POTENTIAL IMPACT ON BIODIVERSITY IN KWALE'S FOREST RESERVE BY POWER PLANT ESTABLISHMENTS

Lameed GA[1*]

Akeem Lameed

*Corresponding author email: lamakim2002@yahoo.com and/or lamgbola@gmail.com

[1]Senior Lecturer, Department of Wildlife and Fisheries Management, Faculty of Agriculture and Forestry, University of Ibadan, Ibadan. Nigeria

ABSTRACT

Kwale forest reserve with gazetted area of $3km^2$ in the present Delta state, south eastern Nigeria, is surrounded by numbers of adjoining communities such as Okpai, Umu-uzor, Ugbome, Nkwor, Amama and Asa. The fringe ecosystem is endowed with important conservation-status species like primate: *Cercopithecus spp; family of artiodactyla, Tragelaphus scriptus, rodentia: Dendrohyrax arborea, Thryonomys swinderianus;* carnivores *Panthera leo, Vulpes pallida* and numbers of *avifauna* species as well as *reptilea.* The natural high forest ecosystem consists of emergent trees, such as: *Ceiba pentandra*, *Landolphia oweriensis*; the under storeys: *Strychnos spinosa*, *Lindaclearia dentata* and the surrounding inhabitant drawn most of their livelihood from the natural ecosystem like bush meat which provide protein, firewood, water for cooking and other basic necessities. The use of Kwale forest reserve and the surrounding ecosystem by the Independent Power Plant (IPP) for electricity generation will continue to contribute to the loss of most natural resource base (flora and fauna). Many of such developmental projects (eco-development) are executed daily in the country and have resultant ecosystem damage, species erosion and environmental degradation. The exploitation over past decades has left a wasteland with serious environmental problems. The percentage preference for hunting of primate, rodent, antelope and avifauna are 55%, 20%, 20%, 5%, respectively, while the preference for consumption of meat indicated that bush meat is mostly preferred (33.5%) by the inhabitants, compared to other conventional sources such as beef, pork, fish, and chicken with 20.6%, 10.5%, 25.6% and 10.0%, respectively. It is pertinent to note that strategic management will be needed to protect, sustain, and manage the Kwale forest reserve along side with IPP developmental concept, thus, there is a need for Environmental Impact Assessment (EIA) as a tool for decision makers as well as ecosystem managers. This is necessary for timely communication of information between the policy makers (government) and stakeholders conducting specific projects that have mutual benefits to the general public.

Key words: Environment, Assessment, Flora, Fauna, Impact

INTRODUCTION

Nigeria has a rich variety of natural forest ranging from open vegetation and savanna forests of northern dry climate, to the tropical moist forest (TMF) of the south with riparian forest along the major rivers (Niger and Benue). Approximately eleven percent of the total land area of the country is covered by forest, comprising eighty percent savanna and twenty percent high forest [1]. The rain forest belt, where Kwale forest can be found is remarkable in spite of its relatively small area; it contains more mammalian species than any other forest vegetation belt in Nigeria [2]. This is attributed to its structural complexity, which allow for large number of niches and its ability to produce abundant food for inhabitants [2].

Generally, the ecosystem in Kwale forest is dominated by evergreen plants, tall shrubs which belong to several unrelated families that share common habitat preferences, physiognomy (that is the structural arrangement of the surface area of land and the vegetation cover), functional and structural adaptations. Vast area of this wetland is mostly affected by activities resulting from decisions, which either ignored the potential economic value of the resources or also placed a significantly higher value on the alternative land use. The current trend of uncontrolled resource exploitation has greatly fragmented and destroyed the natural rain forest ecosystem. Much of the rain forest in the eastern part of the country has been destroyed due to various activities of resource exploitation. Therefore, mammals adapted in the forest have co-evolved with the system over the years and destruction or modifications of the forest have therefore profoundly threatened their continued existence [3].

The Niger Delta is one of the largest wetlands covering over 20,000 km^2 and Kwale forest constitutes a significant part of it. Most of the conservation areas at this zone are not gazetted like Kwale forest; therefore the ecozones have been fragmented by oil exploitation, industrial activities and other eco-development projects. This zone is one of the highest conservation priorities on the West Coast of Africa because it holds a larger number of threatened and endangered species, particularly mammals that are economically and scientifically valuable [2].

