



TÍTULO

**MANAGEMENT CONSTRAINTS AND PERSPECTIVES FOR
SUSTAINABLE USE OF PTEROCARPUS ERINACEUS IN
CAMEROON CASE STUDY**

THE BENUE DIVISION OF THE NORTH REGION

AUTORA

Adeline Neh Ngwa Epse Ndim Anong

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**MANAGEMENT CONSTRAINTS AND PERSPECTIVES FOR
SUSTAINABLE USE OF *Pterocarpus erinaceus* IN CAMEROON CASE
STUDY: THE BENUE DIVISION OF THE NORTH REGION**

By

Ngwa epse Ndim Anong Adeline Neh

Tutor: Dr Rocío Hernandez Clemente,
University of Cordoba, Spain

Co-Tutor: Mr Babale Michel
Director of Garoua Wildlife College, Cameroon

To obtain the UNIA Master Title in Management and Conservation of Species in Trade:

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DEDICATION

To God Almighty the master planner of my life and in memory of my late husband Mr Ndim Anong Robert who is resting in the world beyond.

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I render all glory and thanks to God Almighty the pillar of my life from whom my strength comes for seeing me through this path of great achievement.

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LIST OF ACRONYMS

ACNP	Avis de Commerce Non-Préjudiciable
ADF	Africa's Defence Force
CBD	Convention on Biological Diversity
CF	Community Forest
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Cop	Conference of the Parties
EIA	Environment Investigation Agency
FAO	Food and Agricultural Organisation
FLEGT	Forest Law Enforcement, Governance and Trade
FMU	Forest Management Unit
IUCN	International Union for Conservation of Nature
MA	Management Authority
MINDEF	Ministry of Defence
MINFOF	Ministry of Forestry and Wildlife
MoU	Memorandum of Understanding
NCB	National Brigade for Control and anti-poaching
NDFs	Non-Detriment Findings
NGOs	Non-Governmental Organisations
NTFP	Non-Timber Forest Products
PC	Plant Committee
PEBC	Partenariat sur les Forêts du Bassin du Congo
RST	Review of Significant trade
SA	Scientific Authority

SC	Standing Committee
SEPBC	Société d'Exploitation des Parcs à Bois du Cameroun (Cameroon Timber yards operating company)
SSV	Sales of Standing Volume
SWOT	Strength, Weaknesses, Opportunities and Threats
TRAFFIC	Wildlife Trade Monitoring Network
UNEP- WCMC	United Nations Environment Programme World Conservation Monitoring Centre
USAID	United State Agency for International Development
VPA	Voluntary Partnership Agreement
WABiCC	West Africa Biodiversity and Climate Change
WWF	World Wildlife Fund for nature
ZIB	Zone d'Interêt Biologique
ZIC	Zone d'Interêt Cynegitique

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ABSTRACT

This study, carried out in the Benue Division of the North Region of Cameroon, aimed at contributing to the sustainable management of *P. erinaceus* in Cameroon in compliance with CITES. To achieve this, interviews were conducted with resource persons and focus group meetings were held with local communities to understand their knowledge and uses of the species in and around the study zone. It was realised that despite the legal instruments governing the sustainable exploitation of natural resources in Cameroon, as is the case with *P. erinaceus* which is placed under Category A meaning total protection, lack of awareness of these instruments by the local communities and corruption on the part of local authorities is a major challenge to their effectiveness. Also, local communities have great knowledge of this species and its ecology. About 70% of the population confirmed that the species develops more on sandy-clay soils. The barks and roots of *P. erinaceus* are highly used by more than 90% of the population for therapeutic purposes principally for anaemic and heart problems. The leaves are used by all the communities as fodder for livestock. Illegal exploitation and smuggling of the wood to Nigeria, corruption and poor harvesting techniques by the local population are key threats to this species. Regeneration and species colonisation are hindered by these threats. Elaboration of a robust NDF, sensitizations, capacity building, among others, are some measures proposed for sustainable management of *P. erinaceus* in Cameroon.

