities, whose main occupation is farming. It has a population of 60.000 peasant farmers. The Okomu Forest Reserve is one of the most important and critically threatened protected area in southern Nigeria where hectares of the reserve have been converted to farms, fuel wood, timber harvesting and indiscriminate bush burning; all threatening the integrity and long term viability of the forest reserve. Most of the people involved in the forest farming are indigenous resource-poor households in immediate villages in the area. The surrounding villages are characterized by a shortage of cassava farmlands, degraded uplands with limited opportunity for expansion of farm size. To obtain a better insight into the multitudes of functions (goods and services) provided by Okomu Forest Reserve, a function-evaluation system developed by de Groot (1992) was used for this study.

Reconnaissance studies were conducted in the Okomu Forest Reserve (OFR) to get acquainted with the study area and acquire first-hand information from the rural people (rural survey) and visiting tourists from urban cities (urban survey). The reliability of the instrument was determined using a set of pretest survey questionnaires using the split half method.

A structured questionnaire was used to elicit information on the functions of Okomu Forest Reserve (OFR) from the rural and urban survey. In order to obtain information from the villagers, a multistage random sampling technique was used in selecting villages around the park, based on 10km radius from the park. This gave a total of 2.068 households from the selected villages. Ten percent of the total households were then randomly selected from the villages to obtain

200 village respondents for the study. The second set of respondents was urban tourists visiting the Okomu Forest Reserve/National Park. The sample size was 50 respondents that were willing to participate in the study during the period of data collection

The structured questionnaire was made up of three sections. Section A consist of the socioeconomic characteristics of respondents, land use information and forest products collected. Section B of the questionnaire was given to the rural respondents only and contains a checklist of 16 functions (excluding the regulatory functions). During the pretest survey, language translation issues made it difficult for rural respondents to give appropriate response to questions that bordered on the regulatory functions; hence these were excluded from the questionnaire given to rural respondents during the final survey.

However the questionnaire given to urban respondents had a checklist of 26 functions of protected areas as provided by de Groot (1994). Respondents were expected to tick YES or NO on each function of the forest reserve. Section C of the questionnaire also contained the same checklist of the functions of protected areas for respondents to score each function in order of Importance as perceived by them. A numerical value was assigned to each function on a 3-point scale of 3-very important, 2-important, 1-least important. The mean score of the scale is 2.0, implying that any mean value of the functions that is 2.0 and above is considered important while the value below 2.0 is considered less important by the respondents.

## Results

The socioeconomic characteristics of the rural respondents are presented in Table 1. The survey covered about two hundred (200) rural people (subsistence farmers) with over 60% of them within the age range of 31-50 years. Farmers were mostly females. Majority of the household sizes were within the range of 6 to 10. Many of the villagers do not have access to medical facilities, electricity, running pipe borne water, or primary schools. Most of the villages were isolated and it takes several kilometres to trek to the major road. Over 70% of the

farmers have been in cassava farming for more than 10 years. Over 90% of the respondents had some land under their control either by inheritance or leasing.

Table 1. Socioeconomic characteristics of rural respondents

Variable	Percentage
Age	
21-30	12
31-40	32
41-50	36
51-60	14
>60	8
Gender	
Male	42
Female	58
Educational Level	
Non-formal	26
Primary	68
Secondary	6
Household Size	
1-5	30
6-10	64
11-15	6
Farming Experience	
5-10	28
11-15	30
>15	42
Control of Farmland	
Inheritance	90
Leasing	10

Cassava is the main staple crop cultivated, with average farmer produce of 15 tonnes per year, worth about N50000. Labour for farms is mostly household-based, were members of the family are involved (Table 1). About 43.5 % of the farmers indicated that if given the

opportunity, they would like to clear forests to be able to increase their cassava farm size by 1.5%. The average farmers' expected increase in farm size was 1.5 hectares (Table 2).

