

**Full Length Research Paper****A Systematic Compilation of IUCN Red-listed Threatened Plant Species in Nigeria****Borokini, T.I***National Centre for Genetic Resources and Biotechnology, P.M.B 5382, Moor Plantation, Ibadan, Nigeria .***Abstract**

There exist varying lists of “endangered” plants published by different authors in Nigeria, which are characterised by discrepancies, while the level of threats to these listed species was not defined. Therefore, most of these lists have limitations in their use for conservation management of indigenous plants in Nigeria. This article was written to compile the list of Nigerian native plants that have been evaluated in the IUCN Red list of Threatened Species, making references to the CITES appendices. A list of 164 plants was compiled from versions 2012.2 and 2013.2 of the IUCN Red list. These 164 plants comprise 16 “critically endangered”, 16 “endangered” and 132 “vulnerable” plants; while the list is made up of 120 trees, 16 shrubs, 20 herbs, 6 epiphytes and 2 lianas. Rubiaceae has the highest number of species representatives; while 21 of the entire list are strictly endemic to Nigeria. Varying threats were reported for the species including oil exploration, endemism, land use change, insect damage, genetic erosion, poor germination and growth among others. Recommendations include development of Nigeria’s national red list, effective protected area management, tree domestication, ex-situ conservation, community-based natural resources management and evaluation of other suspected “endangered” plants in Nigeria.

Keywords: Threatened taxa, endangered, IUCN, CITES, Nigeria, biodiversity

Introduction

Each country represents a large number of plant and animal species, each with their biological significance and hence, the need to conserve them. However, if all these biodiversity are to be conserved appropriately, it would take decades of intensive work and huge financial and land resources. In addition to that, the highest rates of biodiversity in the world are found in tropical regions populated by developing countries, which do not have adequate technical and financial resources to manage all these species. Furthermore, all these species have widely ranged population, which are as a result of widely ranged trends of human exploitation, growth forms and varying bio-geographical distribution among many others. Therefore, there is the need for setting priorities for conservation efforts for these species, with more attention to the ones whose population have reduced drastically, species with narrow range of bio-geographical distribution, endemic species and those who belong to monospecific genera. These species that require urgent conservation efforts are called threatened or endangered species. A threatened species is a population of organisms which is at risk of becoming extinct.

Nigeria is unique for its widely varying ecological regions and thousands of plant species within her political boundaries. A total of 7,895 plant species from 338 families and 2,215 genera have been identified in Nigeria (Table 1) (Federal Ministry of Environment, 2006), including about 1,489 species of micro-organisms. Furthermore, the Biodiversity Country Study estimated that there are 3,423 fungi species in Nigeria, 134 plankton species, more than 500 virus species, more than 848 algae species and 55 bacteria species in Nigeria (FEPA, 1992). In Cross River state alone, the Forestry Research Institute of Nigeria lists 85 endangered tree species, and many of these are endemics, found only in this region. Five of them are monospecific, that is, the only representative of a particular genus found in the world (Oguntala, *et al*, 1996).

Table 1: Inventory of Plant Species in Nigeria

Group of Plants	No. of families	No. of Genera	No. of Species
Algae	67	281	1335
Lichens	-	14	17
Fungi (Mushrooms)	26	60	134
Mosses	-	13	16
Liverworts	-	16	6
Pteridophytes	27	64	165
Gymnosperms	2	3	5
Chlamydosperms	2	2	6
Monocotyledons	42	376	1575
Dicotyledons	172	1396	4636
TOTAL	338	2215	7895

Source: Nigeria’s First National Biodiversity Report, FMEnv. (2006)

Many papers have been published about plant species by many researchers in Nigeria and in trying to justify the significance of their studies; they labelled the studied plant a threatened species in Nigeria, without proper literature sources to the claim. In addition, several Nigerian authors have produced many lists of species that were assumed to be threatened, some of which are true, but many others were not justified. The relevant Government documents and national reports were simply estimates compiled by a group of experienced Nigerian scholars and representatives of Research Institutes that have relevant national mandate. One of such was the comprehensive list of over 200 threatened plants in Nigeria, compiled and reported in the Nigeria Country Report on FAO International Technical Conference on Plant Genetic Resources in Leipzig in 1995 (FAO, 1996); while Gbile et al. (1981, 1984) published endangered and rare species in Nigeria, based on plant records in the Forestry Herbarium, Ibadan (FHI) of the Forestry Institute of Nigeria. In addition, FEPA (2007) compiled another list of 18 endangered plants in Nigeria. During the 80th anniversary of the Nigerian Field Society in 2010, a special edition of their journal was published, with the focus on endangered species in Nigeria. Okafor (2010) and Isichei (2010) separately listed another group of endangered plant species. Okafor (2010) explained that the scope or range of endangered plant species include (i) wild species which are restricted to habitats; (ii) widespread but intensively harvested and utilized; (iii) so called uneconomic species; (iv) recalcitrant species which lose viability early; (v) underutilized or neglected species; (vi) primitive cultivars and wild relatives of crop plants.

So far, majority of these compilations of endangered species were done based on local records and personal knowledge and information gathered by the authors, but are characterised by discrepancies and irregularities, thus limiting their use for conservation management of Nigerian flora. For instance, Foresters believe and reported that all forest tree species in Nigeria are threatened due to the high rate of uncontrolled exploitation of forest resources in Nigeria (Adekunle 2006, Famuyide *et al.* 2012, Ouinsavi *et al.* 2009). But the IUCN classification for *Milicia excelsa*, one of the highly priced timber species in Nigeria is “near threatened”, indicating that the species is not even at risk (IUCN, 2014). To support this, a recent study in Ibadan Metropolis alone sighted and reported over 100 stands of *Milicia excelsa* (Borokini et al., 2013), while an estimated several thousands of *Milicia excelsa* stands were sighted in Ondo state during the author’s reconnaissance survey in 2012 and 2013. Furthermore, *M. excelsa* is widely distributed in the entire forest and Guinea savannah ecoregions of Nigeria. This misinformation could lead to misplacement of priorities in conservation efforts in Nigeria.

While it is important to note that global category for a species may be different from the national category for that species. Many countries in the world have produced their national red list of all plant and animal species in their countries, but Africa is lagging behind in this regard, visit to the National Red list website on May 8, 2014 revealed that only 2 African countries – Benin Republic and South Africa – have produced and published their national red list of species. For other countries, they are expected to rely on IUCN red list of threatened species or any other globally recognised classification for effective conservation management.

The IUCN Red List Categories and Criteria are widely accepted as the most objective and authoritative system available for assessing the global risk of extinction for species (De Grammont and Cuarón 2006, Lamoreux *et al.* 2003, Mace *et al.* 2008, Rodrigues *et al.* 2006). It began in the 1960s with the production of the first Red Data Books (Fitter and Fitter 1987) and has since evolved from multiple lists and books dedicated to animal groups or plants into a unique comprehensive compendium of conservation-related information (Vie *et al.*, 2008). The general aim of the IUCN Red List Categories and Criteria is to provide an explicit, objective framework for the classification of the broadest range of species according to their extinction risk (IUCN, 2004). The specific aims of the Red List are to:

1. Provide a system that can be applied consistently by different people;
2. Improve objectivity by providing users with clear guidance on how evaluate different factors which affect the risk of extinction;
3. Provide a system which will facilitate comparisons across widely different taxa;
4. Give people using threatened species list a better understanding of how individual species were classified.

It is based on an objective system allowing assignment of any species (except micro-organisms) to one of eight Red List Categories (Figure 1) based on whether they meet criteria linked to population trend, size and structure and geographic range (Mace *et al.* 2008). For example, a taxon is considered endangered if there is a reduction in population size (>80% in the last 10 years or projected reduction in the future) in numbers (estimated to be less than 2,500 mature individuals) and if projected extinction of at least 20% within 20 years (IUCN, 2004). The IUCN Red List also provides extensive information on species’ taxonomy (classification of species), conservation status, geographic distribution, habitat requirements, biology, threats, population, utilization, conservation actions and spatial distribution maps. Only about 2.5% of the world’s estimated 1.8 million described species have been assessed for The IUCN Red List so far; therefore the number of reported threatened species is much less than the true number at serious risk of extinction. The IUCN Red List is, nevertheless, by far the most complete global list of such species available. By 2008, 44,837 species have been assessed; at least 38% of these have been classified as threatened and 804 classified as Extinct (Vie *et al.* 2008).

One of The IUCN Red List’s main purposes is to highlight those species that are facing a high risk of global extinction. In the absence of a national red list for Nigerian species, this study was conducted to compile the list of threatened plant species in Nigeria from the IUCN red list of threatened species.

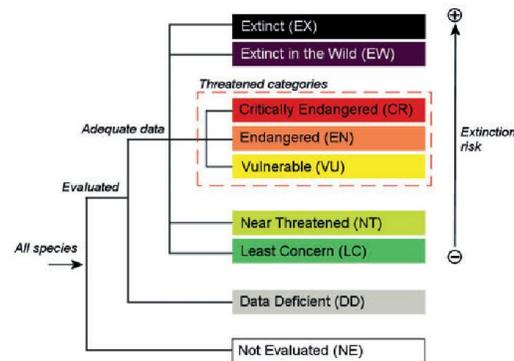


Figure 1: Structure of the IUCN Red List Categories of conservation status of species (Vie et al. 2008)

Methodology

The IUCN Red List of Threatened Species versions 2012.2 and 2013.2 (IUCN 2013, 2014) were screened between 2012 and 2014 to compile the names of details of plant species that are recorded from Nigeria. The names, family, conservation status, distribution range and growth habit of the identified threatened plants were noted. Reference was also made to the compilations made by Glenn (2006) on Earth's Endangered Website and JSTOR Plant collections (www.plants.jstor.org) to make additions to the distribution range and plant family names of some of the threatened plants.

Results

The results indicated that 164 threatened plant species were found in Nigeria (Table 1), of which 16 are critically endangered (CR), 16 were endangered (EN) and the remaining 132 were vulnerable (VU). Furthermore, 21 (12.8%) of them were reported to be endemic to Nigeria, while the rest were naturally distributed beyond Nigerian borders, most of which are located in West Africa. The endemic species were found mainly in Eket (10), Oban Division of Cross River National Park (8) and Degema (3) among other locations, all of which are in the forest ecoregion of Nigeria. The entire 164 threatened plants comprise 120 trees, 16 shrubs, 20 herbs, 6 epiphytes and 2 lianas (Table 1), while they spread across 53 plant families. Rubiaceae has the highest number (18) of species representatives among the 164 threatened plants, followed by Caesalpiniaceae (14), Meliaceae (12), Papilionaceae (11), Annonaceae and Sterculiaceae (9 each) among others. The reported threats noted for these threatened plants include crude oil explorations and spillage (especially in Eket), land use change to agriculture, heavy exploitation due to logging and timber extraction (noted in the unprotected areas surrounding the Cross River National Park and in other locations in Nigeria), local/anthropological induced fire, habitat destruction/loss – due to forest clearance for development projects, poor/slow growth rate of species, mining, poor seed viability, large-scale deforestation, water pollution, dam construction, grazing, cattle trampling, urban expansion and population pressure, flooding, insect attack on seedlings, genetic erosion, low range of distribution and endemism, palm wine tapping, drought, reduction in seed disperser populations, invasive species, die-backs, bark harvesting and over exploitation for fuelwood, chewing sticks among other threats.

In addition to these 164 threatened species, *Cedrela odorata* L. (Meliaceae) and *Shorea roxburghii* G. Don (Dipterocarpaceae) are both tree species, classified as vulnerable and endangered in their native ranges respectively, but these 2 species were introduced to parts of West Africa and have become established in the region. *Cedrela odorata* is also listed in CITES Appendix III (CITES, 2012). The native range of *Cedrela odorata* include Antigua and Barbuda; Argentina; Barbados; Belize; Bolivia, Plurinational States of; Brazil; Cayman Islands; Colombia; Costa Rica; Cuba; Dominica; Dominican Republic; Ecuador; El Salvador; French Guiana; Grenada; Guadeloupe; Guatemala; Guyana; Haiti; Honduras; Jamaica; Mexico (Quintana Roo); Montserrat; Nicaragua; Panama; Peru; Saint Kitts and Nevis; Saint Lucia; Suriname; Venezuela. However, the native range of *Shorea roxburghii* include Cambodia; India (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu); Lao People's Democratic Republic; Malaysia (Peninsular Malaysia); Myanmar; Thailand; Viet Nam.

