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Title: *THE DEGRADATION OF RAFFIA PALMS AND IT'S SOCIO-ECONOMIC AND ECOLOGICAL CONSEQUENCES: THE CASE STUDY OF BAMUNKA, NDOP, NORTH WEST PROVINCE CAMEROON.*

1. INTRODUCTION:

Cameroon is endowed with several natural resources. Its flora cover estimated at 40903 825 hectares is constituted of diverse ecosystems. These ecosystems produce several goods and services which are indispensable for the wellbeing of the nation e.g. non-timber and timber products on which the population depends directly or indirectly for their wellbeing.

Raffia palms constitute an important ecosystem in this flora base. They are mostly found growing in wetlands, especially around flood plains and river valleys. Their presence in several regions has led to the growth and development of particular plant and animal species which are linked up into a complex web of feeding relationships. The presence of such important values and functions has led to the massive exploitation of raffia palms for their goods and services. Such activities are however detrimental to this ecosystem in several parts of the world.

Bamunka which is located in the flood plains of Ndop in the North West province and geographically between latitude 5°37' N and 6°14'N and between longitude 10°23' E to 10°28'E, is an area that has an abundance of raffia palm bushes (see figure 1.)

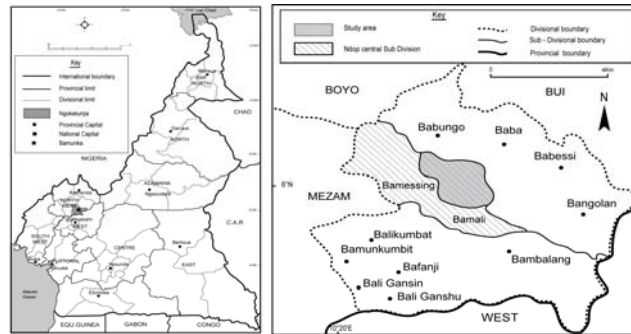


Fig. 1a: Location of Ngoketunjia Division in Cameroon Fig. 1b: Location of Bamunka in Ngoketunjia Division

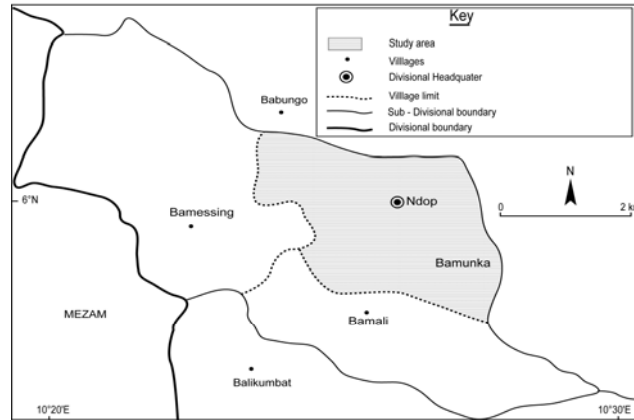


Fig. 1c: Location of Bamunka in Ndop Central Sub-Division

The presence of raffia palms in this region has led to the existence of a particular type of ecosystem which is therefore the reason why several primary activities are practiced in the region. Some examples include wine tapping, handicraft industries based on raw materials from raffia bushes, hunting, fishing, gathering, the search for medicinal plants etc. With an increase in the population of this region and hence the demand for products from raffia bushes, this ecosystem is being rapidly destroyed. The destruction of this ecosystem has also been intensified by other activities like agriculture, bush fires, infrastructural development, agro pastoral activities etc. These have hence led to the decrease in the values and functions of raffia palms in the region. It is for this reason that this research set forth a principal research question as follows: “at what rate have raffia palms been degraded from this area and what are the ecological and socio-economic implications?”

The principal objective was to “*assess the rate at raffia had been lost in this region and to examine the socio economic and ecological impacts*”.

