



The Mbembe Landscape and its Rich Diversity

**Can Conservation challenges be realised?
Tropical Biodiversity Conservation. is it a Myth or a fact?**

21/04/2012 07:32

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Book Summary

Introduction

Cameroon is one of the most diverse countries in Africa in terms of plant biodiversity, hosting over 7,850 plant species (Onana, 2011). Of these, 815 species are endangered (Onana et al., 2011). According to Letouzey (1985), the Cameroon landscape presents different vegetation types among which are the Biafra forest with high rainfall, the Congolese forest, and the semi-deciduous forest with low rain fall. Moreover, the vegetation of Cameroon ranges from lowland evergreen rainforest, semi-deciduous, deciduous, savannah woodland, and savannah grassland forest, at different altitudinal gradient of lowland to sub-montane, alpine and montane forest (Letouzey, 1985; Achoundong, 2007) and forms part of the Guineo-Congolian region of endemism (White, 1979).

Following these features, Davis et al., (1994) revealed that the forest of the cross-border region of Cameroon and Nigeria are highly diverse with a high degree of endemism. Further studies conducted by Barthlott et al., (1996) ranked Cameroon among the top countries in tropical Africa for plant species diversity per degree square. Similar studies equally confirmed the high diversity of endemism of plant species, as found in the 50 ha plot in central Korup National Park, Cameroon with close to 500 tree species (Thomas et al., 2003) and over 250 liana species. Most of this high diversity is usually preserved in protected areas through gazettelement for over long time in Cameroon. Examples include the Douala-Edea Wildlife Reserve (1932), Mbembe Forest Reserve (1934), the Rumpi hills Forest Reserve (1934), etc.

Ongoing conservation efforts by the government of Cameroon at the policy level are in carving out more protected areas and to create a working environment for development partners to assist in meeting the Millennium Development Goals (MDG). It is in this light that the government of Cameroon created a leeway for NGOs, Civil Society Organizations (CSO), etc. and as such NGOs like the Cameroon Biodiversity Conservation Society (CBCS) did the survey on Birds and Reptiles in 2004 (Taku and Njie, 2004) and the Tropical Plant Exploration Group (TroPEG) is presently studying the biodiversity of MFR.

With regard to the Mbembe Forest Reserve, discussions started as far back as 1926 (Pollock, 1926) under the United Kingdom Trusteeship. In 1934, the Mbembe Native Authority Forest Reserve was created, and demarcated as a reserve in 1949 (Hussey, 1949). The second demarcation of this reserve was carried out in 1953 (Lightbody, 1953). Since then no detailed conservation and management strategy plan has been put in place by the Government of Cameroon for MFR. This keeps us with very little or no knowledge on the biodiversity potentials of the reserve (Taku, 2004) and the livelihood of the communities.

Consistent with this, the Tropical Plant Exploration Group (TroPEG) has established a 4 ha plot as preliminary data source for a long term study of MFR. This study will improve the data and knowledge on the vegetative composition, and structure of MFR. It will further contribute to the understanding of the land use changes and sustainable development. As part of this study, a checklist of trees, herbs, and medicinal plants have been produced.

This piece of work is the first detailed study on the plant diversity of Mbembe, even though in 1974, Rene Letouzey who is known to be the father of Cameroon Botany collected plant specimens from this area (Nkambe, Ako, Abuenshie to Abong) with his team (Satabie, Paul Mezili, and G. Achondong). Results of this work will be useful to Government Institutions such as the Ministry of Forestry and Wildlife (MINFOF), Ministry of Scientific Research and Innovation (MINRESI) through the National Herbarium of Cameroon, Ministry of Environment, Nature Protection and Sustainable Development (MINEPDED) together with local communities, national and international NGOs. These results will not only help them to know the biodiversity state and potentials of MFR but they will equally use them to develop a proper management plan for the reserve.

This work has revisited some concepts like biodiversity, forest, etc. and international agreements on climate change to pave the way for in-depth insights of the study, and finally present the findings of a preliminary vegetation survey carried out at the Mbembe Forest Reserve (MFR) in the Northwest Region of Cameroon near to the border of Southeastern Nigeria. In this volume, climate change and biomass calculations are introduced.

Objectives

The overall objective of this project was to assess the Biodiversity and Conservation status of plants in the Mbembe, Fungom and Kimbi forest areas with emphases on the forest around Dumbu, Kwei, Gimbeu and Mayo Binka. Our effort is therefore to contribute to further awareness for decision-makers to take decisions towards conservation, climate change mitigation, sustainable develop-

ment and biodiversity policy for MFR. The specific objectives were:

To identify plants with high conservation, sustainability and medicinal value

- To produce a preliminary checklist of plants of Mbembe Forest Reserve
- To estimate the potential carbon stock (Above ground biomass) of the Mbembe Forest Reserve
- To produce a vegetation report of plants of the area, and publish new species if any.