Keywords: *Pterocarpus erinaceus*, Uses, Threats, Sustainable management

RESUME

Cette étude menée dans le Département de la Bénoué de la Région Nord du Cameroun visait à contribuer à une gestion durable de *P. erinaceus* au Cameroun conformément à la CITES. Pour ce faire, des entretiens ont été menés avec des personnes ressources concernant le cadre de gestion de l'espèce au Cameroun. Des réunions de focus group ont été organisées avec les communautés locales pour comprendre leurs connaissances et leurs utilisations dans et autour de la zone d'étude. On s'est rendu compte que le gouvernement camerounais a mis en place des instruments juridiques qui régissent l'exploitation durable de ses ressources naturelles comme c'est le cas avec *P. erinaceus*. Cependant, la méconnaissance de ces instruments par les communautés locales constitue un obstacle majeur à leur efficacité. Mais ces communautés locales ont une grande connaissance de cette espèce, de son habitat et de ses utilisations. Environ 70% de la population a confirmé que l'espèce se développe davantage sur des sols sablo-argileux. L'écorce a un large spectre d'utilisations médicinales, en particulier pour le traitement de l'anémie par 92% des communautés et les feuilles sont utilisées par toutes les communautés comme fourrage pour leur bétail. Cependant, l'espèce est gravement menacée suite au taux d'exploitation illégale et de contrebande du bois vers le Nigeria, suivi de mauvaises techniques de récolte des parties par la population locale. Cela défavorise la régénération et l'expansion de l'espèce par la multiplication des graines. L'élaboration d'un ACNP, les sensibilisations, le renforcement des capacités, la création de plantations, de forêts communautaires et communales entre autres étaient quelques mesures proposées pour la gestion durable de *P. erinaceus* au Cameroun.

Mots clés : *Pterocarpus erinaceus*, Usages, Menaces, Gestion durable

1. INTRODUCTION

Many indigenous plant species of great importance for human survival are lost worldwide because of human activities such as deforestation, agriculture, overgrazing and bushfires, coupled with the adverse effects of climate change (Adjonou Kossi, 2019). Rosewood, a designation for a wide array of dark-red, tropical hardwood tree species native to the tropical areas of Southeast Asia, Africa, and Central and South America, comprises selected species of the genera *Dalbergia* ('true rosewood'), *Diospyros*, *Millettia*, *Cassia* and *Pterocarpus* (substitute rosewood) (Treanor, 2015). The wood harvested from rosewood species is valued for its strong, heavy, and aesthetically pleasing characteristics, which has led to its high demand for creating furniture and musical instruments. *Pterocarpus erinaceus* Poir (Family Fabaceae), or African rosewood, is a valuable wood species native to the natural dry forests and semi-arid savannas of the Sudano-Guinean region of Africa

From 2009, the demand for luxury furniture made with rare, high-value, and deeply-hued rosewoods in Asia boomed, principally targeting 33 species within the different rosewood genera. According to the Environmental Investigation Agency (EIA) (2016), sales in China's redwood sector exceeded \$25 billion in 2014, and approximately 98% of all of China's redwood imports, both by value and volume, were from Africa and Asia.

Pterocarpus erinaceus Poir. West Africa is the largest producer of rosewood logs, supplying more than 80% by volume to China in 2016 (CITES, 2016). For instance, between January 2015 and December 2016, an annual average of 764,000 m³ worth US\$840 million of rosewood was imported into China from West Africa (EIA, 2017). The intensity of exploitation of the species sparked concerns about its sustainability among various countries in West Africa (Dumenu, 2019). This rapidly increasing demand has led to increased illegal exploitation in many producer countries in Africa (Treanor, 2015). According to EIA's analysis, as of April 2022, over 3 million tons of rosewood worth more than US\$2 billion had been illegally traded between West Africa and China over a five-year period with Nigeria taking the lead (EIA, 2022).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement among 184 countries (also referred to as Parties) and was established to ensure that international trade on wild fauna and flora does not threaten their survival (www.cites.org). Cameroon became a full Party to this Convention on September 3rd