Table 1: List of Nigerian threatened species in the IUCN Red List of Threatened Species versions 2012.2 and 2013.2

S/N	Name	Status	Remarks	Nativity	Habit
1	<i>Acanthopale decempedalis</i> C.B Clarke (Acanthaceae)	VU	The cyclical mass-flowering habit of this species results in large fluctuations in mature populations, making it susceptible to short-term stochastic change, for example local fire events or landslides which could decimate seedling populations. Clearance for agriculture is widespread in the Bamenda Highlands, threatening these populations.	Cameroon; Equatorial Guinea (Bioko); Nigeria (Cross River)	Shrub
2	<i>Achyranthes talbotii</i> Hutch & Dalz. (Amaranthaceae)	VU	Loss of habitat is still a major threat to this species. The proposed conversion of lowland forest around Mt Cameroon to plantation is likely to threaten the plant communities of the rivers that drain the area, such as the Onge, an important site for this taxon, through flooding and excessive silting of their habitat. Illegal logging for timber in lowland Bakossi is likely to have a similar impact.	Cameroon, Nigeria	Herb
3	<i>Acioa eketensis</i> De Wild. [Syn: <i>Dactyladenia eketensis</i> (De Wild) Prance & F. White] (Chrysobalanaceae)	CR	As with <i>A. dichotoma</i> , this species is poorly known and endemic to Eket in south-east Nigeria. The effects of oil exploration operations have caused the extensive, if not complete, destruction of the habitat.	Eket, Nigeria	Tree
4	<i>Acioa dichotoma</i> De Wild. [Syn: <i>Dactyladenia dichotoma</i> (De Wild) Prance & F. White] (Chrysobalanaceae)	CR	A species for which there is little information. Like <i>A. eketensis</i> , it is apparently endemic to the Eket area. Oil exploration operations have extensively, if not completely, destroyed the habitat.	Eket, Nigeria	Tree
5	<i>Khaya anthotheca</i> (Welw.) C. DC. (Meliaceae)	VU	An important source of African mahogany. It is heavily exploited, particularly in East and West Africa. Regeneration is poor in places, especially where parent trees are scarce, and serious genetic erosion is believed to have occurred.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Liberia; Malawi; Mozambique; Nigeria; Sierra Leone; Tanzania, United Republic of; Uganda; Zambia; Zimbabwe	Tree
6	<i>Khaya grandifoliola</i> C. DC. (Meliaceae)	VU	Exploitation is heavy: extraction of mature individuals from subpopulations has been comprehensive. Regeneration is poor away from parent individuals and is best at the savannah-forest boundary.	Benin; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Guinea; Nigeria; Sudan; Togo; Uganda	Tree

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948	
7	<i>Khaya ivorensis</i> A. Chev. (Meliaceae)	VU	Levels of exploitation are very high. Little regeneration takes place after disturbance. Individuals reach a seed-producing age at 30 years, although large seed crops appear only at three to four year intervals.	Angola (Angola); Cameroon; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria	Tree
8	<i>Khaya senegalensis</i> (Desr.) A. Juss. (Meliaceae)	VU	Logging and local exploitation are largely uncontrolled and poorly monitored. In northern parts of the range exploitation may be leading to genetic erosion. Natural regeneration from the seed is poor but does occur from suckers	Benin; Burkina Faso; Cameroon; Central African Republic; Chad; Côte d'Ivoire; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Mali; Niger; Nigeria; Senegal; Sierra Leone; Sudan; Togo; Uganda	Tree
9	<i>Baillonella toxisperma</i> Pierre (Sapotaceae)	VU	The species is overexploited for its timber and is seriously declining in large parts of its range. It is the second most important exported wood in Gabon. Amongst other local uses the tree produces edible oil which can fetch high market prices.	Angola (Angola, Cabinda); Cameroon; Congo; Congo, The Democratic Republic of the; Gabon; Nigeria	Tree
10	<i>Pericopsis elata</i> (Harms) van Meeuwen (Papilionaceae)	EN	Since 1948 trade in the timber has soared. Levels of exploitation have been unsustainable in all countries and the species' habitat has declined. Regeneration is insufficient to replace lost subpopulations. The species is currently listed in CITES Appendix II.	Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Nigeria	Tree
11	<i>Lovoa trichilioides</i> Harms (Meliaceae)	VU	Germination success is somewhat limited by short-lived seeds which are heavily predated. Exploitation rates are high. It is one of the two principal timber species in Congo.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria; Sierra Leone; Tanzania, United	Tree

				Republic of; Uganda	
12	<i>Afrofittonia silvestris</i> Lindau (Acanthaceae)	VU	Forest clearance is the main threat to the survival of the species. However, higher altitude sites discovered in Bakossi are less threatened.	Cameroon; Equatorial Guinea (Bioko); Nigeria (Cross River)	Liana
13	<i>Afrothismia winkleri</i> (Engl.)Schlechter (Burmanniaceae)	CR	Known from only seven locations throughout its range, this species is probably extinct at Mt Cameroon, the type locality, since it has not been seen there in about 100 years, despite considerable searching. The species was previously assessed as CR, but since then new sites have been discovered, at Korup and at Banyang Mbo, both in S.W. Province, Cameroon; accordingly a new assessment is made here. The extent of occurrence is less than 100 km ² , is severely fragmented and there is continuing decline in habitat quality due to forest clearance for timber and agriculture. The Nigerian material has been suggested as belonging to a different, new, unpublished species. The main threat to the species is forest clearance for agriculture, timber and plantations.	Cameroon, Nigeria	Herb
14	<i>Afzelia africana</i> Sm. (Caesalpiniaceae)	VU	Exploitation of the timber for the international market.	Benin; Burkina Faso; Cameroon; Central African Republic; Chad; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Guinea; Guinea-Bissau; Mali; Niger; Nigeria; Senegal; Sierra Leone; Sudan; Togo; Uganda	Tree
15	<i>Allexis cauliflora</i> (Oliver) Pierre (Violaceae)	VU	Extensive logging, mining and clearing of the forest for cultivating crops have caused considerable declines in the habitat.	Ghana, Nigeria	Tree
16	<i>Allexis obanensis</i> (Baker f.) Melch. (Violaceae)	VU	A rarely recorded small tree of the violet family. It is known from the contiguous forest area covered by the Oban Division of the Cross River National Park in Nigeria and Korup National Park in Cameroon. Areas outside the parks have been heavily deforested and cleared for agriculture and commercial crops. Part of the population occurs in the Cross River National Park in Nigeria and Korup National Park in Cameroon.	Cameroon, Nigeria	Tree
17	<i>Allophylus bullatus</i> Radk. (Sapindaceae)	VU	This understorey tree of upper submontane to montane forest, while secure at Mt Cameroon and at Mt Kupe, has lost large tracts of its habitat in recent decades in the Bamenda Highlands. Over 30% of its overall habitat is estimated to have been lost in the last 100 years. Threatened by clearance of forest for agriculture and wood, particularly in	SE Nigeria; Cameroon; São Tomé and Príncipe (Cameroon line	Tree

			the Bamenda Highlands of Cameroon, once probably the main area for <i>A. bullatus</i> . Study of one area here (Moat in Cheek <i>et al.</i> 2000) showed that 25% of forest was lost between 1987 and 1995.	mountains).	
18	<i>Aneilema silvaticum</i> Brenan (Commelinaceae)	VU	There is assumed to be continuing due to clearance of lowland forest for timber and/or agriculture across the entire range.	Cameroon; Congo, The Democratic Republic of the; Nigeria	Herb
19	<i>Angraecum pyriforme</i> Summerh. (Orchidaceae)	VU	Clearance of forest for conversion to agricultural small-holdings or plantations, particularly threatening the Nigerian and Ivory Coast sites where clearance has been widespread in recent decades although the Tai Forest is thought to remain intact. It would therefore appear to have a small area of occupancy and there is continuing decline due to clearance of forest for conversion to agricultural small-holdings or plantations.	Cameroon; Côte d'Ivoire; Nigeria	Epiphyte
20	<i>Angylocalyx talbotii</i> Baker f. (Papilionaceae)	VU	Known only from six sites. This species is threatened with extinction at all its known sites, except at Korup N.P., by forest clearance for logging and agriculture. Threatened by forest clearance for logging and agriculture. Small-holder agriculture was found to be eating into the part of the Mungo River F.R. where the species was seen most recently. Market gardening at the Bambuko F.R. has destroyed much habitat there and forest around Mt Cameroon is also under threat (Cable and Cheek 1998).	Nigeria, Cameroon	Tree
21	<i>Anopyxis klaineana</i> (Pierre) Engl. (Rhizophoraceae)	VU	Habitat loss and exploitation are serious threats in most places. Seeds have poor viability and regeneration has been observed to be poor.	Cameroon; Congo; Côte d'Ivoire; Ghana; Liberia; Nigeria; Sierra Leone	Tree
22	<i>Anthocleista microphylla</i> Wernham (Loganiaceae)	VU	Forest clearance for agriculture and wood; it may already have been lost from both Nigerian sites (Oban and Obudu) since significant forest loss has occurred there in recent decades. Although it is fairly common at Kupe village, it occurs there at such low altitudes (<i>ca.</i> 800 m) that it is vulnerable to agricultural expansion.	Ghana, Nigeria, Cameroon, Equatorial Guinea (Bioko), Sao Tome and Principe	Tree
23	<i>Anthocleista scandens</i> Hook. f. (Gentianaceae)	VU	It is estimated that, over the last 100 years, over 30% of the habitat of this species, mostly in the Bamenda Highlands and Bamboutos, has been lost due to forest clearance. Forest clearance for agriculture and wood, particularly in the Bamenda Highlands, where forest loss has been running at 25% over eight years at one sample area (Moat in Cheek <i>et al.</i> 2000).	Ghana, Nigeria, Cameroon, Equatorial Guinea (Bioko), Sao Tome and Principe	Tree
24	<i>Anthonotha nigerica</i> (Bak.f.) J.Léonard (Caesalpinaceae)	VU	A small forest tree with an apparently disjunct distribution, occurring in the remaining forest in south-east Nigeria and also in Democratic Republic of Congo, where the extent of its occurrence is not at present known. In Nigeria the largest, if not only, intact population occurs in the Oban Division of the Cross River National Park. Deforestation in the region has been extensive.	DRC, Nigeria	Tree
25	<i>Anthonotha obanensis</i> (Baker f.) J. Léonard (Caesalpinaceae)	VU	The population is well protected but logging and conversion of land to agriculture are extensive in the surrounding area. It is endemic to Nigeria.	Nigeria: Sapoba FR (Edo State); Eket (Akwa Ibom State);	Tree

				Oban Division, Cross River National Park (Cross River State)	
26	<i>Antrocaryon micraster</i> A. Chev. & Guillaum. (Anacardiaceae)	VU	Emergent species in semi-deciduous forests. It regenerates in canopy gaps. It performs less well in burnt or heavily disturbed forests.	Cameroon; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Nigeria; Sierra Leone; Uganda	Tree
27	<i>Azelia bipindensis</i> Harms (Caesalpiniaceae)	VU	It is heavily exploited throughout its range for its valuable timber. In some areas they are reported to be few seed trees remaining.	Angola (Angola); Cameroon; Central African Republic; Congo; Congo, The Democratic Republic of the; Gabon; Nigeria; Uganda	Tree
28	<i>Albizia ferruginea</i> (Guill. & Perr.) Benth. (Mimosaceae)	VU	A widespread and often common timber species which has suffered heavy exploitation. Mature individuals are scattered and becoming rare in places.	Angola (Angola); Benin; Cameroon; Central African Republic; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Nigeria; Senegal; Sierra Leone; Togo; Uganda	Tree
29	<i>Autranella congolensis</i> (De Wild.) A. Chev. (Sapotaceae)	CR	Heavy exploitation for the timber is the main cause of its decline.	Cameroon; Congo; Gabon; Nigeria	Tree
30	<i>Baphia dewildeana</i> Soladoye (Papilionaceae)	VU	A forest species scattered within an area extending from south-east Nigeria into Cameroon. Its habitat outside protected areas has experienced heavy declines because of logging and clearing for commercial and subsistence agriculture.	Cameroon; Nigeria	Tree
31	<i>Baphia latiloi</i> Soladoye (Papilionaceae)	VU	A small forest tree which occurs within a range extending from south-east Nigeria just into Cameroon. There has been extensive deforestation in the surrounding area.	Cameroon; Nigeria	Tree