2. LITTERATURE REVIEW

Studies on the chemical content of palm wine were carried out by Bergeret (1957) and Emo (1987). These studies were aimed at bringing out the nutritional values of palm

wine, which is seen by both authors as an important drink in Cameroonian and Nigerian societies respectively. Their works show the importance of palm wine is a major raffia product and draws attention to the fact that wine tapping as an important socio-economic activity. However, little is mentioned about other raffia products.

Ghanara (1968) carried out studies on raffia wine and its possible preservation in Nigeria. He proposed that the product could be bottled and stored under high pressure as a means of preserving its quality for longer periods. This idea will aid as a recommendation in this research, being a means of boosting the economic value of raffia.

A phytogeographic study in Cameroon was carried out by Letouzey (1968 and 1985); in which several vegetation types present in the country were identified. The various raffia species found in different regions were also identified. This study constitutes an important guide for taxonomic classifications of raffia species found in Cameroon.

After elaborate studies on the Bamelike Plateau, *Raphia farinifera* was identified by Cardon (1975), as the dominant species in the area. Further details were given on ecological factors which favor growth and development in the area. Precision on micro-climatic conditions within raffia were materialized through measurements of the humidity and temperature within and out of raffia bushes.

Russel (1965), Dansfield, (1986), and Tuley (1995) in their studies, brought out a classification of African palms. The distribution of these palms according to different climatic zones was equally elaborated. The existence of raffia in Tropical America and Asia were seen to be determined by similar climatic conditions which prevail in both regions. These studies were mostly tied to taxonomic classification and location of these palms with respect to diverse climatic zones. However, this facilitated the identification of palm species in Cameroon in general and in Bamunka in particular.

Zona and Henderson (1989) studied the various methods of animal-mediated seed dispersal of palms. The extinction of some rodents, believed to be active agents of natural palm seed dispersal, was seen as a major threat to palms. This was identified as a major challenge in the regeneration of palms. However, it is was mentioned here that man influences palms more through his activities like agriculture and infrastructural development than only through eliminating agents of palm seed dispersal.

The management of raffia palms in Santa Sub-Division in the North West Province of Cameroon is an important socio-economic sector seen to generate huge income to the region. Some problems associated to the exploitation of raffia products were examined together with

possible solutions to attenuate such set-backs by Achidi (1999). Raffia palms are not however considered here as an ecosystem but as a unique plant with several potentials.

Knöpfli (2001), carried out a study on utensils and artifacts from raffia products. He made a classification of raffia species found in the Grass field regions of the North West Province of Cameroon. He went further to identify climatic factors that have favored the growth and development of raffia in the region. Much was evoked about the various processes involved in exploiting and marketing raffia products in the region. Palm wine was identified as important merchandise for traders around Bamenda, meanwhile fibers from raffia were seen to have led to the creation of an important handicraft industry. The orientation of this study was more towards utensils used in the region, hence little mention was made about the challenges faced with the management of this resource.

Wabo Kuate (2004), was interested in the degradation of raffia and its environmental and socio-economic consequences in the Bandjoun village of Cameroon. The potentials of the raffia ecosystem are seen to be diverse; reason for which the ecosystem is under pressure from over-exploitation. Other natural factors such as diseases and pests are also seen to cause the degradation of raffia. Degraded raffia ecosystems were realized as having lower potentials such as low biodiversity, low wind-breaking potentials and a low potential to arrest water-mediated soil erosion. Proposals to revert the problems faced by raffia were also examined; as being basically the regeneration of degraded zones and the protection of existing bushes.

Bamunka has often been a focal point of research due to its location within a major wetland (Ndop Flood Plain) and in the Upper Nun Basin. The origin of its people and the present ethnic diversity of these people have also created a centre of attraction. This area has elaborate literature on issues like rice cultivation, agro pastoralism, ecosystems and soils. The identification of Ndop Plain as one of the Wetlands in Cameroon WWF (2006) (amongst others like the coast of Kribi, Campo, Douala-Edea, Ndian creeks, Limbe, Lake Chad basin, Tingoh and Menchum Valleys) has also recently caught the attention of some researchers.