1981. CITES regulates trade in wild species through the categorization of these species into appendices that define the level of protection attributed to each category. To reduce overexploitation and ensure the sustainability of the African rosewood *P. erinaceus*, range States proposed the transfer of the species to a CITES Appendix with stricter trade controls. The CITES Plant Committee, at its 22nd meeting, recommended the uplisting of the appendix of *P. erinaceus* in CITES. This was caused by the high demand for wood in the international market. In 2016, at the 17th CITES Conference of the Parties, *P. erinaceus* was transferred from CITES Appendix III to Appendix II, signifying that although not yet threatened with extinction, the species may become so if the trade is not closely monitored. Also recognizing the threats to this species and the need for urgent action, the IUCN Redlist of threatened species classified it as 'Endangered' in all 17 range States in 2017 (IUCN, 2017).

CITES Resolutions of CoP18, Doc.34 recommended that Parties of West and Central Africa that have not put measures in place to combat wildlife crime pursue the implementation of measures and activities that would facilitate the establishment of a solid scientific base Non-Detriment Findings (NDFs) for trade in animal and plant species listed in Appendix I and II, and initiate capacity-building activities to strengthen border controls at key airports, seaports and land border crossings (CITES, 2019). The 73rd Meeting of the CITES Standing Committee (SC) recommended that no export of *P. erinaceus* should take place from any range State unless a scientifically robust non-detriment finding (NDF) has been submitted to the CITES Secretariat and the CITES Plant Committee (PC) Chair for their consideration and approval (CITES, 2020 PC25 Doc. 15.5). Furthermore, the PC, during its 25th Meeting in 2020 held in Geneva Switzerland, stated that range States of *P. erinaceus* are encouraged to ensure that any cross-border movement is legal and regulated and that measures should be implemented or strengthened to detect and address any illegal movement of *P. erinaceus* between range States through strict enforcement actions (CITES, 2020).

Despite international concerns about sustainability, the illegal trade of wildlife and wildlife products remains widespread globally, driven by high demand and value in Asia and other regions (Kamara *et al.*, 2018). Cameroon has rich and diverse forest ecosystems, with over 8,260 plant species, including nearly 150 endemic species, ranking it second in Central Africa after the Democratic Republic of Congo (RDC) (WCMC, 2000). Like many African countries, Cameroon faces poverty, structural challenges, and economic development agendas that have led to unregulated or indiscriminate exploitation of wildlife resources. One such resource is *P. erinaceus*, also known as Kosso which is overexploited from vulnerable savannah ecosystems.

The North Region of Cameroon, which lies within the Guineo-Sudanian and Sudanian-Sahelian phytogeographic zones, is a fragile savanna ecosystem sharing a long and porous border with Nigeria. Although the region has many protected areas, it is often threatened by the illegal exploitation of its resources. This has led to an increased risk of desertification and deprived local communities of a resource traditionally used for fuel, construction, musical instruments, traditional medicine, and animal fodder (EIA, 2016).

The rapidly increasing demand for rosewood in China, has led to increased illegal exploitation and smuggling of *P. erinaceus* from North Cameroon by neighbouring Nigeria. As rosewood becomes rarer in Nigerian forests, traffickers have been harvesting this rare timber species in Cameroon, bribing locals and Nigerian authorities to change the origin of the fraudulent timber before exporting it to China (Locka & Ngeunga, 2022). The uncontrolled harvesting and illegal trade of this CITES Appendix II-listed species pose serious threats to its survival and the ecosystem in the Northern Regions of Cameroon, thus threatening its sustainability.

Recently, the government of Cameroon through the Ministry of Forestry and Wildlife classified this species in Category A as a timber and non-timber forest product, an indication that it is highly threatened, thus the need to ensure the sustainability of the species. However, measuring the trend of the population of *P. erinaceus* in Cameroon is challenging because there is a paucity of data on the species.