			Subpopulations in the Oban Hills, in Cross River National Park, are protected.		
32	<i>Baphia obanensis</i> Baker f. (Papilionaceae)	VU	A morphologically unusual and rare <i>Baphia</i> species, which is confined to an area extending from south-east Nigeria into adjacent parts of Cameroon. Unprotected forest has been heavily logged and taken over for cultivation. The Nigerian population occurs in the Oban Hills, in Cross River National Park.	Cameroon; Nigeria	Tree
33	<i>Belonophora talbotii</i> (Wernham) Keay (Rubiaceae)	VU	The species range appears to be confined to the Oban Hills in Cross River National Park. Large-scale deforestation and clearance for crops have taken place extensively outside the park boundaries.	Nigeria: Oban Division, Cross River National Park	Tree
34	<i>Berlinia hollandii</i> Hutch. & Dalziel (Caesalpiniaceae)	EN	Apparently endemic to south-eastern Nigeria. Unprotected areas have been heavily logged and cleared for agriculture.	Nigeria: Itu (Akwa Ibom State); Oban Division, Cross River National Park (Cross River State).	Tree
35	<i>Brachystegia kennedyi</i> Hoyle (Caesalpiniaceae)	VU	Forest outside protected areas has significantly declined because of large-scale logging and clearing for agriculture.	Cameroon, Nigeria	Tree
36	<i>Brachystegia nigerica</i> Hoyle & A. Jones (Caesalpiniaceae)	VU	Deforestation and clearance for crops have been comprehensive outside protected areas.	Cameroon, Nigeria	Tree
37	<i>Brachystephanus longiflorus</i> Lindau (Acanthaceae)	VU	The paucity of collections from Cameroon despite extensive survey work, and its absence from the Bakossi Mountains, Manengouba and the Bamenda Highlands, indicate that this species is highly restricted in range and there is continued habitat loss across the range. Forest clearance threatens the Nigerian population.	Cameroon; Equatorial Guinea (Bioko); Nigeria	Shrub
38	<i>Brillantaisia lancifolia</i> Lindau (Acanthaceae)	VU	Herb growing on waterfall rocks. The plant is specialist in terms of ecology (rocks in waterfall), therefore its area of occupancy (AOO) is expected to be very narrow. There are only two locations and the species is potentially threatened by water pollution and dam construction. It is therefore listed as Vulnerable. This species is restricted to south Nigeria (Oban district) and Gabon (Sierra del Crystal).	Gabon; Nigeria	Herb
39	<i>Cleistopholis staudtii</i> Engl. & Diels (Annonaceae)	VU	Through some parts of its range (Nigeria, C.A.R., Kumba), forest loss has been extensive since the last collections were made and the species may no longer occur at those places. Clearance of forest for timber, followed by agriculture.	Cameroon; Central African Republic; Gabon; Nigeria	Tree
40	<i>Cryptosepalum diphyllum</i> Duvign. (Caesalpiniaceae)	EN	Records of this forest species are known only from south-east Nigeria. It is not known from the Oban Division of the Cross River National Park. Forest outside protected areas is almost completely cleared and planted with commercial or subsistence crops.	Nigeria: Ukpon River FR, Ekang river, Obubra (Cross River State)	Tree
41	<i>Crotonogyne strigosa</i> Prain (Euphorbiaceae)	VU	Threatened by ongoing habitat loss for agriculture and the upgrading of a major road through the middle of the range. Logging of forest followed by agriculture, amplified by ongoing, massive upgrading of the Kumba-Mamfe road through the heart of its range.	Cameroon; Nigeria	Shrub
42	<i>Crateranthus talbotii</i> Baker f. (Lecythidaceae)	VU	An unusual small tree, which occurs in swamp forests and submontane forest near streams; 200–1,000 m alt. It is being suspected that over 30 % of its habitat has been lost in the last 100 years, largely in Nigeria. Forests outside protected areas have largely been logged and cleared for commercial crops and subsistence farming.	Cameroon; Nigeria	Tree

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948	
43	<i>Crassocephalum bauchiense</i> (Hutch.) Milne-Redh. (Asteraceae)	VU	This erect blue-flowered herb is threatened by clearance of trees for agriculture and wood.	Cameroon; Equatorial Guinea (Bioko); Nigeria	Herb
44	<i>Craibia atlantica</i> Dunn. (Papilionaceae)	VU	Its forest habitat, particularly dry forest in Ghana, has experienced serious reductions in extent, mainly because of agricultural expansion, settlement and fires.	Cameroon; Côte d'Ivoire; Ghana; Nigeria	Tree
45	<i>Chazaliella obanensis</i> (Wernham) Petit & Verdc. (Rubiaceae)	VU	Most of the stands of this species occur below 1,000 m alt. and so are particularly vulnerable to expansion from agriculture. It is estimated that 30–50% of the global habitat of this species is likely to be lost in the next ten years. Threatened by clearance of forest for expansion of agriculture.	Cameroon; Nigeria	Tree
46	<i>Crotalaria bamendae</i> Hepper (Papilionaceae)	VU	The current threats to this species are unknown, however, fire and grazing may adversely affect the population.	Angola (Angola); Cameroon; Nigeria	Shrub
47	<i>Crotalaria ledermannii</i> Baker f. (Papilionaceae)	VU	Current threats to the species are unknown, but conversion of land to cultivation and grazing areas, trampling, or fires may be the main sources. This is an annual or short-lived perennial species and a deleterious change in the habitat or poor seed set in one year could reduce the population within 12 months.	Cameroon, Nigeria	Shrub
48	<i>Chassalia laikomensis</i> Cheek (Rubiaceae)	CR	About 95% of the original forest cover of the Bamenda Highlands has been lost to e.g., agriculture and there have been similar losses at Mambilla and Muanenguba. Clearance of forest primarily for agricultural expansion.	Cameroon; Nigeria	Shrub
49	<i>Cassipourea eketensis</i> Baker f. (Rhizophoraceae)	CR	A botanical survey of Eket area is required to ascertain whether the species is now extinct. The habitat of this species is likely to have been destroyed by operations for oil exploration. However, it is reported from Oban division of Cross River National Park	Nigeria: Eket, Oban division of Cross River National Park	Tree
50	<i>Bulbophyllum filiforme</i> Kraenzl. (Orchidaceae)	CR	This is a species of lowland evergreen forest, where it occurs as an epiphyte. The main threat to the species is forest clearance for agriculture, particularly plantations.	Cameroon; Nigeria	Epiphyte
51	<i>Bulbophyllum nigericum</i> Summerh. (Orchidaceae)	VU	The Nigerian locations are threatened by continued extensive clearance of forest to high elevations; one or more of these subpopulations are likely lost. In all, a loss of over 30% of the population is estimated over the past three generations, which we here estimate to be 10 years, much of this loss being irreversible.	Cameroon; Nigeria	Epiphyte
52	<i>Calpocalyx cauliflorus</i> Hoyle (Mimosaceae)	VU	Known from one outlying population west of the Niger River in Nigeria and otherwise confined to remaining forest in the east extending into Cameroon. The forest habitat has been extensively felled outside protected areas.	Cameroon, Nigeria	Tree
53	<i>Desmostachys vogelii</i> Stapf. (Icacinaceae)	VU	The species habitat has declined because of mining and logging activities and the establishment of commercial plantations.	Cameroon; Ghana; Nigeria	Tree
54	<i>Dielsantha galeopsoides</i> (Engl. & Diels) E. Wimm. (Syn: <i>Lobelia galeopsoides</i> Engl. & Diels.) (Campanulaceae)	EN	A population reduction of two-thirds over the next ten years of what is the world's only known extant sites for <i>Dielsantha</i> is thus projected. Threatened by forest clearance for agriculture: suitable habitat at Bioko was destroyed for cocoa plantations, habitat at Lake Borombi Mbo was reported destroyed in 2002.	Cameroon; Equatorial Guinea (Bioko); Nigeria	Herb
55	<i>Dorstenia prorepens</i> Engl. (Moraceae)	VU	Threatened by forest loss due to agricultural and urban expansion. Threats include forest loss due to agricultural expansion and wood excavation, particularly at Bambuko, and due to urban expansion at Kumba.	Cameroon; Equatorial Guinea (Bioko); Nigeria	Tree

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948
56	<i>Dombeya ledermannii</i> Engl. (Malvaceae)	CR	This species is known from Cameroon (the Bamenda Highlands), and Nigeria (Mambilla Plateau and Jos Plateau). The main threats to the population are clearance for agriculture and over-exploitation for bast fibre.	Cameroon, Nigeria Tree
57	<i>Disperis mildbraedii</i> Schltr. ex Summerh. (Orchidaceae)	VU	There is continuing decline because of continued clearance of forest on Bioko, in the Bamenda Highlands and in neighbouring parts of Nigeria. Hence listed as Vulnerable. Attempt to relocate this species and introduce it into cultivation.	Cameroon; Equatorial Guinea (Bioko); Nigeria Epiphyte
58	<i>Dracaena viridiflora</i> Engl. & K. Krause (Dracaenaceae)	VU	Despite the relatively large altitudinal range and extent of occurrence of this species, it is rare throughout, being known from only seven locations. The total area of occupancy is likely to be less than 2,000 km ² , and there is continuing decline as the sites in Nigeria and the lowland site(s) in S. Province, Cameroon, are under threat from forest clearance for agriculture and logging.	Cameroon; Equatorial Guinea; Nigeria shrub
59	<i>Deinbollia insignis</i> Hook f. (Sapindaceae)	VU	This large treelet, with leaves to 1 m long, is only known from six locations, all of which are threatened with, or have suffered forest clearance. It is suspected that, when better data are available, this species may prove to be Critically Endangered. It may well be extinct on Bioko due to extensive forest clearance there for Cacao plantations in the late 19th and 20th centuries. It may also be extinct in Nigeria due to extensive forest loss there in the late 20th century. Extremely vulnerable due to clearance of lowland forest for agriculture. It may well be extinct on Bioko due to extensive forest clearance there for cacao plantations in the late 19th and 20th centuries. It may also be extinct in Nigeria due to extensive forest loss there in the late 20th century. Forest loss at Bambuko is documented in Cable and Cheek (1998). It is notable that the species was not found elsewhere around Mt Cameroon during the intensive surveys of the early 1990s. At Mt Kupe it is vulnerable due to its low altitude, placing it outside of the proposed new protected area.	Native to Cameroon, possibly extinct in Equatorial Guinea (Bioko); Nigeria Tree
60	<i>Deinbollia maxima</i> Gilg. (Sapindaceae)	VU	The species is declining due to forest clearance for timber and agriculture, particularly in Nigeria, Mt Cameroon and the Libreville area. Threats in Sierra Leone are unknown.	Cameroon; Gabon; Nigeria; Sierra Leone Tree
61	<i>Deinbollia saligna</i> Keay (Sapindaceae)	VU	Populations in unprotected forest have been exposed to extensive logging and clearing for agriculture. Occurring in a few localities in Nigeria and Cameroon and is recently recorded in Ghana.	Cameroon; Ghana; Nigeria Shrub
62	<i>Drypetes molundana</i> Pax & K. Hoffm. (Euphorbiaceae)	VU	Although fairly widespread and well-collected, most of its known sites (eight out of eleven) have suffered forest clearance over the last three decades. Clearance of forest for wood, agriculture and urban expansion (Kumba and Nkolbisson) is recorded at 8 of the 11 known sites and it has been extensive at many of these.	Cameroon; Nigeria Tree
63	<i>Drypetes obanensis</i> S. Moore (Euphorbiaceae)	VU	Endemic to the Oban Division of the Cross River National Park, Nigeria. Pressures from commercial logging and agriculture are very strong outside the park.	Nigeria: Oban Division, Cross River National Park (Cross River State) Tree
64	<i>Drypetes preussii</i> (Pax) Hutch. (Euphorbiaceae)	VU	<i>Drypetes preussii</i> was treated there as being restricted to Cross River in Nigeria and adjoining forests in Cameroon. Inspection of specimens at the Kew Herbarium shows that its range extends along the coast to Gabon. Accordingly its extent of occurrence now	Cameroon; Gabon; Nigeria Tree

			exceeds 20,000 km ² , so it is re-evaluated here according to the new information. It is considered that eight locations are known and there is continuing decline due to habitat loss. Threats to lowland forest in the Mt Cameroon area are documented in Cable and Cheek (1998) and also see below. Outside of protected areas forest has been comprehensively logged and cleared for agriculture.		
65	<i>Drypetes staudtii</i> (Pax) Hutch. (Euphorbiaceae)	VU	Although known from only nine sites there are indications that it is locally fairly common. At Omo there are four collections, and at the Mokoko River F.R. (Mt Cameroon) there are eight. Meanwhile, adjacent forest reserves such as Onge or Bakundu have no records of the taxon. If better data on local threats were available throughout the range of this taxon, it would be better assessed under criterion A and then would be likely to rate as EN or CR. Extensive losses of forest areas have occurred in Nigeria and are ongoing at Wum (M. Cheek pers. obs.). The forest at Mokoko has also been under great pressure for clearance. Clearance of forest for timber and expansion of agriculture, both large-scale commercial and small-holder.	Cameroon; Nigeria	Tree
66	<i>Encephalartos barteri</i> Carruth. ex Miq. (Zamiaceae)	VU	<i>Encephalartos barteri</i> comprises two subspecies - <i>E. barteri barteri</i> , which is more widespread and numerous and has been assessed as Vulnerable, and <i>E. barteri allochrous</i> , which has a restricted distribution and has been assessed as Endangered. The overall assessment of Vulnerable is based on past (60 years) and future (next 30 years) population declines that are estimated to exceed 30% (three generations is 210 years). This species may be affected by too frequent fires which could prevent seedling growth. Plants are also removed from the wild by collectors. Part of the population was lost due to flooding when the Volga dam was built.	Benin; Ghana; Nigeria; Togo	Tree
67	<i>Duguetia barteri</i> (Benth.) Chatrou (Annonaceae)	VU	It is known to occur from south-west Nigeria to Gabon. Most parts of the range have suffered large-scale declines in its habitat because of logging and the demand for land for cultivation.	Cameroon; Gabon; Nigeria	Tree
68	<i>Entandrophragma utile</i> (Dawe & Sprague) Sprague (Meliaceae)	VU	An important source of African mahogany. This widespread species is heavily exploited throughout its range. Genetic erosion caused by the depletion of mature individuals from subpopulations has taken place in most countries. Local overcutting is also common in parts of West Africa. Growth rates are amongst the slowest in the genus and the seeds and seedlings suffer high mortality rates because of insect attack.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria; Sierra Leone; Uganda	Tree
69	<i>Entandrophragma cylindricum</i> (Sprague) Sprague (Meliaceae)	VU	A major source of African hardwood. Growth rates are amongst the slowest in the genus. Exploited heavily throughout its range. Genetic erosion caused by the large-scale depletion of mature individuals from populations has taken place in some countries.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire;	Tree