Developmental project often has an adverse impact on the environment, such as environmental pollution and degradation that are intensified by both human disturbances (anthropogenic activities) and natural occurrences (adverse climatic conditions) [4]. Activities like road construction, mineral and natural resources exploitation, like oil and gas exploitation and unsustainable agricultural practices have affected the environment [5]. In order to effectively protect, sustain and manage the environment, alongside development and advancement, the concept of Environmental Impact Assessment (EIA) is necessary. "Environmental Impact Assessment can be defined as: The systematic process of evaluating the probable consequences of a proposed action during decision-making processes where serious environmental damage can be minimized or even avoided" [6]. Many developmental activities such as damming of rivers, construction of dual carriage roads, and other human-economic activities have been carried out without proper EIA [5]. The effects of these on

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wildlife species and other conservation areas cannot be over emphasized, the multiplier effect are mostly noticeable at the feeder streams or rivers flowing in and out the charnels that are blocked and the wetlands get dried up.

The project of Independent Power Plant (IPP) is a national development project that requires power generation of 450 MW (Megawatt) from the gas effluent of Nigeria Agip Oil Company (NAOC) to the national electric grid. The recycling plant is located at Kwale forest, and this required extension of overhead electrical cable to Onitsha, which is about 52km away. However, the ecosystem and general natural inhabitants of the Kwale forest is bound to change in physiognomy, functional and structural adaptation. Such a vast forest area is mostly affected and flora/fauna resources indigenous to the area are not as adaptable as man, therefore an EIA study is required. As a tool for decision-making, the value of EIA will be realized if there is timely bridge in gap of communications between the individual conducting the assessment and those planning a proposed project, there by solved the problem of writing massive technical document [7].

STUDY AREA AND METHODOLOGY

Kwale forest situated in the old Bendel State, South eastern part of the present Delta state, and is one of the gazetted forest reserves in Nigeria since 1960's. It has land area of 3km^2 with seven adjoining communities namely: Okpai, Umu-Uzor, Ugbome, Nkwor, Amama, Asah and Opia. The major stakeholder to the forest reserve is Opai clan (Fig. 1, Map of the site). The topography is generally flat with depression; hence the area is characterized with wetland flood plain with terrestrial habitat submerged in most part of the year [8]. The Independent Power Plant (IPP) of 450 megawatts required land area of 500m^2 of the Kwale forest, while the power line transmission for over-head electrical cable to Onitsha extends for 52km from the project site.