This research, therefore, seeks to identify opportunities for enhancing the sustainability of *P. erinaceus* in order to contribute to adequate management strategies for the species. It is therefore important to know the rate of exploitation and uses of the species in the North Region of Cameroon in order to develop a management strategy for sustainable use of this CITES Appendix II species. This study focuses on the Benue Division as a first step to understanding current population trends in the north of the country. This research will also provide basic data to enhance in the elaboration of a robust NDF of the species in Cameroon in compliance with CITES. The following research questions were therefore asked to enable us to achieve the aim of this research:

research:

- How is the framework of the management of *P. erinaceus*?
- What are the drivers for the demand for *P. erinaceus*?
- What are the different uses and threats faced by the species?

- What measures are taken for its sustainability in compliance with CITES?

The overall goal of this research is to contribute to the sustainable management of *P. erinaceus* in Cameroon in compliance with CITES Appendix II species. Specifically, it aims at:

1. Evaluating the management framework of *P. erinaceus* in Cameroon;
2. Examining the knowledge of the local communities on *P. erinaceus* species in the Benue Division of the North Region of Cameroon;
3. Inventory the uses and analysing threats on the survivor of *P. erinaceus* in the zone;
4. Propose measures for the proper management and sustainability of *P. erinaceus* in Cameroon in compliance with CITES

2. LITERATURE REVIEW

2.1 Presentation of *Pterocarpus erinaceus*

2.1.1 Taxonomy

Class	Magnoliopsida
Order	Fabales
Family	Fabaceae
Genus	<i>Pterocarpus</i> Jacq
Species	<i>Pterocarpus erinaceus</i> Poir.

2.1.2 Common names:

English: African rosewood / Kosso,

French : bois de vène / palissandre du Sénégal

Spanish: palo de rosa africano

Local names: Fulfuldé (Burkina Faso): bani / banuhi, Ghana: krayie / kpatro, Gambie: keno / kino

2.2 Botanical characteristics of *P. erinaceus*

P. erinaceus is a small to medium-sized tree 12–18 m tall with a diameter of 1.2–1.8 m. In the drier part of its range, it has an open, spreading form and is low-branching, but under favourable rainfall and soil conditions, much larger specimens with clean straight boles 6–8m long or more can be found (Lely, 1925). Exceptionally tall trees reaching 35 m in height have been reported (von Maydell, 1983). The bark of the trunk is dark grey and rough, with scales that curl up at the ends. Its branches are light grey and smooth. The leaves are once-compound, imparipinnate, and 30 cm long. There are 10–15 alternate or sub-opposite leaflets, 6–11 cm long and 3–6 cm wide (Hutchinson et al., 1958). The flowering tree is showy and very attractive, with golden-yellow flowers covering the canopy completely. In its native range, *P. erinaceus* flowers from December to February. The fruit is 4–7 cm in diameter, indehiscent, surrounded by a membranous, circular wing, more or less pleated, giving it a “flying saucer” appearance. The young fruits are light green and turn light brown when dry. The seeds are kidney-shaped to oblong, bearing numerous stiff, entangled, spiny hairs on both sides, straw-coloured at maturity, and persisting on the tree for a long time (Arbonnier, 2004).