				Gabon; Ghana; Nigeria; Sierra Leone; Togo; Uganda	
70	<i>Entandrophragma candollei</i> Harms (Meliaceae)	VU	One of the major sources of African mahogany. The species is widespread and heavily exploited throughout its range.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Guinea; Liberia; Nigeria	Tree
71	<i>Entandrophragma angolense</i> (Welw.) C. DC. (Meliaceae)	VU	One of the main sources of African mahogany. The commercial exploitation of this timber species has resulted in the large-scale extraction of mature individuals throughout its range. Significant genetic erosion has been reported in some countries. It has the potential to occur commonly and regenerates well after logging damage but not after burning. The seed does not appear to disperse over great distances and regeneration is poor away from parent trees. A slow-growing species.	Angola (Angola); Cameroon; Central African Republic; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Equatorial Guinea (Bioko); Gabon; Ghana; Guinea; Kenya; Liberia; Nigeria; Sierra Leone; Sudan; Tanzania, United Republic of; Uganda	Tree
72	<i>Eriocaulon asteroids</i> S.M. Phillips (Eriocaulaceae)	VU	Current threats to the species are unknown, however, too much trampling by cattle may cause damage to these small annual <i>Eriocaulon</i> plants by dislodging them from the basalt substrate the thin layer of peaty soil in which they grow. Conversely, lack of grazing or of intermittent grassland fires might permit the built-up of enough soil on the pavement to allow a <i>Sporolobus</i> -based community to encroach upon the basalt pavement and smother or compete with the <i>Eriocaulon</i> .	Cameroon; Nigeria	Herb
73	<i>Eriocaulon bamendae</i> S.M. Phillips (Eriocaulaceae)	VU	The species is vulnerable, above all, to changes to the water table. Drainage of swamps or conversely, flooding for use as reservoirs would threaten this species with extinction. The species is also vulnerable to trampling by cattle.	Cameroon; Nigeria	Herb
74	<i>Floscopa mannii</i> C.B. Clarke (Commelinaceae)	EN	This species is probably often overlooked due to its small size and unspectacular nature. However, it is nevertheless highly rare in view of the fact that only four collections are known. It would probably be susceptible to complete forest clearance for agriculture,	Cameroon; Nigeria	Herb

			which is occurring across much of its known range.		
75	<i>Gossweilerodendron balsamiferum</i> (Verm.) Harms (Caesalpiniaceae)	EN	This timber species is declining in population numbers. In the main Democratic Republic of Congo/Nigeria forest block it is generally rare or absent. Heavy exploitation and habitat loss.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Equatorial Guinea; Gabon; Nigeria	Tree
76	<i>Hallea stipulosa</i> (DC.) Leroy (Rubiaceae)	VU	In many places it suffers from over-exploitation. M. Cheek (pers. comm.) reports that is not over-exploited in the Cameroon, but this may be the case elsewhere.	Angola (Angola); Cameroon; Central African Republic; Congo; Congo, The Democratic Republic of the; Gabon; Gambia; Ghana; Guinea; Nigeria; Senegal; Sierra Leone; Sudan; Uganda; Zambia	Tree
77	<i>Hallea ledermannii</i> (K. Krause) B. Verdcourt (Rubiaceae)	VU	Overexploitation of the general-purpose timber and habitat degradation in large parts of its range are causing population declines	Angola (Angola); Benin; Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Equatorial Guinea; Gabon; Ghana; Liberia; Nigeria	Tree
78	<i>Haplormosia monophylla</i> (Harms) Harms (Papilionaceae)	VU	It is expected that overexploitation and habitat degradation are resulting in population declines.	Cameroon; Côte d'Ivoire; Liberia; Nigeria; Sierra Leone	Tree
79	<i>Jollydora glandulosa</i> Schellenb. (Connaraceae)	VU	Known from four localities. In Nigeria, it exists only on the Obudu Plateau in Cross Rivers National Park, where it is confined to forested valleys. In Cameroon, the species is restricted to the west, at sites near Obang, Limbe and Ediki. Damage to the habitat is incurred from frequent fires and also from encroaching agriculture, especially banana plantations but also subsistence farming.	Cameroon; Nigeria	Tree
80	<i>Liparis goodyeroides</i> Schltr. (Orchidaceae)	CR	There has been one collection of this species in Nigeria and three collections in west Cameroon, one of which was from Mt. Cameroon. The type collection is from Moliwe and the only other collections known are from south of Ngu at the Plain of Mbaw,	Cameroon; Nigeria	Epiphyte

			Takamanda, and the Niger Estuary. Forest clearance for agriculture (particularly plantations) and firewood.		
81	<i>Hymenostegia bakeriana</i> Hutch. & Dalz. (Caesalpiniaceae)	VU	Confined to the Oban Division of the Cross River National Park and the adjacent Korup National Park in Cameroon. Large-scale deforestation has taken place in surrounding areas.	Cameroon; Nigeria	Tree
82	<i>Hymenostegia talbotii</i> Baker f. (Caesalpiniaceae)	CR	A little-known species, which has been recorded only from Eket in south-east Nigeria. Oil exploration operations in this area have caused the destruction of most if not all the forest habitat.	Nigeria: Eket	Tree
83	<i>Loesenera talbotii</i> Baker f. (Caesalpiniaceae)	VU	In Nigeria this species is known from the Oban Hills, where the population is protected within Cross River National Park and Calabar-Mamfe. In SW Cameroon found in Yingui-Yabassi, WSW Mamfe (one collection each), and Mt Kupe-Bakossi (numerous sites and collections). Areas outside protected areas have suffered serious habitat declines due to forest clearance for agriculture and wood, e.g., at Kupe village.	Cameroon; Nigeria	Tree
84	<i>Mikaniopsis maitlandii</i> C.D Adams (Asteraceae)	VU	Threatened by forest clearance for agriculture and wood, particularly likely at the lower part of its altitudinal range at sites such as Chappal Waddi and Mt Cameroon (plantation expansion to the 1,000 m contour is a major threat).	Cameroon; Equatorial Guinea (Bioko); Nigeria	Tree
85	<i>Monodora unwinii</i> Hutch. & Dalz. (Annonaceae)	VU	A forest tree, endemic to western Nigeria. Only a small area of forest remains and the extent of it continues to decline because of logging pressures and the demand for land for commercial crops and subsistence farming.	Nigeria: Unwin (Edo State)	Tree
86	<i>Neolemonniera clitandrifolia</i> (A.Chev.) Heine (Sapotaceae)	EN	Much of its habitat has been lost to agriculture, mining and logging. Population numbers have been observed to decline rapidly.	Ghana; Liberia; Nigeria; Sierra Leone	Tree
87	<i>Nesogordonia papaverifera</i> (A. Chev.) Capuron (Sterculiaceae)	VU	Genetic impoverishment is reported in outlying parts of the species' range. Exploitation is moderate. Sometimes large individuals are left after logging.	Benin; Cameroon; Central African Republic; Congo; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria; Sierra Leone	Tree
88	<i>Nodonema lineatum</i> B.L.Burtt (Gesneriaceae)	VU	Removal of shade due to forest clearance is the most likely threat. The rock face habitat itself is not likely to be mined, but plants are vulnerable to rock falls. Much forest clearance in Ogoja has occurred in recent decades. Removal of shade due to forest clearance is the most likely threat. The rock face habitat itself is not likely to be mined but plants are vulnerable to rock falls. Much forest clearance in Ogoja has occurred in recent decades.	Cameroon; Nigeria	Herb
89	<i>Napoleonaea egertonii</i> Baker f. (Lecythidaceae)	VU	This striking forest tree was known from very few sites prior to the plant inventory work in western Cameroon beginning in the 1980s. Discoveries of this species at Takamanda and Korup are important as it is relatively well protected at these sites; however, it is not common at Korup, only 1–2 trees having been found (M. Cheek pers. obs.), and its abundance at Takamanda is unknown. At Kupe Village and the adjacent Manehas Forest Reserve, the species is again uncommon, one plant being found at each location.	Cameroon; Gabon; Nigeria	Tree

			However, several specimens were observed within close proximity to Nyandong in W. Bakossi. The Nigerian locations are likely to have been either lost or under severe threat from widespread logging of lowland forest here. The two sites at Mt Kupe are below the 1,000 m lower limit of effective forest protection and thus vulnerable to agricultural encroachment. At Nyandong, several trees were recorded close to the village and adjacent to tracks; these are highly vulnerable to future expansion of the village and road improvement.		
90	<i>Napoleonaea lutea</i> Baker f. ex Hutch. & Dalz. (Lecythidaceae)	CR	This species, along with <i>N. reptans</i> , is poorly documented and apparently confined to Eket in south-east Nigeria. Oil exploration operations in the area are causing extensive damage, to the habitat, if not its complete destruction.	Nigeria: Eket	Tree
91	<i>Napoleonaea reptans</i> Baker f. ex Hutch. & Dalz. (Lecythidaceae)	CR	This species, along with <i>N. lutea</i> , is poorly documented and confined to the Eket area in south-east Nigeria. Oil exploration operations are causing extensive damage, if not complete destruction of the habitat.	Nigeria: Eket	Tree
92	<i>Nothospondias staudtii</i> Engl. (Simaroubaceae)	VU	Semi-deciduous forest has been heavily logged everywhere.	Cameroon; Côte d'Ivoire; Gabon; Ghana; Nigeria	Tree
93	<i>Vepris lecomteana</i> (Pierre) Cheek (Syn: <i>Oricia lecomteana</i> Cheek) (Rutaceae)	VU	This monopodial tree though fairly widespread and conspicuous, is rare (less than 10 locations are known) and declining due to clearance of lowland forest for agriculture and wood. Threatened by clearance of lowland forest for agriculture and wood, particularly in the Mt Cameroon area (Cable and Cheek 1998) and in Nigeria.	Cameroon; Gabon; Nigeria	Tree
94	<i>Pentas ledermannii</i> Krause (Rubiaceae)	VU	Frequent, human-set fires in grasslands in these same areas probably also adversely affect the grassland-forest interface as a habitat for this taxon, although occasional natural fires may aid its regeneration.	Cameroon; Nigeria	Herb
95	<i>Pseudagrostistachys africana</i> (Müll.Arg.) Pax & K.Hoffm. (Euphorbiaceae)	VU	There is continuing decline because of forest clearance for wood and agriculture in parts of its range. On the Obudu Plateau fires and encroaching agriculture are causing damage to the restricted areas of remaining vegetation in forested valleys. General threats from mining, logging and commercial forestry can affect these areas.	Cameroon; Equatorial Guinea (Bioko); Ghana; Nigeria; Sao Tomé and Príncipe (São Tomé)	Tree
96	<i>Pteleopsis habeensis</i> Aubrev. ex Keay (Combretaceae)	EN	In Ghana the establishment of a plantation and the influx of people into the area have caused declines in the species' habitat.	Ghana; Mali; Nigeria	Shrub
97	<i>Pterygota bequaertii</i> De Wild. (Sterculiaceae)	VU	The species appears to be suffering declines because of levels of exploitation through most of its range.	Cameroon; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Nigeria	Tree
98	<i>Pterygota macrocarpa</i> K. Schum. (Sterculiaceae)	VU	Exploitation for the timber occurs at high levels throughout its range and is likely to be causing population declines.	Cameroon; Côte d'Ivoire; Ghana; Nigeria; Sierra	Tree