The Mbembe forest reserve was created in 1934 (204 km²) (Newton, 1935). The population of this area increased to 8,434 inhabitants with a population density of 12.6 per square mile (32.8 persons per km²). With steep and isolated hills, the highest village was Bebe-ketti (Bebe-kette) at 4500 feet (1372 m, asl) and the lowest is a quarter in Abonse (Abuenshie) at 850 feet (259.08 m asl) (Newton, 1935).

The flora varies from open grassland through stunted orchards growth to high forest (Pollock, 1926). The valleys, slopes of hills and high ravines are forested particularly between Ako, Abonkwa and Ndaka.

Fauna

A detail survey of the fauna of Mbembe Forest Reserve is necessary. However, preliminary survey of the Birds and Reptiles of this area has been carried out (Taku & Njie, 2004; Dikko & LeBreton, 2004). In accordance with Taku & Njie (2004), The Nile Crocodile (*Crocodylus niloticus*), Bell's Hinged Back Tortoise (*Kinixys bel-liana*), *Kinixys nogueyi*, Rock Python (*Python sebae*), Royal Python (*Python*

regius), Slender or Graceful Chameleon (*Chamaeleo gracilis*), Nile Monitor lizard (*Varanus niloticus*), forest monitor lizard (*Varanus ornatus*) exist in this area and are threatened according to CITES MINEF Cameroon.

There is high pressure of poaching in the area with the use of local rifles. During our survey we observed species of fauna such as snakes, red and blue deer, pangolin, bats, some species of Monkeys, Bush baby (Potto sp), squirrel, porcupines and many species of insects such as termites, black flies, and ants. The various streams and rivers may be home for many species of amphibians.

According to Pollock 1926, Antelope, hart hog, wild pig, bush cow (Buffalo), Hippopotamus, wild duck, geese, bush fowl and Guinea fowl are found in the area.

Vegetation

The first botanical survey of this area was done by Rene Letouzey from 1965 - 1974. Letouzey and his team: Satabie, Mezili and Achoundong collected less than 200 plant samples from this area: Ndu, Nkambe, Berabe, Ako, and Abuenshie to the banks of River Donga (Onana, 2011). Further survey was conducted in the late 1980's by Cheek, Pollard, and Onana on the vegetation of the Kilum-Ijim forest reserve in Kom and Oku, The Bali Ngemba and Bafut Ngemba reserve which are neighboring landscapes to the MFR.

The vegetation of the MFR is characterized by lowland and sub-montane forest from open grassland savannah, woodland and semi-deciduous palm tree forest with three vegetation types. Grassland savannah is composed of species of *Tacca leontopetaloides*, *Imperata cylindricum*, *Daniella oliveri*, *Terminalia glaucescens*,

Lophira lanceolata, and *Cussonia barteri*. Woodland savannah is characterised by species of *Nauclea latifolia*, *Crossopteryx febrifuga*, *Hymenocardia acida*, and *Annona senegalensis*, and semi-deciduous palm forest by species of *Elaies guineensis* Jacq., *Diospyrus monbuttensis*, *Cola caricifolia*, *Milicia excelsa*, *Pterygota mildbraedii*, *Ceiba pentrandra*, and *Landolphia* spp, *Strychnos* spp.

Species Diversity and Distribution

A total of 6,679 individual plants with 7,893 individual stems were recorded for trees giving 208 species in 50 families. Five species were not identified to family level (Table 24). 2,508 individual stems of herbs (Seedling, Sapling and real herb) were recorded in 190 species and 54 families in 4 ha. After sorting out about 39 doubtful codes, we were left with about 151 species of herbs. We further sorted out all the seedling and sapling from the herbaceous data (62 species). This resulted to 89 species of herbs of which 44 species were properly identified to genus and species level (Table 15). Based on our study, about 45 species of trees and 14 species of herbs were used as medicine in this locality. Appendices 1, 2 and 3 show a checklist of all these. This shows high species richness for the area considering that only 4 ha were sampled. Hence more species may increase if more plots are set up.

Summary of findings

It was found that:

- 1) The Mbembe Forest area is highly rich in species diversity.
- 2) The Mbembe Forest area has high Carbon Stock (Green Carbon), and also high potential to sequester considerable

amount of atmospheric Carbon dioxide.

3) The plant species of Mbembe Forest area are well utilised by the local communities for medicine, food and building material.

4) The Mbembe Forest ecosystem with high density of natural palms (Semi deciduous Palm vegetation) can serve as economic source for local communities and still maintain its biodiversity potentials and high Carbon Stock.

5) The Mbembe Forest area is a potential REDD/REDD+ project site owing to its strategic location and its huge Carbon Stock and sequestration potential.

Conclusion and Recommendation

Mbembe Forest Reserve and its associated communities have evolved over the years with lack of baseline data on its biodiversity. Hence, this work bridges the gap of insufficient data on the richness and diversity of this area, and serves as an eye opener on its above ground resources.