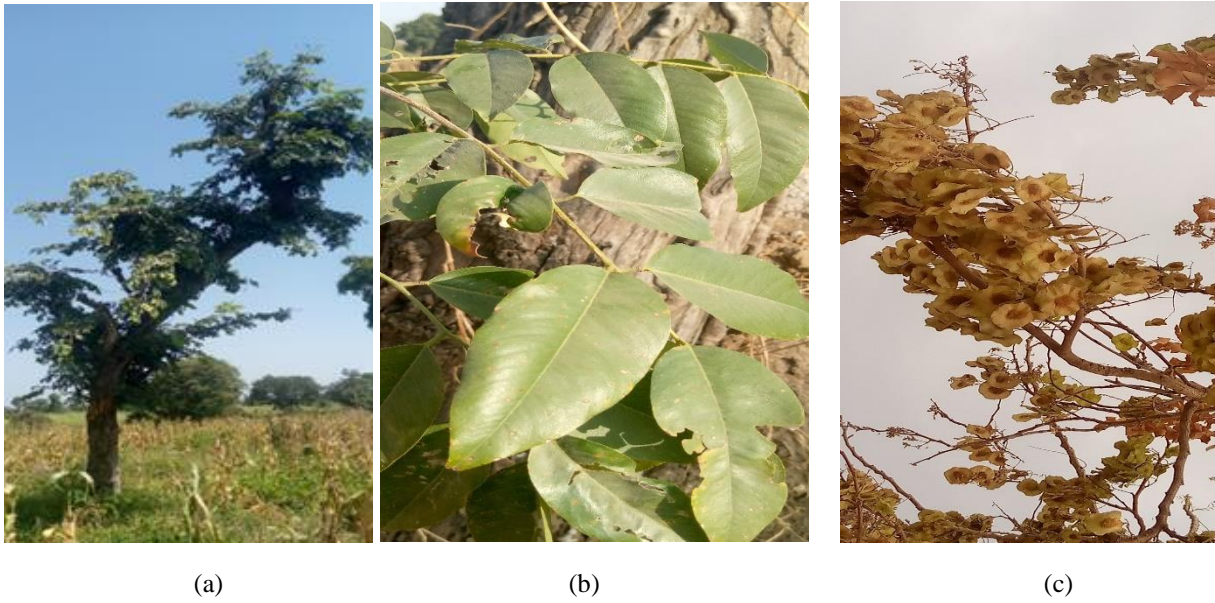


Figure 2.1: *P. erinaceus*: a) Tree b) Leaves c) Mature fruits (Photo credit Ngwa)

2.3 Ecology of the species

P. erinaceus is found in open dry forests of semi-arid and sub-humid lands with mean Annual rainfall of 600–1200 mm and a moderately long dry season lasting 8–9 months. The mean annual temperature in the tree’s natural range is 15–32°C, but it tolerates high temperatures reaching over 40°C. The tree grows at low altitudes (0–600 m). It is drought tolerant, and once established, it survives yearly dry seasons. It also survives the yearly savanna bushfires and readily colonizes fallow lands and deforested savannahs. It grows on all types of soils, with a preference for shallow soils, slopes, and slope bottoms (Forest Commission Ghana, 2021).

2.4 Distribution of *P. erinaceus*

P. erinaceus is widespread in the savannah zone of West Africa and some parts of Central Africa. (Adjonou *et al.*, 2019) (Fig 2.2).

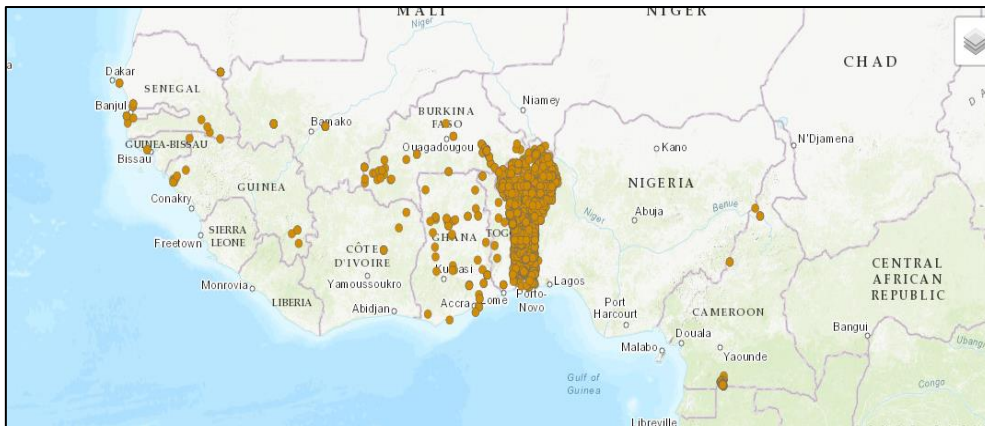


Figure 2.2: Global distribution of *Pterocarpus erinaceus*.