The predominance of transhumance activities in this zone is seen to be favored by climatic factors and a luxuriant vegetation of several gramineous species. This activity is seen to alternate between the wetlands of the plains and the dry highlands, depending upon seasonal variations (Boutrais, 1974).

Ngwa N.E (1979) carried out studies on swamp rice production in the North West Province. The origin of rice in the region right up to its large scale production under the patronage of the Upper Nun Valley Development Authority (U.N.V.D.A) was seen as an important economic cash crop in the region. The UNVDA is also seen as an important actor,

whose action in the swamps has led to the destruction of swamp vegetation, amongst which is raffia.

Agricultural practices in this region are equally seen as a major peasant occupation, in the works of Nkwemoh (1999), Pangmashi (1999) and Duma (1999). These activities are responsible for the food security and abundance prevalent in the region.

A cross section of this literature is revealing on the socio-economic and ecological importance of raffia palms. Since little has been studied on the rate at which they have been degraded as well as the link between such changes and associated socio economic and environmental impacts, this study is a first attempt in Bamunka.

3. METHODOLOGY:

The hypothesis in the study was that “there is a significant relationship between raffia palm degradation and the disappearance of several ecological and socio economic values in Bamunka”.

To validate this hypothesis, the following methodology was used:

- Consultation of secondary sources i.e. literature, topographic maps, aerial photos and satellite images.
- Fieldwork; during which 150 questionnaires were randomly administered in the 18 quarters of Bamunka.
- On the field equally, sample frames of 100 m² and 1m² were studied closely for trees between 3 m+ and those less than or equal to 2m respectively. This was in a bid to observe the biodiversity and make comparative analysis.
- GIS was used in the delimitation of areas occupied by raffia bushes over different periods. This was complemented by field survey during which a GPS was used to locate different areas occupied by raffia as well as other activities which could have destroyed raffia bushes.
- Interviews with hunters aided in obtaining the names and diversity of fauna species which had existed in the area.
- Observations were also made and snapshots taken on different activities which made use of raffia products or which occur in raffia bushes.

3. RESULTS:

Raffia palms in this village were seen to have a wide variety of resources which are important both to the people and the general environment of this region. It is due to these

resources that the exploitation of this ecosystem is continuous and has increased due to an increase in the population and hence needs of the people of this region. Consequently there has been a massive degradation of this resource. Little is being done by the locals to protect raffia palms in spite of its important role. It is for this reason that some proposals were made in this research.

3.1. RESOURCES IN RAFFIA PALM ECOSYSTEM:

Two categories of resources can be associated to the raffia palm ecosystem. These are resources exploited from the raffia palm itself and those which are found in coexistence with the raffia palm ecosystem.

3.1.1. Resources exploited from the raffia palm:

Almost every part of a raffia palm is exploited; the leaves, branches, fruits, roots and the whole plant itself are put into use in this region. Some products of the plant can be seen below.

a). Raffia palm wine:

This is the most important product of this plant. In this village, palm wine tapping is the mainstay of the people. Over 27% of locals in this village are wine tappers. The activity is unlimited by sex or age since it entails very little manual strain. When a mature plant of about five years old is identified a hole is bored into the larger part of its stem. This is covered with soil for about a week and then cleaned. Wine starts coming out of the hole and an Indian bamboo pipe is stuck to it with a calabash or bottle as a receptacle (see photo 1). A plant can produce wine for about 3 months with about 10 liters collected each day. Wine is tapped every day early in the mornings and late in the evening.