Table 2. Land use information of farmers

Variable	No of Observations	Frequency	Percent	Mode
Quantity of farmland per farmer (hectares)	200			
< 0.5 ha		40	20%	
0.5ha to 1ha		25	12.5%	
1ha to 2ha		120	60%	1ha to 2ha
>2ha		15	7.5%	
Planned increase in cultivated land per farmer (hectare)	200			
1%		60	30%	
1.5%		87	43.5%	1.5%
2%		53	26.5%	

Table 2 (Continued)

Variable	No of Observations	Frequency	Percent	Mode
Annual quantity of farmland planted with cassava per farmer	200			
0.5ha		50	25%	
1ha		50	25%	
1.5ha		70	35%	1.5ha
2.0ha		30	15%	
Total annual cassava yield per farmer (tonnes)	200			
10		60	30%	
15		90	45%	15tonnes
20		50	25%	
Total annual quantity of cassava marketed per farmer (tonnes)	200			
8.5		65	32.5	
13.5		80	40%	13.5
18.5		55	27.5%	
Total annual value of cassava per farmer (Naira)	200			
25.000		60	30%	
50.000		100	50%	50000
75.000		40	20%	

Most common forest products collected by the rural people are shown in Table 3. In order of monetary value, fire wood is the most harvested forest product, followed by fruits, snails (mainly the African giant snail, *Achatina achatina*), mushroom and herbs for medicine. Most other products include

bamboo used for fencing of compounds, gums from exudates of trees, grasses used in hut construction and weaving of mat and hat. Mean annual value of forest products collected by farmers ranged from N1500 for mushroom to N6000 (for firewood).

Table 3. Value of forest products collected by farmers

Forest product	Number of observations	Total value for all farmers (Naira)	Mean annual value for all farmers (Naira)
Fuelwood	200	1.200.000	6.000
Snails	195	429.000	2.200
Mushroom	80	120.000	1.500
Fruits	175	665.000	3.800
Herbs for medicine	20	56.000	2.800

*Functions of the Okomu Forest Reserve*

Tables 4 shows the mean responses on checklist of 26 functions of the Okomu Forest Reserve based on the rural and urban survey.

*Regulation Functions of the Okomu Forest Reserve:* This could be seen from the

mean responses from the urban survey of the ten (10) sub-functions under the regulation functions. The means range from 2.00 to 2.42 with a sub grand mean of 2.23. All means were above 2.00, indicating that respondents from the urban survey considered all regulatory functions to be important.

Table 4. Checklist of functions of Okomu forest reserve

Index	<i>Regulatory functions</i>	Rural survey Mean	Remark	Urban survey Mean	Remark
1	Regulation of chemical composition of the atmosphere	-		2.36	Important
2	Climate regulation	-		2.30	Important
3	Watershed regulation	-		2.40	Important
4	Water catchment	-		2.42	Important
5	Erosion prevention	-		2.10	Important
6	Fixation of solar energy	-		2.04	Important
7	Storage recycling	-		2.00	Important
8	Biological control	-		2.18	Important
9	Nursery function and migration	-		2.30	Important
10	Maintenance and biological diversity	-		2.20	Important
	Sub grand mean			2.23	
	<b><i>Carrier function</i></b>				
1	Fishing	2.04	Important	2.14	Important
2	Recreation and tourism	1.50	Less Important	2.82	Important
3	Nature protection	1.32	Less Important	2.66	Important
	Sub grand mean			2.54	
	<b><i>Production function</i></b>				
1	Food/nutrition	2.81	Important	2.12	Important
2	Genetic resources	1.03	Less Important	2.56	Important
3	Medicinal Resources	1.90	Less Important	2.64	Important
4	Raw material for clothing, etc.	1.20	Less Important	1.24	Less important
5	Raw materials for manufacturing	1.05	Less Important	1.18	Less Important
6	Biochemicals	1.01	Less Important	0.67	Less Important
7	Fuel and Energy	2.49	Important	1.04	Less Important
8	Ornamental resources	1.08	Less Important	1.96	Less Important
	<b><i>Information function</i></b>				
1	Aesthetic function	1.04	Less Important	2.20	Important
2	Spiritual/religious information	1.53	Less Important	2.60	Important
3	Historic information	1.54	Less Important	2.56	Important
4	Cultural/artistic inspiration	1.60	Less Important	2.50	Important
5	Educational/scientific information	1.02	Less Important	2.76	Important

*Carrier Functions of the Okomu Forest Reserve:* Results from the urban survey indicated mean responses to be 2.82, 2.66 and 2.14 for recreation and tourism, nature protection and fishing respectively with an average of 2.54 indicating that the urban respondents consider all functions of the carrier to be important. However, respondents from the rural survey were more concerned about a function that has monetary value and considered fishing as the only function that was important with mean of 2.04 (Table 4).