Map taken from IUCN Redlist for the species <https://www.iucnredlist.org/species/62027797/62027800>

It is scattered, common and locally gregarious. (Arbonnier, 2004). It is present up to the latitude of 14°N, but at this latitude, the individuals are small and stunted. From this latitude, the species *Pterocarpus lucens* dominates and is more abundant. In the south, stands of *P. erinaceus* extend to the moist forest limit in Ivory Coast and the humid coastal savannas in Guinea, Togo and Benin, where a gallery species, *Pterocarpus santalinoides*, is common along rivers and temporary streams (Winrock, 1999).

In Sierra Leone, *P. erinaceus* is in the Northern and some parts of the Eastern Province of the country. It is predominant in the savannah woodland of protected and non-protected areas, mainly in the Outamba Kilimi National Park and the Sula Mountain range and its environs. (Foray-Musa, 2020)

In Cameroon, *P. erinaceus* is present in six out of the ten regions of the country: Northwest, Southwest, East, Adamawa, North, and Far North (Betti, 2020). The main areas with vast natural populations remain the Northern regions (Adamawa, North and Far North). It is found in all types of soils but it prefers acidic to neutral, light to medium, and freely draining soils. It occurs in wooded savannahs and open dry forests up to 600-1100 m altitude where annual rainfall reaches 600-1500 mm with a moderate or very long dry season that can last from 8 to 9 months. It can tolerate temperatures up to 40°C, but its range is 15-32°C. (Betti, 2020)

2.5 Socioeconomic importance of *P. erinaceus*

The species is known for its multiple uses in the different regions where it grows naturally. It is widely exploited as timber and is estimated to be the world's most heavily traded tropical hardwood. In addition, it is one of the most demanded woods of the dry forests of West Africa, both for its colour (varying from pink-red to dark brown, with dark streaks) and for the

technological qualities that make it an ideal wood for the manufacture of furniture, decorative panelling, and various utensils (NAS, 1979).

In Ghana, *P. erinaceus* is exploited for timber (lumber, poles, sliced veneer, moulding, plywood), wood fuel (Charcoal and firewood), fodder (foliage, bark, roots) and medicine (foliage, immature pods) (Dumenu et al. 2017) However, it is mainly exploited for timber and wood fuel (charcoal and firewood) while moderately and marginally exploited for fodder and medicine. *P. erinaceus* thus participates daily in satisfying the needs of the population. Arbonnier (2004) also outlined a wide spectrum of therapeutic uses of the species' derivatives: the bark used for wounds, tooth decay, coughs, chronic ulcers, and anaemia; the stem for tooth decay; the fruit for leprosy; the roots for wounds and coughs; roots and leaves for mental illness; the sap for deworming, eye disease, ringworm, diarrhoea and dysentery, female sexual sterility.

In Niger, *P. erinaceus* is the only green fodder during the hunger season (April– June). The fodder collection is generally focused on young leaves and flowers. Just as there is a lack of good knowledge of this plant, in the same way, there is intense marketing of its derivatives and ineffective forest ecosystem management plans, which is a major cause of the sharp decline in its population (Guedje, 2003). The Dandy communities are distinguished from other ethnic groups with a larger number of diseases treated with the species, including gastric problems, anaemia, fever, sexual weaknesses etc. (Adjonou *et al.*, 2019).

In Togo, the Para-Gourma, Kabyè, and Tem communities use the species to treat more than 18 diseases, including impotence, anaemia, menstrual periods, and dermatoses such as skin scurf, intestinal wounds, and white losses in women. In addition, in Kabyè and Tem communities, the organs of the species are also used to facilitate delivery in pregnant women, cure ringworm and scorpion bites, etc. (Adjonou *et al.*, 2019).