Despite the discrepancy in species richness, this area is diversified in terms of vegetation types and has important plant species which explain the rich vegetation. Thus, the landscape has undulating topography ranging from 295 to 841 m asl, and various vegetation types (woodland, savannah, and a kind of lowland gallery forest filled with high density of palms) occurring in a staggered manner throughout this landscape. The dynamic nature of the Mbembe Forest Reserve area including the human population have evolved over centuries with no strategic management plan to cater for the ecosystem. However, this area has been able to withstand different regimes of perturbation over time. This explains

the high level of diversity across the landscape. In spite of insufficient scientific data and results from this area, this work serves as a leeway for building a biodiversity management plan, by redefining its boundaries and improving monitoring strategies.

Also, this work presents Carbon Stock of the area and its potential to benefit from REDD/REDD+ initiative through Payment for Environmental Services (PES).

Mbembe Community Forest area a zone of high Analog Forestry (AF) development potential

Analog Forestry (AF) is a system which seeks to establish analog ecosystems with architectural structures and ecological functions similar to the original climax or sub climax vegetation. It also seeks to strengthen rural communities, socially as much as economically, through the use of species that provide commercial products.

AF technology is one of the agro-ecological approaches with a holistic view that suits the livelihood needs of local communities but can simultaneously also conserve biodiversity in forested landscapes in the tropics or restore degraded agriculture systems in the tropics. If we need to establish a balance between solving food security and reducing environmental degradation then we need to consider AF systems as a method of approach that can do the magic for us.

The Mbembe area covers an area of 1727.52 sq. km (i.e. about 17275 ha). It

is consist of over 16 villages which are rapidly growing in population, although the Mbembe Forest Reserve (MFR) has a surface area of about 285.75 sq. km (28.575 ha) i.e. about 16.54% of the area. This area is characterized by undulating topography such as hills, steep slopes, cliff and mountains. The area is streams and rivers and the vegetative pattern that is patchy have grassland savannah, savannah forest, gallery forest and dry forest structure. Agriculture land is scares with a rapid growing population, also cattle grazing land are limited in this zone. The current agriculture method is practiced along river banks or water course in some villages. This agricultural technique is destroying the vegetation along water course and water table resulting to huge water shortage in dry season.



The Mbembe Forest

The ever rapidly growing population in Ako subdivision will continue to do so and infrastructural development also expanding at the expense of the environment. It's time to reflect on how to sustainably manage the resource of this area. The manner in which infrastruc-

tural development and agriculture practices are being done presently if not checked will exert more pressure on the remnant forest vegetation because the current agriculture practice is environmentally unfriendly and do not take in to account sustainability.



Mbembe Community



Mbembe Local Grinding Technology

AF systems are the best way of ensuring agriculture sustainability as it creates that balance biodiversity conservation and economic growth which are often seen as opposing interest.

The potentials for AF is high because of

high diversity of trees of ecological and economic importance found in the area and also because of a remnant forest vegetation that could be reflected in terms of species and structure during the AF designs. Some of the economic species doing well in this area are: Bush mango (*Irvingia gabonensis*); Bush pepper (*Piper guineensis*); Oil palm (*Elaeis guineensis*); Avocado (*Persea americana*)

THE LEGAL BEDROCK OF TroPEG

Plant exploration is a conception which is in tune with the times. There is hardly any forum of national or international dispensation in which our environment does not come into play in one way or the other.

In our quest to explore, all related and concerned benefactors are defacto participants. Local and International legislations enforced won't do, the traditions customs and folklores of the immediate communities are of prime concern.

TroPEG in her bit to foster the sustainable development of the environment embarks on the different facets of environmental auditing such as plant identification and associated researches, as well as capacity building. This TroPEG does in strict compliance with the related national and international norms, not leaving out the folklores and mores of the communities involved.

Like most environmental expeditions, the goal of TroPEG is to broaden our awareness of our universal heritage. In this regard, our com-

mon humanity makes it imperative for us to start by harnessing and nurturing that which is the cradle of our civilization – namely our local and national environs.

It was with this in mind that TroPEG home-in in the ground breaking Mbembe reserve venture. The picturesque report speaks for itself. All the different components involved are seen at their very best. Without over emphasizing the capabilities of TroPEG; it is worth noting that we collaborate with individuals and juristic persona...and these we have done.

In all of these, the modus operandi of TroPEG is to factor in the available legislation as the case maybe, without circumventing the necessary customary norms. To this end, TroPEG in the Cameroon case draws much inspiration from Chapter three, Section ' f ' of Law no. 96/12 of 5th August 1996 relating to environmental management in Cameroon.

To accomplish our goal of a sustainably well developed environment; TroPEG relies very much on all the stake holders in this domain, and promises only the very best to all our benefactors. You can count on us...

¹The principle of substitution according to which in the absence of a written general or specific rule of law on environmental protection, the identified customary norm of a given land accepted as more efficient for environmental protection, shall be applied.

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Mbembe Savannah Landscape