KEY

OKPAI FOREST
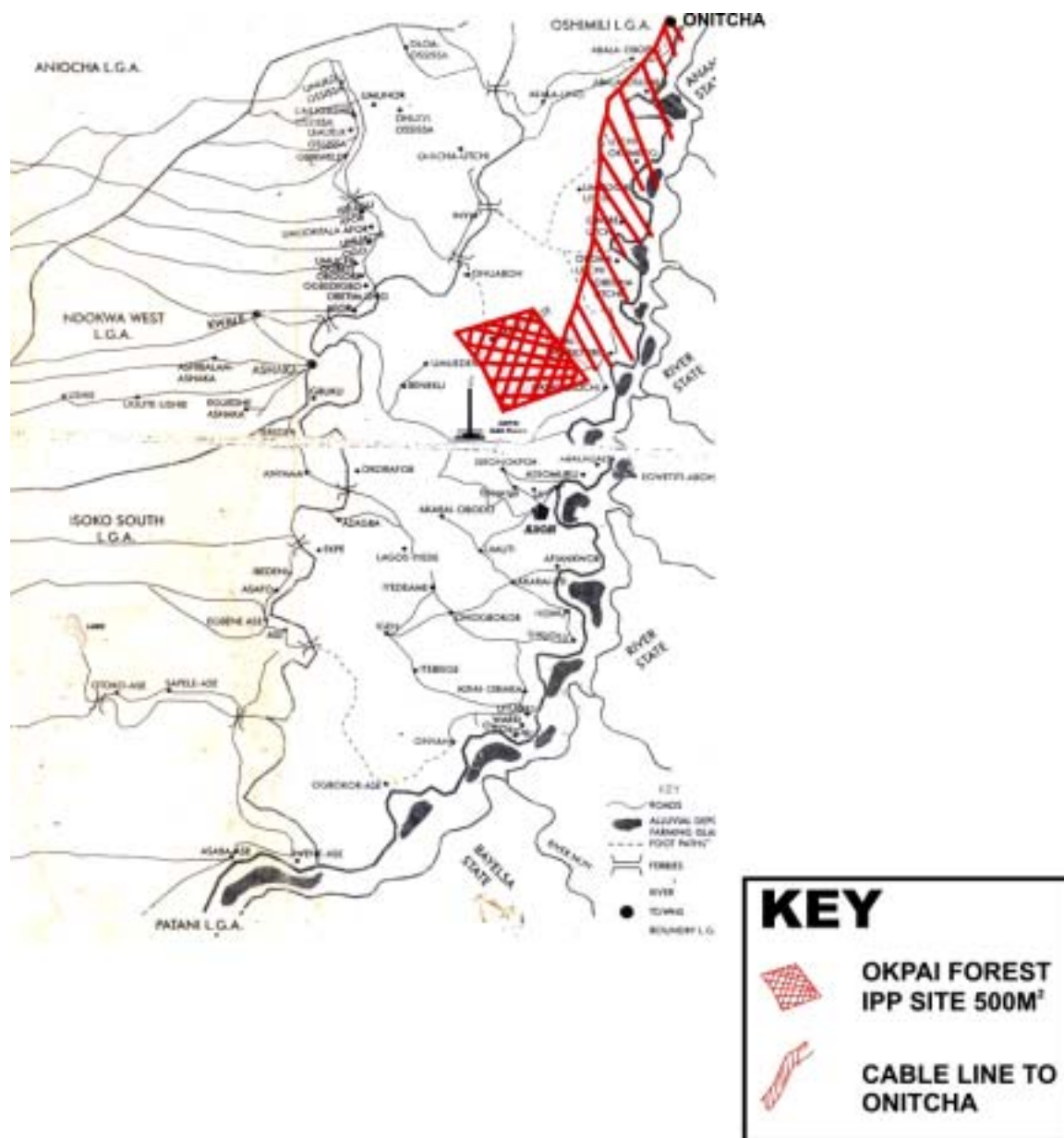IPP SITE 500M^2

CABLE LINE TO
ONITCHA

**Figure 1: Study Location of Kwale-Power Generation within the Ndokwa Local
Government Area, Delta State, Nigeria**

The present study is mainly an eco-development project, which is defined as an
ecologically sound development strategy that emphasizes the need for harmonizing
economic, social and environmental concerns in the process of development [9]. This,
therefore, requires on-the-spot assessment of the general environment, which includes
the flora and fauna evaluation. Five transects of five kilometers each were established,
with an expected segment of five meters width. At each reference point (5m interval),
quadrants of 5m^2 were laid randomly to evaluate all plant species as described and
identified [10]. Both indirect and direct sampling methods were adopted for rapid

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assessment of fauna that is mammals and aves [11]. This study covered both dry and wet season of the year 2003. The forest reserve was assessed by using preference index method [12]:

$$D = \frac{(r - p)}{r + p - 2rp}$$

Where r is the proportional use of habitat by the species and p is the proportion of forest environment. The method took into consideration habitat use, condition, and information on the species abundance and utilization rate. Other information is obtained through structured questionnaire (administered by individual by knowledge 'Ik' model) to the inhabitants at the sites. The current price of wild animals (bush meats) was established, average number of each species were used to determine current market price.

Tasks carried out to obtain wildlife data were:

a) Reconnaissance survey of the study site (the first day). By establishing ten transect lines and transect survey of all wild species (to determine species status)
b) Wildlife Socio- Economic study: To determine human-wildlife conflicts, and also current market values of wild animals in that area through questionnaire administration.

The above were achieved through the following:

(i) Assessing the composition of flora and fauna diversities within the area;
(ii) Assessing the impact of forest activities in terms of the anthropogenic activities within the area.
(iii) Proffering mitigation measures (recommendations) towards the conservation of natural resources (wildlife) and establishment of IPP at the Forest ecosystem and the anthropogenic importance of the area to human inhabitants at the site.

The materials used are as follows: recording-ecological sheet, binoculars, Geographic Positioning System (GPS), forest guide (native of the area), measuring tape (500 – 1000m rule), camera and films, ecological map of the area.

The research work is purely based on impact of the proposed project on the wild fauna, thereby predicting likely environmental impact as well as effect on the species composition at the site, and evaluating their status and possible mitigation measure to the policy makers.