Photo 1: Raffia wine tapping

Foreground: wine receptacle, background, raffia plant

About 3700 litres of wine are tapped and sold on a daily bases in this region. This generates an income of about 185000 FCFA (about \$37 USD) with an average of 5000 FRS per tapper each a day. The sale of wine by retailers is also a form of employment for those who own drinking spots. About 150 palm wine drinking spots exist in the area; making the demand for wine to be ever-increasing.

Wine in this village also has a cultural connotation. Libations, bride prizes and cultural ceremonies make use of wine. Also wine is used by herbalist in the preparation of traditional medication against typhoid, malaria, fever etc. Recently, highly fermented wine is being used in the distillation of locally made whisky called “afawfaw”. This is also used in the sterilisation of shaving instruments in barbing saloons.

b) Branches:

Although not belonging to any bamboo species, raffia palm branches are locally referred to as ‘bamboos’. The branches which are at times as long as 12 meters are used in several ways. Bamboo serves as fuel wood, building material and raw material for the fabrication of several local artefacts as seen on the table I below.

Table I : Some “bamboo” products

Product of “Bamboo”	Specifications	Approximate duration of fabrication	Estimated unit prize in CFA francs
Bed	1.5m wide and 3m long	3 days	5300frs
Chair	30cm wide and 40cm long	2 hours	250frs
Tomato basket	Diameter of 44cm made of soft material	35 minutes	25frs
Kitchen basket	Diameter of 1.57m	3 hours	400frs
Outing/festive basket	Decorated with tainted fibre of about 126cm	5 hours	2000frs
Boat	As long as 4m	One week	20,000frs
Door	1m wide 3m long	4 hours	3500frs
Window	1m wide 1m long	1 hour	1500frs
Comb	Made of hard peelings	3 minutes	100frs
Barn/ceilings	Interloged poles and peelings. 4mX4m	2 days	700frs

Source: author2005.

About 18 bundles (worth 200 poles) of bamboo are harvested from this village on a daily bases, with one bundle costing about 13000FCFA. They are most often sold to people who use them for handicraft activities.

Some products of raffia branches can be seen on the photos 2,3 and 4 below.



Photo 2: 'bamboo' mat



photo3: House made of "bamboo"

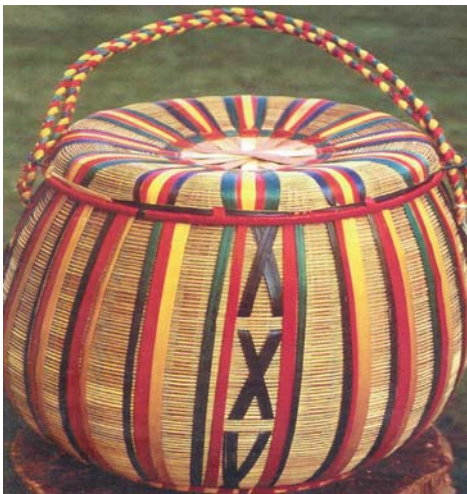


Photo 4: "bamboo" basket



photo 5: "bamboo" ceiling

c) Leaves:

The leaves of raffia palms serve as roofing material (see photo 6) and as a source of fiber (from young leaves) used in the fabrication of bags, wallets, shoes, cases, decorations and several works of art. Raffia palm fibers are also locally believed to be a cure for inflammations; a strand is tied around the area on the patient until he/she is relieved.



Photo 6: Raffia leaves designed for roofing



photo 7: Raffia fibre bags worth 2500FCFA

d) Fruits:

The fruits of this plant, locally referred to as “ankop”, are used in the fabrication of curtains for bars, restaurants and public offices (see photo 8). At maturity, the yellow hard fruits are boiled with palm wine, peeled and dried. An inner section of the fruit is obtained (see photo 9). This locally replaces cola nuts and is considered as a stimulant, appetizer and aphrodisiac. It is widely eaten and some people indulge in its sale as a source of livelihood.