*Production Functions of the Okomu Forest Reserve:* From the urban survey,

medicinal resources, genetic resources and food/nutrition had mean values of 2.64, 2.56 and 2.14 respectively, hence were the functions of production considered important. This is in contrast to the rural survey where only food/nutrition (2.81) and fuel and energy (2.49) were considered important.

*Information Functions of the Okomu Forest Reserve:* The information functions from the urban survey had mean values ranging from 2.20 (aesthetic function) to 2.76 (educational and scientific information), hence the respondents considered them to be important. However respondents from the

rural survey did not consider any of the information functions to be important, hence all the means were below the critical value of 2.00.

### **Discussion**

Shifting cultivation is the major farming system practised by the farmers, and most of them indicated an interest in expanding plot sizes and increasing number of farms available land cultivated. This trend may not be unconnected with the increasing prices of cassava tubers and products since 1999 when the Obasanjo administration came into power in Nigeria. This increase in prices of cassava has encouraged farmers into increased cultivation of the crop. The processing of cassava into various value-added products as earlier noted by Nwosu (2005) is a strong stimulant towards this rebirth of cassava production.

Shifting cultivation by poor agriculturists is considered to be quantitatively the most serious threat to the remaining forests and the fact that “shifted cultivators” appear to be responsible for the main part of deforestation has been used to argue that broader socioeconomic, often outside of the forest areas need to be addressed if the sustainable solution to deforestation is to be found.

The Okomu Forest Reserve plays an indispensable role in creating and preserving a stable and high-quality environment. The results of this study show the importance of firewood as an energy source in a developing country like Nigeria. Ogwumike (2006) noted that 85% of households in Nigeria use fuel wood for cooking. This is a dismal condition and connotes severe deforestation, environmental pollution and poverty in the country.

### *Regulatory Functions*

The urban respondents (tourists) considered all regulatory functions to be important. The perception of respondents towards regulatory functions such as nursery function/migration, maintenance and biological diversity and biological control was confirmed by previous studies of Isikhuemen & Ikponmwonba (2020) who reported that Okomu - Gilli Gilli - Ekewan - Ogba - Ologbo forest corridor is a significant

migratory route/refuge for wildlife and biodiversity repository for species. They also reported that government/company staff in urban locations viewed poor conservation strategies as threats to achieving the functional roles of wildlife refuge/corridor and biodiversity repository in Okomu Forest Reserve.

Earlier studies of MacDicken et al. (2015) showed that forest moderates the local climate, reduce soil erosion, and regulate stream flow by forming a protective cover over the land. The forest reserve also influences the local climate around all the villages by reducing wind speed and temperature extremes and by increasing the atmospheric humidity. Directly or indirectly, Okomu Forest Reserve contributes to the maintenance of human health, through regulation of the local and regional climate, storage and recycling of human waste. Most other functions of the Okomu Forest Reserve, such as recreational use, the opportunity to harvest resources, scientific and educational use, depend on these regulatory functions. Often, the importance of protected areas to regulation functions becomes apparent only after these functions have been disturbed.

### *Carrier Functions*

This group of functions relates to the capacity of the Okomu Forest Reserve (OFR) to provide space and suitable substrate or medium for human activities which require permanent infrastructure, such as habitation, crop cultivation, fishing and fish farming, certain types of recreation and nature conservation. The urban respondents viewed all functions of the carrier to be important with highest means in recreation and tourism and nature protection. Digun-Aweto et al. (2019) noted that for educational reasons OFR attract tourists to have experience of wildlife and rainforest vegetation. The beautiful scenery of the lakes, Osse River, treehouse, and nature trails gives visitors leisure experience. Places of interest which the visitors will find exciting and thrilling include the tree house, a 15.0m tall silk cotton tree from which a panoramic view of the forest reserve can be observed. Other places include Lake 64, the



Elephant range, *Arakhuan* stream, crocodile lake, Nature Trail (a walk through the sanctuary will reveal the presence of important flora and fauna) and Okomu River, ideal for canoe ride and sport fishing. The use of conservation education, code of conduct, eco-lodges and tour guides are some of the eco-tourism management strategies used in OFR Park (Ajayi & Eveso, 2017).