			Leone		
99	<i>Pseudosabicea pedicellata</i> (Wernham) N.Hallé (Rubiaceae)	VU	A scandent shrub apparently more common in S.E. Nigeria than adjoining Cameroon, this species grows in a particularly threatened habitat. Only seven locations are known. Declining due to clearance of forest for agriculture and wood; this has been particularly prevalent in Nigeria in recent decades, although several collection sites of this species are from protected areas. However, those in Cameroon appear to be unprotected.	Cameroon; Nigeria	Shrub
100	<i>Pseuderanthemum dispersum</i> Milne-Redh. (Acanthaceae)	VU	This robust herb or shrub appears rare throughout its range, and was recorded only once during the extensive inventory work in S.W. Province, Cameroon, during the 1980s and 1990s, a collection by D.W. Thomas at Bangem in north Bakossi. A continued decline in habitat is inferred by clearance of extensive areas of lowland and mid-elevation forest throughout its range for plantation agriculture and timber.	Cameroon; Nigeria	Herb
101	<i>Polystachya cooperi</i> Summerh. (Orchidaceae)	EN	There is continuing decline because of extensive and continued forest clearance at high latitudes in eastern Nigeria and at Muanenguba in Cameroon. Extensive and continued forest clearance at high latitudes in E Nigeria and at Mwanenguba threaten any remaining populations at these sites.	Cameroon; Nigeria	Epiphyte
102	<i>Piptostigma giganteum</i> Hutch. & Dalz. (Annonaceae)	VU	This species appears to be known only from the Oban Division of the Cross River National Park. Unprotected forest has been extensively logged and cleared for cultivation.	Nigeria: Oban Division, Cross River National Park (Cross River State)	Tree
103	<i>Pararistolochia goldieana</i> (Hook.f.) Hutch. & Dalz. (Aristolochiaceae)	VU	Although widespread, it is rare. Despite intensive surveys over several years at Mt Cameroon, only a single individual was found (Cable and Cheek 1998). Forest loss has been extensive throughout Sierra Leone and Nigeria and is continuing; it is unlikely that this plant survives at its Calabar or Lagos localities, for example. Threatened by clearance of forest for timber and agriculture.	Cameroon; Equatorial Guinea (Bioko); Nigeria; Sierra Leone	Tree
104	<i>Quassia sanguinea</i> Cheek & Jongkind ined. (Simaroubaceae)	VU	By extrapolation, it is estimated that over 30% of the overall population has been lost due to habitat destruction over the last three generations, or sixty years (estimating one generation at twenty years). Threatened by forest clearance for wood, followed by agriculture, particularly in the northern part of its range, Bamboutos Mts and the Bamenda Highlands.	Cameroon; Nigeria	Tree
105	<i>Raphia regalis</i> Becc. (Arecaeae)	VU	First described from a 1910 collection from the Oban area, Nigeria, this species was thought extinct in that country until a conscious effort to rediscover it in the 1970s by Otedoh proved successful, it being recorded in large numbers (at that time) in the Equi Issu hills near the Cameroonian border. This highly distinctive palm, with no aerial trunk and with leaves rating amongst the largest in the plant kingdom, is likely under-recorded due to difficulties in collecting specimens of it, and in the fact that it has received limited taxonomic attention, being treated only briefly in Otedoh's revision of the genus <i>Raphia</i> (<i>Journal of the Nigerian Institute for Oil Palm Research</i> 6(22), 1982), with no specimen citations. Continuing decline is inferred because of extensive forest clearance for timber and for agricultural expansion in Nigeria and Bakossi. Selective felling for use in building and tapping of palm wine, mainly in Nigeria, poses a serious threat. The species may well be more threatened than the current listing indicates.	Angola (Angola, Cabinda); Cameroon; Congo; Gabon; Nigeria	Tree

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948
106	<i>Rhabdotosperma ledermannii</i> (Murb.) Hartl. (Scrophulariaceae)	VU	This species is known from eight locations and is declining due to deforestation for agriculture. It is estimated that there has been This equates with about a 30% loss in area of occupancy for this species over the last 10 years. Loss of montane forest due to agriculture is thought to be the main concern for this species. 25% of forest cover was lost in a sample area of the Bamenda Highlands between 1987 and 1995 (Moat in Cheek <i>et al.</i> 2000).	Cameroon; Nigeria Herb
107	<i>Rhodognaphalon brevicuspe</i> (Sprague) Roberty (Bombacaceae)	VU	A timber species of West and Central Africa. Exploitation is moderate. Little is known about regeneration but it does not appear to be abundant and growth rates are slow.	Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Nigeria; Sierra Leone Tree
108	<i>Robynsia glabrata</i> Hutch. (Rubiaceae)	VU	These areas are vulnerable to the effects of population growth and associated activities. The species is uncommon.	Côte d'Ivoire; Ghana; Nigeria Tree
109	<i>Rutidea nigerica</i> Bridson (Rubiaceae)	VU	Although it has a fairly wide distribution, this liana is known from only ten localities, at some of which (e.g., Lagos, Kumba) it may very well already be extinct due to forest clearance for agriculture and wood. Threatened by forest clearance for agriculture and wood; it is very likely that its habitat has been lost at Lagos and Kumba where there has been extensive forest clearance in recent decades' as there has been in much of Nigeria. Surveys should be made to attempt to rediscover this species at its known sites, and to evaluate the size of subpopulations, regeneration, local threats and possibilities for conservation.	Benin; Cameroon; Nigeria Liana
110	<i>Sabicea xanthotricha</i> Wernham (Rubiaceae)	VU	This species is currently only known from four locations and is very likely to be declining due to forest clearance for agriculture and wood. Threatened by forest clearance for agriculture and wood, particularly at Oban and at Mokoko F.R.	Cameroon; Nigeria Tree
111	<i>Soyauxia talbotii</i> Baker f. (Medusandraceae)	EN	A small tree which is recorded only in south-east Nigeria. The family is endemic to West Africa. Unprotected forest has been extensively logged and cleared for cultivation.	Nigeria: Eket Tree
112	<i>Saxicolella marginalis</i> (G.Taylor) C. Cusset ex Cheek (Podostemaceae)	CR	This species has only been recorded from Nigeria and Cameroon. There is a continuing decline of its habitat quality due to water pollution and its populations are severely fragmented. The species may also be present in Ghana and Niger but this needs to be confirmed. It is therefore listed as Critically Endangered. Drought and water pollution have been identified as major threats. The species may be threatened by pollution from laundry operations at the town of Fundong, Cameroon just upstream from the waterfall. Also, a lot of debris has been seen at the side of this pool.	Cameroon; Nigeria Herb
113	<i>Scaphopetalum parvifolium</i> Baker f. (Sterculiaceae)	VU	This small forest tree is recorded from the Oban Hills, within Cross River National Park. Unprotected forest has been extensively logged and cleared for cultivation.	Nigeria: Oban Division, Cross River National Park (Cross River State) Tree

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948	
114	<i>Vitellaria paradoxa</i> C.F.Gaertn. (Sapotaceae)	VU	This species has been overexploited for timber, firewood and charcoal production. Its habitat is also suffering from agricultural encroachment and increasing population pressure.	Cameroon; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Guinea; Nigeria; Senegal; Sudan; Uganda	Tree
115	<i>Talbotiella eketensis</i> Baker f. (Caesalpiniaceae)	EN	Found only in south-east Nigeria. In Eket the habitat appears to have been almost completely destroyed because of oil exploration operations. Elsewhere levels of logging and clearing are high outside protected areas.	Nigeria: Eket, Degema	Shrub
116	<i>Tapinanthus preussii</i> (Engl.) Tiegh. (Loranthaceae)	VU	This parasitic shrub is known from only 11 localities in lowland forest (Polhill and Wiens 1998). It appears to have a very patchy distribution, not being recorded from some extensive areas which have been well surveyed, such as Mt Cameroon (Cable and Cheek 1998). The low altitude at which it occurs makes it vulnerable to forest clearance throughout its range. Threatened by clearance of forest for agriculture and wood.	Angola (Angola, Cabinda); Cameroon; Gabon; Nigeria	Shrub
117	<i>Tieghemella heckelii</i> (A.Chev) Pierre ex Dubard (Sapotaceae)	EN	There are only two species in the genus. An important timber species found mainly in wet evergreen rainforest. Overexploitation in some countries is leading to serious population declines, notably in Ghana and in Liberia, where there is a possibility of the species becoming extinct. Regeneration may also be limited in parts of its range because of the reduction in elephant numbers and other seed dispersers.	Cameroon; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria; Sierra Leone	Tree
118	<i>Trichoscypha mannii</i> Hook.f. (Anacardiaceae)	VU	Needs to be reassessed as the species now includes <i>T. atropurpurea</i> (was previously also listed as Vulnerable) and thus has a much wider distribution than originally thought. Unprotected forests have been heavily logged and cleared for commercial and subsistence agriculture. Mining, logging and the establishment of industrial plantations have also caused decline in parts of Upper Guinea. There is a protected subpopulation in the Oban Hills, in Cross River National Park, Nigeria.	Cameroon; Côte d'Ivoire; Ghana; Liberia; Nigeria	Tree
119	<i>Trichostachys interrupta</i> K. Schum. (Rubiaceae)	VU	Known from six locations and declining due to clearance of forest for agriculture. This clearance has occurred extensively in Nigeria, and at Barombi Mbo in Cameroon, where the species may no longer occur.	Cameroon; Nigeria	Shrub
120	<i>Turraeanthus africanus</i> (Welw.) Pellegr. (Meliaceae)	VU	A monotypic genus endemic to the Guineo-Congolian regional center of endemism. It is exploited at moderate levels for its timber and is becoming rare in places.	Angola (Angola); Benin; Cameroon; Congo, The Democratic Republic of the; Côte d'Ivoire; Equatorial Guinea; Ghana; Nigeria; Sierra Leone; Uganda	Tree

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948
121	<i>Tricalysia talbotii</i> (Wernham) Keay (Rubiaceae)	VU	Known from only ten locations and declining due to clearance of forest for agriculture and wood. Given the far-reaching forest loss in Nigeria and anticipated increased forest loss along the upgraded Kumba-Mamfe Road, the prospects for this species do not seem good. Reassessment is likely to result in an EN or CR rating. Threatened by clearance of forest for agriculture and wood.	Cameroon; Nigeria Tree
122	<i>Uvariastrum zenkeri</i> Engl. & Diels (Annonaceae)	VU	This species has been recorded only in south-east Nigeria and neighbouring Cameroon. Unprotected forests have been heavily logged and cleared for commercial and subsistence agriculture.	Cameroon; Nigeria Tree
123	<i>Warneckea memecyloides</i> (Benth.) H.Jacques-Felix (Melastomataceae)	VU	The range of this forest type is restricted and has declined because of mining, logging and other commercial forestry activities in all areas. Although much forest remains in Gabon, it is now largely under concession to logging companies.	Cameroon; Côte d'Ivoire; Gabon; Ghana; Nigeria Tree
124	<i>Afzelia pachyloba</i> Harms (Caesalpiniaceae)	VU	Heavily exploited for its commercial timber. Relatively few seed trees remain throughout its range.	Angola (Angola); Cameroon; Congo; Congo, The Democratic Republic of the; Gabon; Nigeria Tree
125	<i>Eribroma oblonga</i> (Mast.) Pierre ex A.Chev. (Sterculiaceae)	VU	Levels of exploitation for its timber are moderate and are contributing to the declines in population numbers.	Cameroon; Côte d'Ivoire; Equatorial Guinea (Bioko); Gabon; Ghana; Liberia; Nigeria; Sierra Leone Tree
126	<i>Uvariopsis tripetala</i> (Bak.f.) G.E. Schatz (Syn: <i>Dennettia tripetala</i> Bak.f.) (Annonaceae)	VU	A small tree found in dry forest. Its habitat is most vulnerable to agricultural expansion and the effects of high population growth and fires.	Ghana; Nigeria Tree
127	<i>Vernonia bamendae</i> C. D. Adams (Asteraceae)	VU	Known from Cameroon (Bamenda Highlands), and Nigeria (Mambilla Plateau). It is curious that despite collecting expeditions in 1996, 1998 and 1999, this species has not been rediscovered from its type locality. It may be that it is not only narrowly endemic, but within its small range, extremely rare and possibly declining. The current threats to this species are unknown, but the incidence of grazing and fire are likely to be important factors in the survival of this species.	Cameroon; Nigeria Shrub
128	<i>Uvariadendron occidentale</i> Le Thomas (Annonaceae)	VU	Dry forests have been heavily degraded and lost to agricultural expansion, overgrazing, fire and in some cases the introduction of invasive species such as the neem tree.	Cameroon; Côte d'Ivoire; Ghana; Liberia; Nigeria Tree
129	<i>Xylopiya africana</i> (Benth.) Oliv. (Annonaceae)	VU	Presumably this species was once common in the Bamenda Highlands where it is now all but extinct. While there are no figures for rates of forest loss in the Bamenda Highlands as a whole, in one area which has been studied, the Kilum-Ijim area, forest loss of 25% over 8 years in the 1980s–1990s has been recorded (Moat in Cheek <i>et al.</i> 2000). Past forest loss in the Bamenda Highlands is therefore the main basis for the listing of <i>Xylopiya</i>	Cameroon; Nigeria; Sao Tomé and Príncipe (São Tomé) Tree