Photo 8: Raffia fruits on sale



photo 9: Raffia fruits used as curtains

e) Latex and roots:

The roots of raffia are believed to have spiritual powers which can scare away evil spirits. That is why they are some times extracted, dried and burnt in homes. This opinion is however shared only by a few people in the village. As for the latex, it is used with other herbs in the treatment of skin rashes. Also in place of soil (used to block the outlet of wine during the preparation of a new palm for wine extraction), this latex is used to block the outlet for a while before the actual tapping process.

3.1.2. Other resources exploited within the raffia palm ecosystem:

There are some resources whose existence in this region can be directly associated to the existence of raffia palms. These include: Fresh water fish, a wide variety of micro and macro fauna species which serve as game, medicinal plants, palm beetle larvae and a multitude of medicinal plants. Their presence has led to the development of several activities in the area as can be seen below.

a) Fishing:

This activity employs over 33.82% of the population of this village either as part time or full time job. Fresh water fish species here like the *Tilapia spp.* and *Clarias spp.* are commonly caught in marshy raffia bushes. This is because they impart cool micro climates which are favorable for the growth and development of these species.



Photo 10: *Tilapia sp* caught in wet raffia bushes

b) Hunting and gathering:

Several animals find it a favorable habitat in raffia bushes. Some animals and birds like the otter shrew, bush baby, water bugs, crocodiles, hippopotamus, partridge, doves etc where usually hunted in this ecosystem by early hunters between the 1960s and early 1980s. Their existence here was due to the presence of easy prey on which they could feed on and on the cool and calm nature of these bushes. Although hunting is not so dominant in Bamunka today, it is an activity which has for long employed a good number of local residents.

The main gathering activities in raffia bushes are the search for palm beetle larvae, herbs and water fowl eggs. Beetle larvae which usually bore into and kill raffia plants are usually extracted, boiled in salted water and dried. It is either sold or fried in palm oil and eaten alongside local meals.

It can be seen from this section that raffia palm ecosystems have a lot of socio economic values which are put into use by the local population for their subsistence. It is however unfortunate that an increase in exploitation activities has led to the rapid degradation of this resource from Bamunka as will be seen in the next section.

3.2. THE DEGRADATION OF RAFFIA PALMS FROM BUMUNKA (1963-2002)

Due to the importance of this ecosystem, an increase in the population of this region meant its rapid destruction. Raffia palms are today being over exploited and in some cases,

large expanses are destroyed for the cultivation of food crops. On figure 2 it can be observed that in 1963, raffia occupied 1248 hectares and by 1983, it decreased to 844 hectares and finally to 674.08 hectares in 2002.

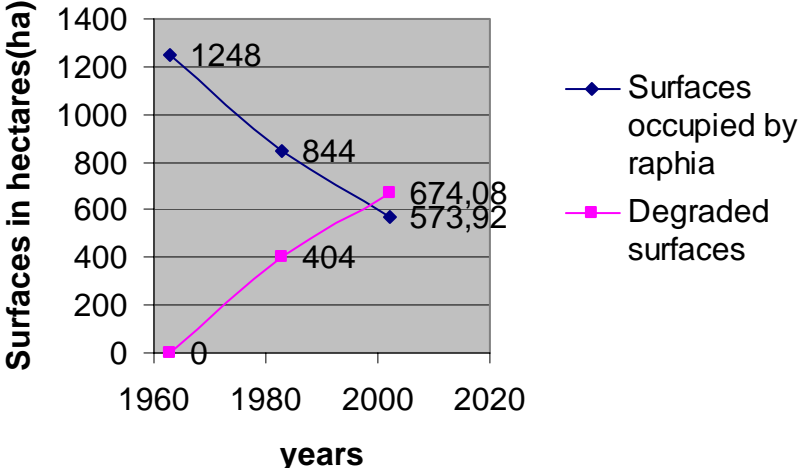


Figure 2: Evolution of raffia palms in Bamunka from 1963 to 2002
 Source: Aerial photos of 1963, 1983 and satellite image Landsat TM of 2002

Based on these figures, it was estimated that raffia palms were lost at a rate of about 1.6% per year and could be completely lost in the area by 2039. This can be associated to a number of factors which are principally anthropogenic in nature.