The OFR hosts freshwater ecosystems. The only function of the carrier that was perceived to be of importance to the rural respondents was fishing; a function that has monetary value. This agrees with observations of Momoh (2002); Digun-Aweto *et al.* (2019) who stated that forests ecosystems provide local communities with daily sustenance such as game and fishing, through meeting subsistence needs and income generation.

#### *Production Functions*

Food/nutrition was perceived as an important production function by the rural and urban respondents. Earlier observations from other studies agree with these results. Previous studies of Famuyide *et al.* (2000) & Marisol *et al.* (2011) reported that in Okomu Forest Reserve, about 12.22% of the rural community depends on mushroom and snails as food while 34.44% of them consume forest fruits as part of their food habits. As noted by Ambe & Malaisse (2001), wild fruits greatly contribute to the diet of rural peoples by providing rare nutrients and facilitating survival in times of famine. The African mango, *Irvingia gabonensis*, whose kernel is locally called *ogbono*, a highly nutritive soup condiment is one of the products of this forest.

Urban respondents also considered medicine and genetic resource functions of production of OFR. Traditional medicine practitioners harvest barks, leaves and roots of these trees for herbal medicine. In their study on important medicinal plants of OFR (Idu & Osemwegie, 2007) identified 60 species consisting of 50 leafy flora and 10 mushrooms that useful in trado-medical health care. They also reported that about 75% of men in the rural communities within the OFR have known about ethnobotanical

plants through inherited knowledge. The OFR is a repository of several genetic resources consisting of several species of flora and fauna which beautifies the ecosystem and is relevant for nature tourists. Fuel wood and energy was viewed as an important production function of the OFR by the rural people. Fuel wood exploitation is major practice of the local people, since this is their main energy source for cooking. This is in consonance with opinion of Ozturk *et al.* (2010) that protected areas limits the resources on which the local rural population depends. Studies of Azeez *et al.* (2010) reported that 70.7% of rural dwellers around different forest reserves in Edo State, Nigeria exploit forest resources such as wood to satisfy domestic needs.

#### *Information Functions*

The rural dwellers did not perceive any of the information functions to be important. In the views of Emelue & Ukandu (2014), rural dwellers are usually more concerned about forest functions of monetary value and that contributes to their daily sustenance. The lack of appreciation of the information functions of the OFR may also be due to the poor educational status of the local people. Digun-Aweto *et al.* (2015) opined that the locals who were not favourably disposed to forest conservation are mostly those with weak formal education level.

The urban respondents considered all information functions to be important. Consumers (tourists) usually value the ambience, the experience, the difference, and the cultural exchange associated with such visits to protected areas (Onyeabor & Alimba, 2008). The nature experiences will make the tourists' visits memorable. This will also involve educational tours and excursions for students both at secondary and tertiary institutions.

#### **Conclusion**

From this study, it is clear that the rural dwellers are more concerned about forest functions that has monetary value and contributes to their daily livelihood; hence functions such as fishing, food/nutrition, fuel and energy were considered important. It is therefore imperative that for the maintenance

of this Okomu Forest Reserve in a sustainable manner, there is need to involve all stakeholders including the rural farmers living around the reserve. There is need for conservation education of local community members around the forest reserve so that they can appreciate other benefits of the OFR other than those with livelihood function.

It is also important to note that the management of the forest reserve needs constant monitoring and attention in order to maintain the natural features that will make OFR attract tourists and continue to provide ecosystem services.

### **Ethics Committee Approval**

This research was conducted with the Approval of the Ethics Research Committee, Department of Agronomy, Forestry and Wildlife, Delta State University, Asaba Campus, Delta State, Nigeria on the 15/10/2020 (Approval Issue Number: AGYFW/2019/006).

### **Peer-review**

Externally peer-reviewed.

### **Author Contributions**

Conceptualization/Introduction: F.O.; Material and Methodology: F.O., N.U.; Supervision: F.O., N.U.; Visualization: F.O., N.U.; Writing-Original Draft: F.O., N.U.; Writing-review & Editing: N.U.; Other: F.O. All authors have read and agreed to the published version of manuscript.

### **Conflict of Interest**

The authors have no conflicts of interest to declare.

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