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RESULTS

In total there are 47 mammalian species, 7 reptilians and 3 amphibians encountered. Every species and sub-species at the forest ecosystem were evaluated according to the classification by IUCN [13]. Most of these species are threatened, endangered, vulnerable and extinct species (Table1).

Species like bush back *Tragelaphus scriptus*, tree squirrel *Funiscinrus pyrrhopus*, patas monkey *Cercopithecus patas,* and tree hyrax *Dendrohyrax arborea* were populous and directly sighted (absolute density). While foot print (relative density) of species like leopard *Panthera pardus*, fox *Vulpas palluda*, forest otter *Aonyx carpensis* and genet cat *Civerra civetta* were prominent along the stream bank of river Niger closer to Beneku - water side settlement. The reptiles such as monitor lizard *Veranus niloticus*, tree pangolin *Manis tricuspis* and water moccasin *Ancistrodon piscivoruos*, were directly sighted.

Bird populations were characteristically distributed over the villages and farmlands (19 species), forest area (49 species), river bank and beaches (14 species) as shown in table 2. African Black kite *Milvus migrans* and pied hornbill *Tochus nasutus* are the most abundant, while carmelite sunbird *Nectarina spp*, long tail glossy starling *Lamprotornis caudatus*, slender billed bulbul *Andropardus virens* and abyssinian roller *Coracias abyssinica* were sighted in the forest and beaches. A rare bird species Abdim's stock *Ciconia abdinni* an intra-African migrant, were sighted during dry season, which indicated roosting period, because the species only migrate to northern part of the country indicating beginning of wet season.

The physiognomy of the natural high forest with component trees differentiated the site (Kwale forest) as tropical rainforest. Vegetation is endowed with highest stratum, the upper canopy composed of emergent trees such as*: Treculia africana, Berlinia auriculata, Chrysophylium albidum and Cynometra megtalophylla.* The prominent tree species are *Landolphia oweriensis, Glyphaea brevis, Cynometra megalophylla, Ceiba pentandra and Irvingia gabonensis* (Table 3). The under-storey layer was dominated by *Napoloon vogelli, strychnos spinosa, Lindacleeria dentata* and *Diospyros* species, and the climbers include *Paulina pinnata* and *combretum smeathmannii*. The species preferences for hunting by the people were primate (monkeys, baboon and galagos), giant rat, cane rat and other antelopes (bush buck, duikers).

The identified purpose of hunting apart from their utilization for medicinal purposes was for protein source such as bush meat. The market price of bush meats is not cheaper when compared with prices of conventional meats such as beef, pork, fish and chicken; despite this bush meat is still favored by the inhabitants. The percentage preference for hunting of primate, rodent, antelope and avifauna are 55%, 20%, 20%, 5%, respectively (Table 4); this indicated relishes of the bush-meat. The preference for consumption of meat indicated that bush meat is mostly preferred (33.5%) by the

inhabitants, compared to other conventional sources such as beef, pork, fish, and chicken with 20.6%, 10.5%, 25.6% and 10.0%, respectively (Table 5).

DISCUSSION

Most of the species of flora and fauna in Kwale forest reserve and the Okpai ecosystem (transit pipeline to Onitsha) are classified as conservation-important species (threatened, endangered or rare) by the IUCN 1996 category. The extent of development that utilizes these natural resources (.that is eco-development) is determined by many economic, social and political factors, which are external to its primary need and objective [14].

The need of Kwale Forest Reserve for Independent Power Plant generation (IPP) may contribute significantly to the continuous loss of natural forest as well as stock of indigenous wildlife species in the wetland eco-zone. Most of the pscivorous bird species are specialized brooders, either using the area for breeding, incubating and for feeding on fruiting trees; mammals, on the other hand, are procreating on balanced rate of relationship (predator / prey relationship). Once this habitat is tampered with, they will find it extremely difficult to adapt and adjust to disturb environment because the wild animals are climax species. Nature has provided wildlife with certain forms of habitats [15]. Due to this, wildlife is not as adaptable as man to new or disturbed environments. It can, however, be confirmed that land-use decisions will be highly influenced by economic criteria of this nature, and government decision on the position of natural resources (flora and fauna) given the public pattern of land use will be related to economics growth [16].