3.2.1. Agriculture:

This primary activity is the mainstay of the people of this region with over 80% involved. Agriculture is either extensive or intensive. Extensive agriculture in this region is patronized by the Upper Nun Development Authority (U.N.V.D.A) which encourages extensive swamp rice cultivation. Rice is more of a cash crop in this village because most people involved mostly sell the product in the end. The creation of rice fields led to the clearing off of extensive raffia bushes which initially occupied this area (see figure 3).

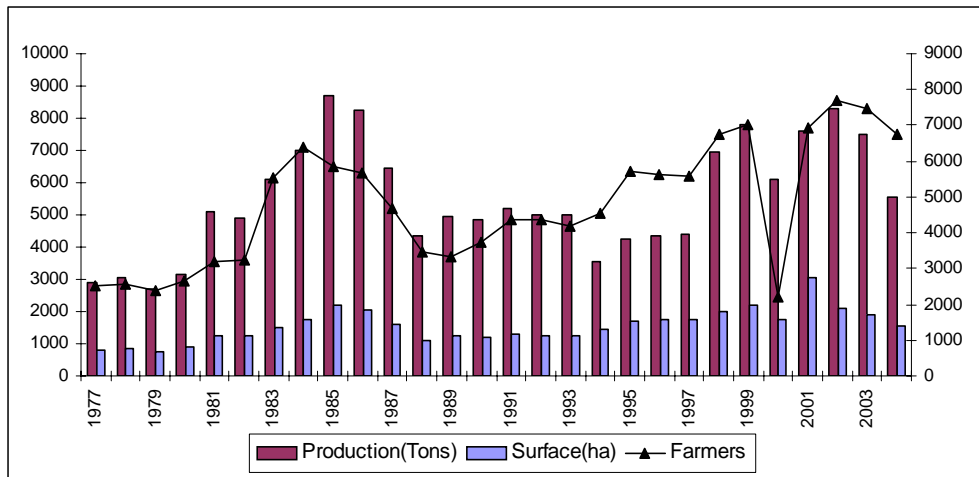


Figure 3: Evolution in rice fields, farmers and production from 1977 to 2005

Source: U.N.V.D.A (2005)

It shows from the figure that the number of farmers and surfaces cultivated for rice have increased over the years. Areas cultivated increased from about 824 ha in 1977 to about 3045ha in 2002. All of these are occurring at the expense of rice fields in this area (photo 11).



Photo 11: Rice fields replacing raffia bush
 Foreground: Rice fields, background: raffia bush

3.2.2. Increasing quest for construction sites:

With an increase in the population of this village, there was the need by many residents for lands on which they could construct. Zones of habitation therefore increased from about 42 ha in 1963 to about 4479 ha in 2003. Some raffia bushes which were close to raffia bushes were cleared and their stumps dug out to create space.

The construction of houses also meant the creation of a dense communication network which increased easy access to raffia bushes.

3.2.2. Poor exploitation practices:

Practices like the indiscriminate cutting of “bamboos” and over tapping of wine, are very common in this region. This is leading to the disappearance of several bushes especially those which can be easily accessed.

3.2.3. Bushfires:

The burning of bushes in the dry season is an agricultural practice which is common in this region. This is an easy way of clearing farms which contain a lot of grass. In some cases, these flames accidentally extend to other areas. This exposes raffia bushes with dense and dry undergrowth to the danger of going ablaze as seen on photo 12.



Photo 12: Raffia bushes attacked by Bushfires

3.2.4. Pests and diseases:

The palm beetle is the main pest to raffia palms. When poorly tapped, the crevices opened on raffia stems are some times infested by beetles and subsequently their larvae which are capable of completely destroying a plant over a period of 2 months of getting into it. Equally, palm blight is the main fungal infection to raffia. *Fusarium sp.* attack some plants and leads to their death or to a stunted growth often with very low production of fruits and branches.