			<i>africana</i> . On Mt Cameroon it appears rare, being found only twice in the surveys of 1992–1994. Elsewhere in the mountains of the Cameroon line it is also known from the extension into Nigeria: the Obudu Plateau where it is also threatened due to forest clearance, if indeed, it is still extant there. It is also known from São Tomé in the Gulf of Guinea. Strangely, it is not known from Bioko, nor from the Rumpi Hills nor the Bamboutos Mts, Mt Kupe and the Bakossi Mts are now probably the largest single subpopulation of <i>Xylopia africana</i> . Clearance of forest for timber and agricultural land.		
130	<i>Xylopia talbotii</i> Exell (Annonaceae)	VU	Subpopulations of this forest tree were known in Eket and Oban. The Eket subpopulation is likely to have been seriously or completely destroyed by oil exploration operations. Oban population is relatively well protected within the 3,000 km ² of the southern division of the Cross River National Park.	Nigeria: Oban Division, Cross River National Park (Cross River State); Eket (Akwa Ibom State).	Tree
131	<i>Justicia camerunensis</i> (Heine) B.J.Pollard (Acanthaceae)	VU	In Cameroon it has a patchy distribution, being absent from several seemingly suitable areas including the Bakossi Mountains and much of Mt Cameroon. Throughout its range, it is threatened by extensive forest clearance, and many subpopulations have already disappeared. Throughout its range, it is threatened by extensive forest clearance. The Northwest Province subpopulation is highly threatened as closed-canopy forest is scarce here today; it was noted in the collection of 1975 that the forest patch in which it was found was "now in exploitation by local people with handsaws"; this site is therefore likely to be lost. At Mt Kupe, it was recorded most often above Nyasoso, at around 1,000 m alt., where agricultural encroachment is causing significant losses of forest. Sites around Yaoundé are also likely to have been lost.	Cameroon; Nigeria	Tree
132	<i>Justicia orbicularis</i> (Lindau) V.A.W.Graham (Acanthaceae)	VU	A highly distinctive species known from just 12 locations. Populations appear disjunct, being absent in several seemingly suitable areas. In Bakossi, it is only known in the west, though further exploration of the lowlands of southern Bakossi may reveal further populations. It is also absent from the lowlands around Mt Cameroon, and has not been recorded in extensively collected forest areas around Bipinde and Kribi in South Province, Cameroon. Throughout its range, deforestation has been extensive in the lowlands, and this continues outside protected areas.	Cameroon; Nigeria	Shrub
133	<i>Ixora degemensis</i> Hutch. & Dalz. (Rubiaceae)	EN	A shrubby tree endemic, confined to an area on the coast at Degema.	Nigeria: Degema	Tree
134	<i>Ixora foliosa</i> Hiern (Rubiaceae)	VU	About half the area where this characteristic tree of wet montane forest occurred was in the Bamenda Highlands. They are now destitute of natural forest except for a very few exceptions. It is estimated that over 30% of the habitat of this tree has been lost over the last century and that over 30% of that remaining will be lost in the next century. Threatened by forest clearance for agriculture and wood, especially in the Bamenda Highlands, once probably the main area for this species. In one study area of these highlands, 25% of forest was lost between 1987 and 1995 (Moat in Cheek <i>et al.</i> 2000).	Cameroon; Nigeria	Tree
135	<i>Ixora nigerica</i> Keay (Rubiaceae)	VU	This shrubby tree is endemic to southern Nigeria.	Nigeria: Ndealichi FR, Ukon FR	Tree

					(Cross River State)
136	<i>Begonia preussii</i> Warb. (Begoniaceae)	VU	Clearance of forest for wood and agricultural land (especially plantations) is a major threat throughout its range and probably accounts for the lack of collections from Bioko in the last century (where forest was largely cleared below 1,000 m alt.).	Cameroon; Equatorial Guinea (Bioko); Nigeria	Herb
137	<i>Begonia pseudoviola</i> Gilg. (Begoniaceae)	VU	The prognosis for habitat destruction for this taxon is high. This taxon might be better assessed, but lack of data on the state of sites west of the Bamboutos Mts makes this difficult to apply. Threatened by forest clearance for wood and agriculture.	Cameroon; Nigeria	Herb
138	<i>Begonia schaeferi</i> Engl. (Begoniaceae)	VU	The assessment of this species as VU in Cheek <i>et al.</i> (2000) is maintained here as no new data are available on the taxon. The species is known from collections made from Obudu Plateau in Nigeria, and Manenguba, Mt Nlonako, Bamboutos Mts, Bamenda Highlands, and the Kongoa Mountains, Cameroon. While cliff faces generally are unlikely to be disturbed, clearance of adjoining forest for fuel and agriculture could endanger this species by removing the shade necessary for its survival.	Cameroon; Nigeria	Herb
139	<i>Diospyros crassiflora</i> Hiern. (Ebenaceae)	EN	Virtually all large trees of this species have been felled for the ebony wood, except perhaps in the most remote parts of its range.	Cameroon; Central African Republic; Congo; Congo, The Democratic Republic of the; Gabon; Nigeria	Tree
140	<i>Diospyros barteri</i> Hiern. (Syn: <i>Diospyros hirta</i> Gürke ex Hutch. & Dalziel) (Ebenaceae)	VU	General forest loss has been high in all three countries where it is found because of logging, mining, oil exploration and commercial forestry activities.	Cameroon; Ghana; Nigeria	Tree
141	<i>Eugenia gilgii</i> Engl. & Brehmer (Myrtaceae)	CR	The natural habitat of this species has been almost completely destroyed and the remaining area is disappearing rapidly. Recorded from Cameroon (the Bamboutos Mountains, Bamenda highlands, and Ngaoundere), and Nigeria (Mambilla Plateau). The largest subpopulation is estimated at about 50 trees (at Mbingo). The clearance of forest areas for wood and agricultural land forms the main threat to the survival of this species.	Cameroon; Nigeria	Tree
142	<i>Guarea cedrata</i> (A. Chev.) Pellegriin (Meliaceae)	VU	Levels of exploitation are moderate and the species often suffers from its similarity to <i>Entandrophragma angolense</i> , resulting in it being harvested with the same intensity.	Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Liberia; Nigeria; Sierra Leone; Uganda	Tree
143	<i>Guarea thompsonii</i> Sprague & Hutch. (Meliaceae)	VU	Although moderately exploited, this species is less commercially important than <i>G. cedrata</i> . Growth is slow, reaching only 9 ft (DBH) in 200 years.	Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire;	Tree

					Gabon; Ghana; Liberia; Nigeria	
144	<i>Homalium dalzielii</i> Hutch. (Flacourtiaceae)	VU	A small tree recorded in Lagos in Nigeria and from Dja and Kpoguidi in Benin.		Benin; Nigeria	Tree
145	<i>Cola nigerica</i> Brenan & Keay (Sterculiaceae)	CR	Collected from Mt. Cameroon (one pre-1988 collection) and Nigeria (ca. five collections). <i>Cola nigerica</i> is extremely rare in each of the five disjunct areas in its range. For example in the 1992 survey of Mabeta-Moliwe, while 22 specimens of <i>Cola flavo-velutina</i> were recorded, only a single specimen of <i>Cola nigerica</i> was found. All the areas in which <i>Cola nigerica</i> occurred have been cleared or are under threat of forest clearance and cultivation.		Nigeria; possibly extinct in Cameroon	Tree
146	<i>Cola hypochrysea</i> K. Schum. (Sterculiaceae)	VU	Its range extends from south-eastern Nigeria, (although it does not appear to occur in Cross River National Park), to Cameroon, where it has been recorded from Japoma, Dibamba, Eseka, Kribi, Ebolowa and Campo. Unprotected areas have been extensively logged and cleared for agriculture.		Cameroon; Nigeria	Tree
147	<i>Cola glabra</i> Brenan & Keay (Sterculiaceae)	VU	A small tree confined to the few remaining forested areas in south-west Nigeria. Large-scale logging, encroaching agriculture and the planting of commercial crops have resulted in large declines in the habitat.		Nigeria: Akure FR, Owena FR (Ondo State)	Tree
148	<i>Macaranga paxii</i> Prain (Euphorbiaceae)	VU	Extending from south-eastern Nigeria to Cameroon. There is a subpopulation in the Oban Division of the Cross River National Park in Nigeria and in Cameroon the species is recorded in Ebone, Mantoum and Mt. Cameroon. Unprotected forests have been heavily logged and cleared for agriculture.		Cameroon; Nigeria	Tree
149	<i>Memecylon candidum</i> Gilg. (Melastomataceae)	VU	Confined to an area extending from south-east Nigeria to Cameroon. Outside protected areas deforestation has occurred on a large scale.		Cameroon; Nigeria	Tree
150	<i>Millettia macrophylla</i> Benth. (Papilionaceae)	VU	A small forest tree which occurs in areas of remaining forest, ranging from south-east Nigeria to Cameroon. Also recorded from Bioko (Equatorial Guinea). There are only eight collections in the Kew Herbarium from Cameroon. Unprotected forest has been heavily logged and cleared for agriculture.		Cameroon; Equatorial Guinea (Bioko); Nigeria	Tree
151	<i>Millettia conraui</i> Harms. (Papilionaceae)	VU	A small forest tree, similar to <i>M. macrophylla</i> , with a range extending from south-east Nigeria into Cameroon. Unprotected forest has been heavily logged and cleared for agriculture.		Cameroon; Nigeria	Tree
152	<i>Schefflera mannii</i> (Hook.f.) Harms (Araliaceae)	VU	Forest clearance for agriculture and wood has reduced the habitat of this species by an estimated 30% or more over its whole range due principally to loss in the Bamenda Highlands, which, having the largest area above 2000 m in the Cameroon uplands, was probably once the stronghold for this species. Between 1987 and 1995, 25% of forest was lost in one area of the Bamenda Highlands (Moat in Cheek <i>et al.</i> 2000). Extensive losses of habitat have also occurred at Manenguba, Obudu, Bamboutos and Bafut-Ngamba. Forest clearance for agriculture and wood are the main threats.		Cameroon; Equatorial Guinea (Annobón, Bioko); Nigeria; Sao Tomé and Principe (São Tomé)	Tree
153	<i>Terminalia ivorensis</i> A. Chev. (Combretaceae)	VU	Exploitation is moderate. Poor regeneration is often attributed to crop failure. Attempts at plantation growth have generally failed through frequent diebacks.		Cameroon; Côte d'Ivoire; Ghana; Guinea; Liberia; Nigeria; Sierra	Tree

			Leone		
154	<i>Psychotria podocarpa</i> Petit (Rubiaceae)	VU	A total of six locations are known, where site observations have been made, it is known to occupy only 1–2 m ² . Declining because of clearance for agriculture, especially in the Mt Cameroon area. Threatened by clearance for agriculture especially in the Mt Cameroon area, where the planned expansion of plantations is likely to destroy the subpopulations listed above.	Cameroon; Nigeria	Shrub
155	<i>Psychotria moseskemei</i> Cheek (Rubiaceae)	CR	A Shrub, rarely a small tree, 2–5 m tall. This newly described montane species has been listed as Critically Endangered on the basis that it grows in the same habitat and has a similar range to <i>Chassalia laikomensis</i> . Habitat loss/degradation due to the clearance of land for small-holder farming.	Cameroon; Nigeria	Tree
156	<i>Prunus africana</i> (Hook f.) Kalkman (Rosaceae)	VU	Harvesting of bark for the European medicinal market. On Mt Cameroon as with some other areas within the range of this species, many trees have died as a result of girdling caused by bark removal. The bark from the trees on Mt Cameroon is transported to the Plantecam factory at Mutengene where it is extracted to produce a powder for export to a company in France In recent times; the species was located in Ngel Nyaki Forest Reserve, Mambilla Plateau (Chapman and Chapman 2001).	Angola (Angola); Burundi; Cameroon; Congo, The Democratic Republic of the; Equatorial Guinea (Bioko); Ethiopia; Kenya; Lesotho; Madagascar; Mozambique; Rwanda; Sao Tomé and Principe (São Tomé); South Africa (Eastern Cape Province, Gauteng, KwaZulu-Natal, Limpopo Province, Mpumalanga); Sudan; Swaziland; Tanzania, United Republic of; Uganda; Zambia; Zimbabwe; Nigeria	Tree
157	<i>Wahlenbergia ramosissima</i> ssp. <i>ramosissima</i> (Campanulaceae)	VU	This species is known from only nine specimens at five mountain sites along the Cameroon border. It has previously been assessed (Cable and Cheek 1998, Cheek <i>et al.</i> 2000) as Vulnerable. This rating is maintained here because of the small area of occupancy, the number of locations and presumed continuing decline due to the impacts of trampling by cattle during the wet (growing) season. Unknown, but possibly trampling by cattle during the wet (growing) season. It has been reported in Nigeria at Ngel Nyaki Forest Reserve and possibly other parts of Mambilla plateau.	Cameroon, Nigeria	Herb