CONCLUSION

In conclusion, incompatible land uses are presently spreading into strongholds of wild animals and forest reserves; therefore the land use plans for the remaining land in the tropical region should assume a degree of compatibility between all the competing uses, such as wildlife, forest reserve, agriculture, oil exploitation and animal husbandry [17]. Utilization of wild animals for bush-meats is an alternative source of protein for the people in the area, while numbers of economic trees and fruits bearing tree species are also in abundance in the reserve due to its secondary rainforest nature and thicket of secondary plant succession. Eighty percent of the people in southern Nigeria depended on bush meat as source of protein [11]. Destruction of this natural habitat will render specialized species homeless thus endangering them or causing them to migrate. To the people in rural area, wild animals are so vital for food, medicine, traditional and cultural uses that adequate consideration must be given to maintain natural habitat when planning for rural development projects (eco-development) [15].

Developmental projects in Nigeria are proposed and executed on a daily basis; many of these projects involve large-scale vegetation cover removal and ecosystem damage. Many of these projects did not have proper Environmental Impact Assessment (EIA)

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studies before implementation. The exploitation of both renewable and non renewable resources over the past decades has created problems in the environment, which has further adversely affected the socio-economic development of the nation.

Table 1: Wildlife species population structure in study location of Kwale Forest Reserve

CLASS	ORDER	FAMILY	COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS	MODE OF IDENTIFICA-TION	POPULATION NUMBER
MAMMALIA	Carnivora	Viverridae	March mongoose	*Atilax paludinosus*	T	F	1
			African	*Vivvera civetta*	E	F	2
			Civet	*Genetta poensis*	T	F.A	1
		Felidae	Forest Gene	*Nandinia biotata*	T	I	-
		Mustelidae	Palm civet Serval	*Felis serval*	E	I	-
			Leopard	*Panthera pardus*	E	I.F	1
			Cape Clawless Otter	*Aonyx capensis*	E	I	-
	Carnivora	Carnidae	Fox	*Vulpes palluda*	T	A	2
		Mustelidae	Spotted necked otter	*Lutra maculicolis*	T	F	1
			Warthog	*Phaecechoerus aethiopicus*		F.A	15
	Artiodactyla		Red River - hog	*Potamocherus porcus*		F.A	10
		Suidae		*Hippoppotamus amphibious*			
		Hippopotamu	Hippopotamus		T	A.I	1
		Bovidae		*Syncerus caffer*			
				Tragelaphus spekei.			
			African buffalo	*Cephalophus monticola*	T	I	-
			Sitatunga	*Kobus kob*	E	I	-
			Blue duker	*Tragelaphus scriptus*	T	F	6
			Kob,		T	F	4
			Bushbuck		T	F.A.	9
	Primate	Galagidae	Dwarf Galago	*Galagoides demidovii*	E	S	1.
		Cercopithedidae	Mona monkey	*Cercopithecus mona*	E	C	2.
			Pata monkey	*Erythrocebus patas*	T	C	3

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		White-nose monkey	*Cercopithecus nicititans*	E	C	5
Rodentia	Sciuridae	Redless Tree-Squirrle	*Funisciurus anerythrus*	T	A.C.	5
					A.C.	5
		Giant forest-Squirrel	*Protexerus stangeri*	T	S.I.	8
	Cricetidae			T	S.I.	3
		Gambian Giant-rat.	*Cricetomys gambianus*			
		Cane rat	*Thryonomys swinderianus*	T	I.A.	1
	Muridae	Black rat	*Rattus rattus*	T	I	-
		Shaggy rat	*Dasymys incomtus*	T	D.I.	4
		Swamp rat	*Malacomys Edwards*	E	I.	-
		Striped mouse	*Hybomys vittatus*	T		
Insectivora	Soricidae		*Crocidura insitania*	V	I	-
			Crocidura odorata	V	I	-

			Nigerian Musk shew			
	Hyracoidea	Procavidae	Black Giant shrew	*Dendrohyrax Dorsalis*		
					T	C.	11
	Pholidota	Manidae	Western Tree-hyrax	*Manis tricuspis*	E	S.	2
			Long-tailed/Tree Pangolin				
REPTILIA	Reptila		Nile croccodilus	*Croccodilus niloticus*	T	I.A.	1
			Monitor lizard	*Veranus niloticus*	T	S	1
			Water moccasin		T	S	1
			Rock python	*Python sebae*	E	I	-
			Green mamba	*Dendrospis viridis*	T	I	-
			Black cobra		T	A	1
			Hingeback	*Kinixys erosa*	T	I	-