3.2.5. The extinction of large mammals:

Initially in this region, raffia was not planted by man. Their seeds were simply transported and deposited in areas where they could easily germinate. But with the extinction

of most of these animals from this region and the dependence on this technique for seed propagation, raffia palms have little chances of regeneration.

4. REPERCUSSIONS OF RAFFIA PALM DEGRADATION.

Several negative feedbacks occurring here today can be associated to the disappearance of this ecosystem from the region. These feedbacks are socio economic and ecological; and in some cases further have other secondary repercussions.

4.1. SOCIO ECONOMIC REPERCUSSIONS:

4.1.1. The abandonment of some primary activities in the area.

Bamunka before the 1960s was a village dominated by primary activities like fishing, hunting, gathering, handicraft and agriculture (not yet extensively carried out). Raffia palm bushes were habitats for a high biodiversity of plants and animals which were an arena for hunting and gathering activities. Fishing was equally a mainstay for several people who did it either as part time or full time activities. But today with the degradation of these habitats and resources, these activities have been abandoned by many local residents. The handicraft sector especially the weaving of baskets and bags is no longer profitable because raw materials are scarce; hence actors are abandoning the activity altogether. Artefacts produced today as opposed to the past are low in quality and appearance. This is also due to the fact that the expertise in this sector is gradually being forgotten by a new generation unaware about past techniques.

4.1.2. The loss of some cultural values:

Raffia bushes were in the past considered as sacred environments and residents of ancestral spirits of the land. This gave several bushes the status of sacred places into which access was restricted. But today, the destruction of such areas has led to the loss of this value. The large and 'frightful' animals that gave these bushes their status no longer exist. Furthermore, the biodiversity of plants within these bushes which served as medicinal plants have greatly disappeared. All these have made these bushes no longer regarded as places of respect as in the past.

4.1.2. Occasional floods:

The role of raffia bushes as flood controls and water flow regulators (Tchindjang, 1999) is indisputably lost when they are destroyed. Interviews in this area reveal that rainfall in this region has dropped but curiously the same sources confirm an increase in floods even after

slight rainfalls. This is a great hindrance to communication as road networks are often flooded during the heavy August rainfalls in this area. (See photo 13)



Photo 13: Floods that often drown roads during the rainy season.
Foreground: road under water.
Background: Car under water.

4.2. ECOLOGICAL REPERCURSIONS:

The main ecological repercussion is the loss of habitats for both flora and fauna species. This has had further implications in this village as will be seen below:

4.2.1. The extinction of species:

From interviews with hunters in this village and from observations made on relics of animal skins in the village palace, it was found out that this village was rich in large mammal species like lions, elephants, hippopotamus, antelopes, monkeys, gorillas, cheaters, civet cats, amongst others (photo 14).