International Journal of Environmental Sciences		Borokini, T.I	Vol. 3 No. 3	ISSN: 2277-1948
158	<i>Polygala tenuicaulis</i> ssp. <i>tenuicaulis</i> (Polygalaceae)	VU	Reported to be native to Cameroon, this species was also discovered in Ngel Nyaki Forest Reserve. This subspecies may require fire for regeneration.	Cameroon, Nigeria Herb
159	<i>Stachys pseudohumifusa</i> ssp. <i>saxeri</i> (Lamiaceae)	VU	Current threats to the population are unknown, but may include trampling by cattle. More data is needed on the numbers of individuals at each site, and on the type and level of regeneration.	Cameroon; Nigeria Herb
160	<i>Garcinia kola</i> Heckel (Clusiaceae)	VU	It is probably the most important source of chewsticks. Overexploitation has caused population declines. Seedlings are uncommon and slow-growing.	Benin; Cameroon; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Liberia; Sierra Leone Tree
161	<i>Mansonia altissima</i> var. <i>Altissima</i> (Sterculiaceae)	EN	It occurs particularly in disturbed areas or light gaps in lowland moist forest. Regeneration is good after disturbance.	Benin; Cameroon; Congo; Côte d'Ivoire; Ghana; Nigeria Tree
162	<i>Nauclea diderrichii</i> (De Wild. & T.Durand) Merrill (Rubiaceae)	VU	It is heavily exploited for its timber, which is used in general construction work. Regeneration is good in large canopy gaps but the species is out-competed by other pioneers after clear-felling.	Angola (Angola); Cameroon; Central African Republic; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Gabon; Ghana; Liberia; Nigeria; Sierra Leone; Uganda Tree
163	<i>Synsepalum glycydora</i> Wernham (Sapotaceae)	VU	A small tree, apparently confined to the Oban Hills in Cross River National Park. Surrounding areas have been extensively logged and cleared for cultivation. However, one doubts if <i>S. glycydora</i> is synonymous to <i>S. dulcificum</i> , because the latter is found in dry forest areas of Western Nigeria.	Nigeria: Oban Division, Cross River National Park (Cross River State); Degema (Rivers State) Tree
164	<i>Eriocoelum pungens</i> var. <i>inermis</i> Keay (Sapindaceae)	EN	The habitat of the Eket subpopulation has been degraded, if not completely destroyed, by oil exploration operations. The other subpopulation is unprotected and its habitat is vulnerable to severe degradation.	Nigeria: Eket and Degema Tree

Source: IUCN (2012, 2013)

Discussion

A total of 164 threatened species were found in Nigeria, of which 21 were endemic to the country. One of the most important factors considered in the evaluation of a species' conservation status is species distribution range/endemism (IUCN, 2004). Eket is the home to 10 of the 21 endemic threatened species in Nigeria. This is a big town in Akwa Ibom state in the Southern region of Nigeria, which is also known for its high deposit of crude oil. This attracts the oil exploration activities, which has been noted as a huge threat to the sustainability of the threatened and endemic plants in the region. Furthermore, huge gas flaring and oil exploration was reported to cause acid rain (Nduka *et al.* 2008). Of the 21 threatened endemic plants reported in this study, 8 were found in the Oban Division of the Cross River National Park. Cross River National Park is the peak of Nigeria's biodiversity, being the largest tract of the remaining and surviving primary rainforest in Nigeria. About 78% of primate diversity finds home in the National Park; while it harbours another 30 species of non-primate mammals (Stuart *et al.* 1990). Over 30% of the Nigeria's 860 bird species are found in the Park (Manu & Imong 2006), while Eniang and Ijeomah (2011) reported 56 species of snake in the Oban division of the Cross River National Park. Larsen (1997) estimated about 950 butterfly species in the Oban division, of which the Cross River National Park officials reported that 2 are endemic and another 2 – *Tetrahanis okwangwo* and *T. oboti* are new to science. Furthermore, the Park officials reported that 2 new frog species were identified in the Park, while the floral diversity of the National Park was reported to be 1568 species from 523 genera in 98 families. These include 1303 flowering plants, 141 lichens and 56 moss species.

Rubiaceae has the highest number of species representatives among the threatened plant species in Nigeria. Rubiaceae was reported to be among the most diversified and largest of the families in the African rain forest (Robbercht 1996), and the family is identified as the fourth largest plant family globally, with 13,143 species, classified into 611 genera (Davis *et al.* 2009), more than 40 tribes, and three subfamilies (Goevarts *et al.* 2006). They occur on all continents (Goevarts *et al.* 2006), but most taxa are in tropical or subtropical areas (Bremer & Eriksson 2009). Endemism was reported to be generally high in Rubiaceae because many of the species have restricted distributions (Goevarts *et al.* 2006).

Sixteen (16) of the 164 threatened species in Nigeria were evaluated as "critically endangered". Under the IUCN, this indicates that there has been a population size reduction by 80 – 90 % in the last 10 years or 3 generations; decline in the area of occupancy of the species; distribution range of less than 10 – 100 km²; extreme habitat destruction, and/or population size estimated as less than 250 mature individuals (IUCN, 2001). Species found in this category are at the highest risk of going extinct, and therefore, there is the need to take strong efforts to conserve the remaining populations. The same goes for the remaining 16 "endangered" and 132 "vulnerable" plants reported for Nigeria. As at January 2010, the IUCN identified 1701 critically endangered species in the Plant Kingdom (IUCN, 2009). However, Butchart *et al.* (2006) reported that some species may be placed in the critically endangered category because there was no adequate data to support that the species is actually extinct. The documented number of threatened species and extinctions is only the tip of the iceberg, as this number depends on the overall number of assessed species; in addition 5,570 species classified as Data Deficient are possibly threatened (Hilton-Taylor *et al.* 2008).

In another study to compile the endemic flora of Nigeria, 73 of the entire 165 endemic plants were found in Oban Division of the Cross River National Park, while 21 were located in Eket. Furthermore, Rubiaceae has the highest number of species representatives (16) among the endemic flora recorded in Nigeria. The plant species that have been evaluated in Nigeria is skewed in favor of trees, more than shrubs, herbs and other plant forms. This is probably because trees face more threats than other plant forms, in terms of exploitation for fuelwood, timber, medicinal purposes; and in the forest ecosystems, trees are more or less the keystone species, which other plants and animals rely on for survival. However, there is the need to focus attention also on the shrubs and herbs, especially the one that have high medicinal values, as they are being exploited heavily and harvested unsustainably.

A wide range of threats were noted for the threatened plants in Nigeria. Majority of the species found in protected areas were noted to be in high risk due to illegal land use change to agriculture, while those found outside the protected areas are faced with heavy uncontrolled exploitation for timber, fuelwood, chewing sticks and others, wildfire, dam construction, habitat destruction, mining, urban expansion, cattle trampling and grazing, land clearing for farming and oil exploration (Table 1). While the Cross River National Park was reported to be well managed and fully protected; surrounding forests, which ought to serve as buffer zones, were reportedly being heavily exploited for timber and agricultural activities. However, in addition to the anthropogenic threats, there are also biological phenomena noted as threats. These include invasive species, poor/slow growth of the seedlings, genetic erosion, endemism, poor seed viability, die-backs and reduction in seed disperser population, among other biological threats.

Indigenous trees in Nigeria have been reported to have long gestation period, slow growth rates of between 1.5m³/ha/year to 2.5m³/ha/year at juvenile stages, irregular fruiting within species of the same type and among species of different types, low variability rates of seeds, low seed production among majority of trees, few species population in a unit area of land, low success rate of regeneration and low coppicing abilities (Oseomobo, 1993), which has impeded the commercial production of most of the indigenous tree species. A good example is *Garcinia kola*, which is categorised as "vulnerable" for its over-exploitation for chewing sticks in

most parts of West Africa (Irvine, 1961; Olabanji et al., 1996), but was reported to have very long gestation period to flowering and fruiting (Adebisi, 2004). Lots of these threatened tree species are also subjected to unsustainable debarking for medicinal purposes. One of such is *Prunus africana*, whose bark is being exploited heavily for international trade to Europe for the treatment of benign prostatic hyperplasia from all the African countries within its distribution range. Overseas trade in *P. africana* barks from Africa is worth US\$220 million/year (Cunningham et al., 1997), while annual export from Cameroon alone was 2000 tonnes/year, worth 1.3 million euros (Nsawir and Ingram, 2007). This species is found in Nigeria only in the Mambilla Plateau, reported in Gashaka Gumti National Park and Ngel Nyaki Forest Reserve (Chapman and Chapman, 2001), but trade in *P. africana* bark trade in Nigeria is not well known, but Chapman (2004) reported extensive debarking in the Ngel Nyaki Forest Reserve in 2003. CITES placed *P. africana* as an Appendix II listed species in Cameroon and Democratic Republic of Congo in 1995, meaning that the species may become threatened if trade is not regulated (CITES 2006).

Nigeria is a signatory to many international environmental-related treaties and conventions, while the nation has promulgated many such laws to ensure sustainable use and conservation of natural resources within her political boundary. But the problem has always been the poor implementation, fuelled by corruption within government circles. Many of the National Parks are so huge, yet poorly staffed such that proper monitoring of the parks is not done (WCS, 2010). One of such is the Gashaka Gumti National Park where monitoring staff find it difficult to cover the entire boundaries of the park, but enlists the help of the enclave and neighbouring villages to report poaching. In addition, Meduna et al. (2009) and Ijeoma and Ogbara (2013) also reported inadequate staffing, poor remuneration for staff and lack and poor maintenance of equipment as some of the problems in Kainji Lake National Park. Meduna et al. (2009) and Oseni (2007) also reported widespread encroachment in Old Oyo National Park and Yankari Game reserve. These grave situations are common in many other protected areas in Nigeria. As a result, a wide range of illegal activities are being perpetrated by poachers, farmers and tree fellers. The Wildlife Conservation Society reported over 600 illegal farms within the Afi River Wildlife Sanctuary alone (WCS, 2010). USAID (2008) reported that almost 1,000 forest reserves exist on the world database of protected areas of the IUCN; most of them have been seriously degraded or de-reserved. The felled indigenous trees are replaced by *Tectonia grandis* (Teak), *Gmelina arborea* (Gmelina) and other exotic tree species. Worse still, many protected areas such as Cross River National Park, Gashaka Gumti National Park (USAID, 2008) and Omo Biosphere reserve still harbour enclave villages till date, most of whom use clear the land for agriculture. An effort by a State Government in Southwest Nigeria to forcefully eject the enclave villages from a protected area resulted in violence and long legal battle which is probably yet to be resolved.

This study also provokes the need to generate baseline information on the species diversity and the population ranges of the plants (and animals) in Nigeria. From this data collection, the national red list of threatened species in Nigeria can be compiled and proper conservation priority can be given to them. The present lack of data on the species was noted in FAO (2000) and USAID (2008), while there are so many discrepancies on the different lists of threatened plants in Nigeria. Furthermore, the degree of threats to those species was not provided in existing wide varieties of lists of plants adjudged to be endangered. Proper attention should be given to wild relatives of crop plants facing genetic erosion, trees with high medicinal values for their barks, plants with low distribution range, all endemic plants in Nigeria, indigenous grasses facing annual wildfires (especially in the afro-montane regions), economic timber species, epiphytic orchids, bryophytes and lichens among others.

There is the need to intensify efforts on the domestication of all indigenous trees species in Nigeria, as well as consider an ex-situ conservation of such species. The protected area staffs needs to be trained and equipped with modern equipment for personal safety and effective monitoring. Adequate funding from Government budget should be allocated to them, while international and corporate bodies' funding should be maximally explored. Eliminating the enclave villages in the protected areas may be very difficult; therefore, community-based natural resources management may be a viable option for managing the crisis between the enclave villagers and the Government.

Since only 21 of 165 endemic plants in Nigeria have been evaluated by IUCN, there is the need to evaluate the rest, as well as other plants that were identified by several authors as endangered in Nigeria. One of such is *Okoubakha aubrevillei*, which is one of 2 species in the genera, both endemic to tropical Africa. Ladipo et al. (2008) reported for PROTA database that this tree noted that it is very rare in all its range. Few stands were sighted in some forest reserves in Edo State, but they are coppices from the felled old tree (Isikhuemen and Iduozee 2008). Botanical records for this tree species are scanty (Cunningham, 1993) and the only published study on this species by Veenendaal et al. (1996) was on its hemi-parasitic properties. Cunningham (1993) recommended damage assessments be carried out for this species, as well as *Garcinia afzelii*, *G. kola*, *Griffonia simplicifolia* and *Pausinystalia johimbe*. Seed germination for *Okoubakha* is extremely poor (Hawthorne, 1995), as trials carried out in National Centre for Genetic Resources and Biotechnology, Ibadan in the 2000s yielded only 3 seedlings (NACGRAB, 2004). The bark of the tree is exploited heavily for medicinal purposes. The tree is considered a sacred tree in many parts of Southern Nigeria, with many incantations and folklores about it, while some tribes worship it as a god. The barks were seen in an herbal market in Ibadan, Nigeria, while the herb seller claimed it is very scarce to get the bark, hence it is relatively expensive than other medicinal tree barks on sale (Borokini and Clement, 2012).

This study was conducted to close the knowledge gaps and provide baseline information on the threatened plants in Nigeria for proper conservation management. It is believed that this information would encourage Nigerian scientists to focus more research on these species, while relevant Government and non-Government organizations will ensure the sustainability of these threatened species. Furthermore, it is believed that this study will chart the course towards the development of Nigeria's red list of threatened species.