2.6 Factors influencing the rate of exploitation of *P. erinaceus*

Several factors have influenced the exploitation of rosewood. According to Treanor (2015), the rapid increase in demand for rosewood in China, which serves as one of the top markets and biggest consumer of rosewood in the manufacture of luxurious furniture and musical instruments, has led to increased illegal exploitation. Akpona *et al.* (2017) pointed out that this species' local and international trades are increasing and suggested the need to integrate its management into national afforestation programs. Suitable management and restoration activities are fundamental and can help to mitigate erosion and desertification effects. Despite

the overuse of this species, producing countries lack scientific and technical information to guide its protection and integrate the species into reforestation programs (Segla *et al.*, 2015).

2.7 Role of *P. erinaceus* in its ecosystem

P. erinaceus is an important leguminous species in its habitat: the species fixes atmospheric nitrogen through a symbiotic relationship with the soil bacteria. The species is one of the main components of wooded savannah habitat and can survive bushfires throughout the year (Betti, 2020). By contributing to curb the current illegal and unsustainable exploitation of the species for international trade, compliance with CITES in the production of NDF will help protect the unique habitats of *P. erinaceus* by protecting this important key species, according to Betti (2020).

2.8 Review of significant trade (RST) in *P. erinaceus* in range States

The CITES Appendix II listing of *P. erinaceus* in 2017 required all exporting countries to certify that the trade was legal in origin and would not negatively impact the survival of the species. According to CITES CoP17 Prop. 57 (2016), the increase in trade of *P. erinaceus* timber is as a result of rising demand in Asia for rosewood furniture and increasing scarcity of other officially recognized ‘rosewood’ species.

CITES Parties reported importing over 825,000 cubic metres of *P. erinaceus* logs in 2017 (a cubic meter of kosso is estimated to weigh on average roughly one metric ton, each log weighs about 200 kg, and each log is equated to one tree, so 825,000 metric tons divided by 200 kg gives an estimate of 4,125,000 trees). Based on these data, Nigeria was the highest exporter of 475,101m³, Gambia 132,121m³, Ghana 93,215m³, Sierra Leone 55,119, Mali 50,083m³, Benin 19,962m³ and Burkina Faso 68m³ of the volume in 2017 (UNEP-WCMC, 2017).

2.9 Threats to *P. erinaceus* and drivers across range States

The major threat to the species is illegal logging for international commercial trade. Farmers and illegal loggers harvest large diameters altering the population structure of the species in off-reserve areas in Ghana according to USAID/WA BICC (2021). Felling of the small diameter size-class tree for charcoal making and illegal logging of bigger diameter size-class trees fuelled by international trade remain the biggest threats to the survival of the species in the wild.

Inappropriate agricultural practices, frequent bushfires and fuelwood collection by rural dwellers also contribute to the destruction of the species from saplings to matured trees.

There is no scientific basis to determine the conservation status of rosewoods in terms of its current population to make informed decisions about the sustainability of trade in the species in the range States. The lack of these basic facts about the population status of rosewoods limits the relevant institutions charged with making management decisions from setting quotas where relevant as a management tool to ensure that any kind of use of the species does not have a detrimental effect on its population in the wild (USAID/WA BICC, 2021)

2.10 State of exploitation, threats and regeneration of *P. erinaceus* in Cameroon

In Cameroon, the current exploitation and processing of *P. erinaceus* do not follow any established management standards. There is no real international trade for *P. erinaceus* timber, but it is sawn in the wild illegally and is increasingly in demand. Timber obtained illegally from Cameroon is exported to China via Nigeria. In the past, the main threat to the species was the overexploitation of branches for animal fodder. With Chinese demand in recent years, illegal and uncontrolled harvesting is likely to become the main threat. Hence the urgency of anticipating and taking measures to regularize this new form of exploitation. (Betti, 2020) Natural regeneration is often abundant and the species can be very invasive if protected from grazing for a few years (Duvall, 2008).