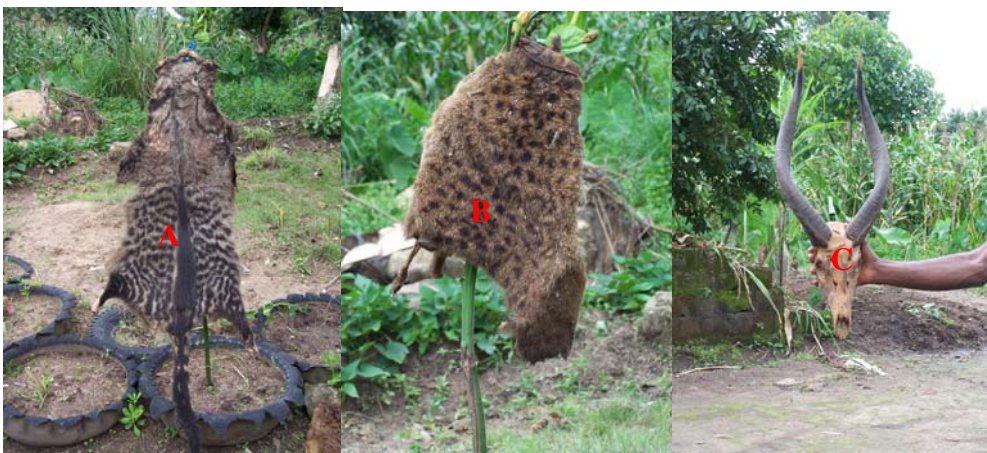


Photo 14: A: Civet cat skin, B: Panther's skin, C: skull of antelope.

All these have disappeared in the area due to serious destruction of raffia bushes which served as habitats. Habitat destruction also facilitated hunting of animals that strayed into open farmlands.

4.2.2. Increased erosion of river beds and turbidity of rivers:

The filtering role of raffia palm roots allows water that flows in raffia bushes to often appear clean; this is the reason why they are often sources of portable drinking water to the local population. With a disappearance of raffia palms (whose roots impeded erosion), this quality of water for drinking is being lost due to increased erosion, hence increased turbidity of water.

4. DISCUSSION

From this write-up, it can be realised that raffia palms are an important resource in Bamunka. But due to an increase in the population of the area, there is more demand for resources in this ecosystem. Increasing demand unfortunately has led to unsustainable management practices which are leading to the degradation and in some cases disappearance of this ecosystem. This is the main reason why there is a marked difference in the nature of this ecosystem in the early 1960s (when very little exploitation was exercised in them) and today when there is a heavy influence by man through unsustainable exploitation practices. Several socio economic activities as well as ecological values related to this ecosystem have disappeared due to its degradation. This makes it clear that there is an indisputable relationship existing between the degradation of this resource and the disappearance of such values; this going a long way to validate the earlier mentioned hypotheses.

The situation occurring in Bamunka is a similar situation occurring with several natural resources in villages of Cameroon which instead of being preserved or regenerated for sustainable use because they are important, are instead exploited continuously to exhaustion Wabo Kuate (2004). This unfortunately is not only limited to the scale of this village; a similar situation is occurring at a national level e.g. in the forest exploitation sector where Cameroon is a leading deforester in the Central African Sub Region (Verbelain et al, 1994). It further has a global implication because forest exploitation is mostly carried out by foreign exploitation companies to satisfy a global market. In the long run such markets will run short of goods. In the case of Bamunka, it is recommended that the locals should embark on regenerating raffia palms and abandon old traditional methods of regeneration like depending on natural agents that are getting extinct today.

CONCLUSIONS

This study was aimed at closely studying raffia palms in Bamunka village in the Northwest province of Cameroon which appears as a favorable area in which raffia palms can grow. This explains why there are large expanses of raffia palms in the region. Its existence has made several societies living in this area to develop several uses of this resource and hence

techniques of exploiting it. Bamunka is an example of a village community here in which raffia palms are exploited towards diverse ends. Over the years raffia palms created a peculiar ecosystem marked by a rich biodiversity. A combination of such resources has made this area a very lucrative arena for exploitation especially by a local population which has increased rapidly over the years. A high population in this area has led to over exploitation as well as to the development of other activities which are detrimental to raffia palms such as large scale agriculture. This explains why the resource is degrading at a rapid rate of 1.65% per year and could completely disappear by the year 2039 if nothing is done to arrest the situation. However, like any renewable resource, if raffia is regenerated, it will continue to exist and satisfy the needs of the locals. Given the fact that Bamunka is mostly agriculture inclined, the issue of giving up agricultural fields to planting raffia is another issue at stake, but which could be solved by integrating agroforestry techniques especially alley cropping of raffia plants in food crop fields. Through this means, raffia will exist without jeopardizing the presence of any other activity.

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