Key: F = footprint; C = Call, S = Direct sighting, D = Droppings, A = Activity sites, I= Information (interview)
Threatened = T, Endangered = E, Vulnerable = V, Extinct = Ex

Table 2:Distribution of avifauna at the study locations
Table 2A. Aves (birds) in the Kwale/Okpai   localities

COMMON NAMES	SCIENTIFIC NAME
1. African Black kite	*Milvus migrans*
2. Stand Night jar	*Macrodipteryx longipemix*
3. Black-belied Coucal	*Centropus grillii.*
4. Little African Swift	*Apus affinis*
5. Yellow fronted canary	*Sevinus mozambicus*
6. Yellow wagtail	*Motocilla flava*
7. Collard sunbird	*Nectarinia cuprea*
8. Pintailed Whydah	*Vidua macroura*
9. Bronze Mannikin	*Lunchura cucullata*
10. Senegal coucal	*Centropus senegalensis*
11. Tambourine Dove	*Turtur tympanistria*
12. Laughing Dove	*Prinia subflava*
13. West African Thrush	*Corvus albus*
14. West African Prinia	*Pycronotus barbatus*
15. African Pied crow	*Merops albecollis*
16. Common bulbul	*Erycronotus barbatus*
17. White throated Bee-eater	*Merops albecollis*
18. Broad Bill Roller	*Erystomus glancurus*
19. Village Weaver Bird	*Placeus cucullatus*

Table 2:Distribution of avifauna at the study locations
Table 2B. Aves (birds) in the River Niger Banks, Beaches

COMMON NAMES	SCIENTIFIC NAME
1. Abdim's Stock	*Ciconia abdimii*
2. West African rive Eagle	*Haliaetus vocifera*
3. Pied Kingfisher	*Ceryle rudis*
4. Swam Palm bulbul	*Thescelecichla leacoplearms*
5. Pygmy kingfisher	*Ceyx Picta*
6. Common vulture	*Neophron monachus*
7. Whistling Teal	*Dendrocygna viduata*
8. Splendid sunbird	*Nectarina coccinigaster*
9. Great White Egret	*Ardeola ibis*
10. Hammerkop	*Scopus umbrella*
11. Little African Swift	*Apus affinis*
12. White-Ruped Swift	*Apus caffer*
13. African Sand Martin	*Riparia pahidicola*
14. African Black Kite	*Milvus migrans*

Table 2:Distribution of avifauna at the study locations
Table 2C. Aves (birds) in the project site and forest areas (page 17-19)

COMMON NAMES	SCIENTIFIC NAMES
1. Vinaceous Dove	*Streptopelia vinacea*
2. Laughing Dove	*Steptopelia senegalensis*
3. Tambourine Dove	*Turtur tympanistria*
4. West African Touraco	*Touraco pera*
5. Violet Plaintain - eater	*Musophaga violacea*
6. Little Sparrow Hawk	*Accipiter erythropus*
7. West African Gooshawk	*Accipitertoussenelli*
8. Palmnut Eagle	*Gypohierax angolensis*
9. Abdim's Stock	*Ciconia abdimii*
10. WhistlingTeal	*Dendroygna viduata*
11. African Golden Oriole	*Iriolus awratus*
12. Black headed Oriole	*Oriolus branchrhynchus*
13. Glossy backed Drongo	*Dicrurus adsimilis*
14. Common Garden Bulbul	*Pyconotus barbatus*
15. Swamp Palm Bulbul	*Thescelocichla leucopleurus*
16. West African Thrush	*Turdus pelius*
17. African Pied crow	*Carvus albus*
18. Senegal wood Hoope	*Phoeniculus chrysocomus*

19. Pired King fisher	*Ceryle radis*
20. Senegal king fisher	*Halcyon senegalensis*
21. Broad billed Roller	*Erystomus glaucurus*
22. Cardinal Wood Peker	*Dendropicus fuscescens*
23. Piping Hornbill	*Bycanisters fistulator*
24. Splendid glossy Starling	*Lamprotonis splendilus*
25. Mosque Swallow	*Hirundo senegalensis*
26. White throated bee-eater	*Merops albecollis*
27. Yellow Wagtail	*Motacilla flava*
28. Senegal coucal	*Centropus senegalensis*
29. Black bellied coucal	*Centropus grilli*
30. Levaillent's Cuckoo	*Clamator glandaius*
31. African Barn Owl	*Tylo alba*
32. Wood Owl	*Ciccaba woodfordi*
33. Standard night jar	*Macrodipteryx longipennis*
34. Little African Swift	*Apus affinis*
35. White Rumped Swift	*Cypsiurus parous*
36. Ahanta Francolin	*Francolinus ahentensis*
37. Crested malimbe	*Malimbus malimbus*
38. Red vented malimbe	*Malimbus scutatus*
39. Allied Hornbill	*Tockus semifascialus*