References

- Adebisi, AA (2004). A case study of *Garcinia kola* nut production-to-consumption system in J4 area of Omo forest reserve, south-west Nigeria. pp 115-132 in Sunderland T & Ndoye O (eds.) Forest products, livelihoods and conservation. Case studies of Non-timber Forest Product Systems. Vol. 2 Africa. CIFOR. ISBN 979-3361-25-5
- Adekunle, V.A.J (2006). Conservation of tree species diversity in tropical rainforest ecosystem of South-west Nigeria. J. Trop. For. Sci. 18 (2): 91–101
- Borokini, T.I and Clement, M. (2012). Ethnomedicinal significance and conservation status of tree barks sold in herbal markets in Ibadan, Southwest Nigeria. Int. J. Curr. Res. 4 (3): 31 – 36.
- Borokini T.I, Onefeli A.O and Babalola F.D (2013). Inventory Analysis of *Milicia excelsa* (Welw. C.C. Berg.) in Ibadan (Ibadan Metropolis and University of Ibadan), Nigeria. J. Plant Stud. 2 (1): 97 – 109. <http://dx.doi.org/10.5539/jps.v2n1p97>
- Bremer, B. and Eriksson, T. (2009). Time tree of Rubiaceae: Phylogeny and dating the family, subfamilies and tribes. Int. J. Plant Sci. 170 (6): 766–793.
- Butchart, S.H.M., Stattersfield, A.J. and Brooks, T.M. (2006). Going or gone: defining “Possibly Extinct” species to give a truer picture of recent extinctions. Bull. Brit. Ornith. Club 126A: 7-24.
- Chapman, J.D. and Chapman, H.M (2001). *The Forests of Taraba and Adamawa States, Nigeria. An Ecological Account and Plant Species Checklist*. University of Canterbury, Christchurch, New Zealand.
- Chapman, H. M. (2004). Botanical Survey of Tchabal Mbabo, Adamawa Province Cameroon Nigerian Montane Forest Project Project number RAF/G43/A/1G/31. Transboundary Collaboration for Ecosystem Conservation: the Mountain Forests of Gashaka-Gumti National Park, N. a. T. M. Canterbury, New Zealand, University of Canterbury.
- CITES, PC16 WG1 Doic 1, CITIES 16th meeting of the Plants Committee Peru, July 3-8 2006
- CITES (2012). Convention on the International Trade in Endangered Species of Wild Fauna and Flora. Appendices I, II and III. 46p.
- Cunningham, A.B. (1993). African medicinal plants: setting priorities at the interface between conservation and primary healthcare. UNESCO People and Plants Working Paper 1, Paris, France. 53 pp.
- Cunningham, M., Cunningham, A.B. and Schippmann, U. (1997). Trade in *Prunus africana* and the implementation of CITES. German Federal Agency for Nature Conservation, Bonn, Germany.
- Davis, A.P., R. Govaerts, D.M. Bridson, M. Ruhsam, J. Moat & N.A. Brummitt (2009). A Global Assessment of Distribution, Diversity, Endemism, and Taxonomic Effort in the Rubiaceae. Ann. Miss. Bot. Gard. 96 (1): 68-78.
- De Grammont, P.C. and Cuarón, A.D. (2006). An evaluation of threatened species categorization systems used on the American continent. Conserv. Biol. 20 (1): 14-27.
- Eniang, E.A. and Ijeomah, H.M (2011). Diversity of Ophidian Species in Oban Division of the Cross River National Park, Nigeria. Prod. Agric. Tech. J. 7 (1): 188- 201.
- Famuyide O.O, Adebayo O, Odebode A.V, Awe F, Ojo O.B and Ojo D (2012). Timber species availability and Variation in Ibadan and Oyo Timber Markets over the last forty years. Elixir Bio Diver. 49: 10131-10136
- Federal Ministry of Environment (2006). Nigeria First National Biodiversity Report. Federal Ministry of Environment, Abuja.
- Federal Environmental Protection Agency (FEPA), (1992). Federal Environmental Protection Agency. Biological Diversity in Nigeria: A Country Study 1991 – 1992.
- Federal Environmental Protection Agency (FEPA), (2007). National Biodiversity Strategy and Action Plan. The Federal Environmental Protection Agency, The Presidency, Abuja.
- Fitter, R. and Fitter, M. (1987). The road to extinction: problems of categorizing the status of taxa threatened with extinction. IUCN Gland, Switzerland and Cambridge, UK.
- Food and Agricultural Organization (FAO), (1996). Nigeria: Country Report to the FAO International Technical Conference on Plant Genetic Resources. Pp 1-51. Prepared by Sarumi, M.B., D.O. Ladipo, L. Denton, E.O. Olapade, K. Badaru and C. Ughasoro. Food and Agricultural Organization of the United Nations, Rome.
- Food and Agricultural Organization (FAO), (2000). Country Report: Nigeria. Forestry Outlook Study for Africa (FOSA). <http://www.fao.org/docrep/004/AB592E/AB592E02.htm>. Food and Agricultural Organization of the United Nations, Rome.
- Gbile, Z.O., Ola-Adams, B.A. and Soladoye, M.O. (1981). Endangered Species of the Nigerian Flora. Nig. J. For. 8 (1): 14 – 20.
- Gbile, Z.O., Ola-Adams, B.A. and Soladoye, M.O. (1984). List of rare species of the Nigerian Flora. Research Paper Forest Series No 47. Forestry Research Institute of Nigeria, Ibadan, Nigeria.
- Glenn, C.R. (2006). Earth's Endangered Creatures (online). At <http://earthsendangered.com> [Accessed 10 – 25 January, 2013].
- Govaerts, R., Ruhsam, M., Andersson, L., Robbrecht, E., Bridson, D., Davis, A., Schanzer, I. and Sonkâ B. (2006). World Checklist of Rubiaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/rubiaceae/> [accessed 21 February 2013].
- Hawthorne W.D (1995). Ecological profiles of Ghanaian forest trees. Tropical Forest Papers 29. OFI/ODA, Oxford.

- Hilton-Taylor, C., Pollock, C., Chanson, J. and Katariya, V. 2008. State of the world's species. In: J.-C. Vié, C. Hilton-Taylor and S.N. Stuart (eds), The 2008 Review of The IUCN Red List of Threatened Species. IUCN Gland, Switzerland.
- Ijeomah, H. M. and Ogbara, D. (2013). Challenges of Wildlife Management in Kainji Lake National Park, Nigeria. *Nig. J. Agric. Food Env.* 9(1):1-8
- Irvine, F. R. (1961) *Woody Plants of Ghana with Special Reference to Their Uses*. Oxford Univ. Press
- Isichei, A.O (2010). Endangered Plants in Nigeria: Time for a new paradigm for vegetation conservation. *The Nig. Field* 75: 64 – 84.
- Isikhuemen E.M and O. F Iduozee O.F (2008). Degraded Forests in Protected Landscapes: Prospects of Biodiversity Rehabilitation in Urhonigbe Forest Reserve, Edo State, Nigeria. International Conference on Traditional Forest Knowledge and Sustainable Forest Management in Africa; Accra, Ghana; 15-17 October 2008
- IUCN. 2001. IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.
- IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org>. Source of the above list (Downloaded on 29 January 2010) (<http://www.iucnredlist.org/apps/redlist/search/link/4b8fa73d-2093477d>)
- IUCN (World Conservation Union) 2004. 2004 IUCN Red List Categories and Criteria, IUCN, Gland, Switzerland.
- IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. <www.iucnredlist.org>. Downloaded between 23 December 2012 and on 10 January 2013
- IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded between 10 March 2014 and 05 May 2014
- Ladipo, D.O., Adebisi, A.A. and Bosch, C.H. (2008). *Okoubaka aubrevillei* Pellegr. & Normand. In: Schmelzer, G.H. & Gurib-Fakim, A. (Editors). *Prota 11(1): Medicinal plants/Plantes médicinales 1*. [CD-Rom]. PROTA, Wageningen, Netherlands. Lamoreux, J., Akçakaya, H.R., Bennun, L., Collar, N.J., Boitani, L., Brackett, D., Brautigam, A., Brooks, T.M., Fonseca, G.A.B. and Mittermeier, R.A. (2003). Value of the IUCN Red List. *Trends Ecol. Evol.* 18: 214-215.
- Larsen, T.B. (1997). Butterflies of the Cross River National Park – diversity writ large. Proceedings of workshop on Essential Partnership – The Forest and the People, Cross River National Park, Calabar, Nigeria. pp. 229–235
- Mace, G.M., Collar, N.J., Gaston, K.J., Hilton-Taylor, C., Akçakaya, H.R., Leader-Williams, N., Milner-Gulland, E.J. and Stuart, S.N. 2008. Quantification of extinction risk: IUCN's system for classifying threatened species. *Conservation Biology* (in press doi:10.1111/j.1523-1739.2008.01044.x).
- Manu, S.A and Imong I. (2006). An Ornithological survey of the Cameroon Highlands in Cross River State, Nigeria: Afi Mountain Wildlife Sanctuary, Cross River National Park, Mbe Mountains and Sankwala Mountains. NCF-WCS Biodiversity Research Programme. AP Leventis Ornithological Research Institute, Jos, Nigeria; 34pp.
- Meduna, A. J., Ogunjinmi, A.A and Onadoko, S.A. (2009). Biodiversity Conservation Problems and their Implications on Ecotourism in Kainji Lake National Park, Nigeria. *J. Sust. Dev. Afr.* (10) 4: 59-73.
- NACGRAB (2004). Preliminary investigations into vegetative multiplication of some forest trees of phytomedicinal importance in South-West Nigeria. In: Annual Report of the National Centre for Genetic Resources and Biotechnology, Ibadan, Nigeria. 85 pp.
- Nduka, J.K.C., Orisakwe, O.E., Ezenweke, L.O., Ezenwa, T.E., Chendo, M.N. and Ezeabasili, N.G (2008). Acid Rain Phenomenon in Niger Delta Region of Nigeria: Economic, Biodiversity, and Public Health Concern. *The Sci. Wor. J.* 8: 811–818.
- Nsawir, A.T. and Ingram, V. (2007). *Prunus africana*: Money growing on trees? A plant that can boost rural economies in the Cameroon Highlands. *FAO Nature & Faune* 22. “The value of biodiversity”
- Oguntala, A.B., Soladoye, M.O., Ugbogu, O.A. and Fashola, A.T. (1996). A review of endangered tree species of Cross River State and Environs. In: Obot and Barker, 1996, pp. 120 – 125.
- Okafor, J.C (2010). Endangered Species in Nigeria. *The Nig. Field* 75: 50 – 65.
- Olabanji, S.O., Makanju, O.V., Haque, D.C.M., Buoso, M.C., Ceccato, D., Cherubini, R. and Mooschini, G. (1996). Analysis of Chewing Sticks of Pharmacological Importance. *Nucl. Instr. Meth. Phys. Res.* 113:368-372.
- Osemeobo, G.J. (1993). Impact of Land Use on Biodiversity Preservation in Nigerian Natural Ecosystems: A Review. *Nat. Res.* 33: 1015-1025
- Oseni, J. O. (2007). Ensuring Peaceful Coexistence between Man and Animal in Protected Areas in Nigeria”. http://peaceparks2007.whsites.net/papers/oseni_peaceful
- Ouinavi C, Sokpon N. and Khasa D.P (2009). Genetic Diversity and Population Structure of a Threatened African Tree Species, *Milicia excelsa*, Using Nuclear Microsatellites DNA Markers. *Int. J. For. Res.* vol. 2009, Article ID 210179, 8 pages, 2009.
- Robbercht, E. (1996). Geography of African Rubiaceae with reference to glacial rain forest refuges. In: *The Biodiversity of African Plants* (ed. L. J. G. van der Maesen), pp 564-581. Springer Netherlands.
- Rodrigues, A.S.L., Pilgrim, J.D., Lamoreux, J.F., Hoffmann, M. and Brooks, T.M. (2006). The value of the IUCN Red List for conservation. *Trends in Ecol. Evol.* 21(2): 71-76.
- Stuart, S.N., Adams, R.J and Jenkins, M.D (1990). Biodiversity in Sub-Saharan Africa and its Islands Conservation, Management, and Sustainable Use. Occasional Papers of the IUCN Species Survival Commission No. 6. IUCN, Gland, Switzerland, 242pp.
- USAID (2008). Nigeria Biodiversity and Tropical forestry assessment: Maximizing Agricultural Revenue in Key Enterprises (Markets). Chemonics International Inc.

Veenendaal E.M, Abebrese I.K, Walsh M.F and Swaine M.D (1996). Root hemiparasitism in a West African rainforest tree, *Okoubakha aubrevillei* (Santalaceae). *New Phytol.* 134 (3): 487 – 493.

Vié, J.-C., Hilton-Taylor, C., Pollock, C., Ragle, J., Smart, J., Stuart, S.N. and Tong, R. (2008). The IUCN Red List: a key conservation tool. In: J.-C. Vié, C. Hilton-Taylor and S.N. Stuart (eds). *The 2008 Review of The IUCN Red List of Threatened Species*. IUCN Gland, Switzerland.

WCS. (2010). “Nigeria”. World Conservation Society (WCS). www.wcs.org>where we work>Africa.