40. Yellow-fronted canary	*Serinus mozambicus*
41. Green fruit Pigeon	*Treron australis*
42. Grey Parrot	*Psittacus erythacus*
43. Naked face Barber	*Gymnobucci calvus*
44. Yellow-fronted Tinkerbird	*Pogoniulus chrysocomus*
45. Carmelite Sunbird	*Nectarinia coccinigaster*
46. Long tailed glossy starling	*Nectarinia cupreea*
47. Abyssinian roller	*Coracias abyssinica.*

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Table 3:Flora species frequency and occurrence at IPP site (Secondary Rainforest)

Serial No.	Species	Life Form	Remarks as on site
1.	*Acanthus montanus*	Herb	Threatened (Th.)
2.	*Adenia lobata*	Herb	Th
3.	*Aframomum daniellia*	Herb	Th.
4.	*Aframosia alata*	Herb	Th.
5.	*Alchomea cordifolia*	Shrub	Th.
6.	*A. laxiflora*	Shrub	Th.
7.	*Allophyllus africanus*	Herb	Th.
8.	*Anthocleisia nobilis*	Tree	R.
9.	*Anthonothat macrophylla*	Tree	Th.
10.	*Baphia ninda*	Tree	Dominant
11.	*Bermia grandiflora*	Tree	Th.
12.	*Bridelia micrantha*	Tree	R
13.	*Calamus derratus*	Shrub	D.
14.	*Carpolobia lutea*	Shrub	Th.
15.	*Chromolacna odorata*	Herb	Th.
16.	*Cissus polyantha*	Shrub	Th.
17.	*Cleistopholis pattens*	Tree	Th.
18.	*Combreum zenkeri*	Shrub	Th.

19.	*Commelina benghalensis*	Herb	Th.
20.	*Cosnis afer*	Herb	R.
21.	*Digitaria debilis*	Herb	Th.
22.	*Dimorphochlamys mannii*	Herb	Th.
23.	*Dossotis rotundifolia*	Herb	Th.
24.	*Elaeis guineensis*	Tree	D.
25.	*E vogeli*	Tree	Th.
26.	*Harungana madagascariensis*	Shrub	Th.
27.	*Leptoderris branchyptera*	Herb	Th.
28.	*Macaranga barteri*	Herb	Th.
29.	*Manihot esculenta*	Shrub	Th.
30.	*Marantochloa cuspidate*	Climber	Th.
31.	*Napoleona vogelii*	Tree	D.
32.	*Nauclea latifolia*	Tree	R.
33.	*Olax subscorptoides*	Climber	Th.
34.	*Oxyanthus tuboflorus*	Shrub	Th.
35.	*Paulina piñata*	Shrub	D.
36.	*Phyilanthus discoideus*	Herb	Th.
37.	*Picralima nitida*	Herb	Th.
38.	*Psidium guajava*	Tree	Th.

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39.	*Pterocarpus santhozyloides*	Tree	Th.
40.	*Pycnanthus anagolensis*	Shrub	Th.
41.	*Scleria racemosa*	Tree	Th.
42.	*Smilax kraussiana*	Climber	Th.
43.	*Tabernaemontana pachysiphon*	Tree	Th.
44.	*Triumfetta cordifolia*	Tree	Th.
45.	*Vitex paradoxa*	Tree	R.
46.	*Xylopia aethiopica*	Tree	Th.

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Table 4: Wildlife species percentage preference for hunting at the site

Species	Percentage (%)
Rodents (Cane rat, giant rat, squirrel	55%
Artiodactyla (bush buck, duiker)	20%
Primate (Patas monkey, Baboon, Galagos)	20%
Aves (birds)	5%

Table 5: Meats price rate per kilogram and percentage preference rate

Meat Source	Price rate in Naira (N)/kilo	% (PPR)
Beef	430	20.6
Pork	400	10.5
Fish	300	25.6
Chicken	550	10.0
Bush meat	850	33.5

- N: Naira, currency value in Nigeria. PPR : Percentage Preference Rates

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