2.11 Management status and CITES compliance

CITES recommended that West and Central African states with domestic legislation in place prohibiting the export of timber and timber products, establish a voluntary 'zero export quota' for *P. erinaceus*. Also, at its 70th meeting, the CITES' Standing Committee (SC) requested the CITES Plants Committee (PC) to consider the inclusion of *P. erinaceus* from all range States in the Review of Significant Trade process (CITES, SC70, 2018).

In line with the findings outlined in document CoP18 Doc. 343 that very few countries in West and Central Africa have the capacity for making robust scientific-based non-detriment findings, no range State of *P. erinaceus* demonstrated that the provisions of Article IV of the CITES Convention were being met. Further guidance and capacity building in relation to timber NDFs is therefore required across all the range to ensure that any future exports are science-based and

that ongoing adaptive management is in place, which could be addressed through the implementation of Decision 18.93, paragraph c of Cop 18.

2.12 Management and conservation of *P. erinaceus*

Apart from adopting an export quota system as part of species trade management, other conservation measures have been deployed to enhance the population of the species. According to a report of the Forestry Commission of Accra, (2021), these measures include the strict prohibition of species harvest in wildlife protected areas and forest reserves, enforcement of a national ban on harvesting and export of *P. erinaceus*, the establishment of research, monitoring and plantation development programmes, encouraging citizen planting, community sensitization and restriction on size-class harvesting, and conducting capacity building training programmes on species identification and detection for enforcement agencies including police and customs officers.

2.13 Forest Management in Cameroon

The 1994 forestry law that lays down regulations on forest, wildlife and fishing and also the Prime Ministerial Decree of August 1995 that lay down the procedure for implementing the forests policy by public bodies are all instruments used to come up with a set of principles, criteria and indicators of legality in Cameroon. They are laid down to encourage the rational exploitation of forests and ensure the protection of biodiversity and nature. The 1994 law divides the national forest estate into permanent and non-permanent forest estates. The law provides that the permanent forest category covers 30% of the national territory. Decision N° 0209/D/MINFOF/CAB of 26 April 2019 classify Special Forest Products (SFP) and Non-Timber Forest Products (NTFP) and fix the list of those presenting a particular interest over the national territory. Cameroon forest is divided into permanent and non-permanent forest estates. Stands of *P. erinaceus* are present in both forests. Permanent forest estate includes state and council forests, while non-permanent forest estate includes national, community, and private forests.

2.14 Forest degradation in Cameroon

The Cameroonian Ministry of Forests and Wildlife estimates the country's forest cover at about 22.5 million hectares (PFBC 2007; MINFOF 2008). More recent estimates, however, list about

19.6 million hectares (PFBC 2007). Over the years, Cameroonians' deforestation rates varied widely according to the method and the period used for the assessment (MINFOF and FAO 2005). In 2005, the Ministry and the FAO (2005) estimated the rate of deforestation in Cameroon over the previous 30 years at about 100,000 hectares per year (0.48%/yr), while more recent estimates focussing only on forested areas indicate much lower rates (0.14%/yr), albeit over the decade 1990-2000 (Duveiller *et al.* 2008). Fuelwood collection and agricultural expansion are often listed among the leading causes of forest loss (MINFOF and FAO 2005), while logging is mainly mentioned in the literature as a source of forest degradation.

2.15 Management of CITES in Cameroon

Cameroon signed the CITES Convention in June 1981 and ratified it in September of the same year. The government of Cameroon appoints three CITES organs to manage CITES issues: the Management Authority (MA) and Scientific Authority (SA) for Flora and SA for Fauna.

❖ CITES Management Authority

Cameroon's CITES Management Authority belongs to the Ministry of Forestry and Wildlife, Department of Forest, Sub-Directorate of agreements and permits, and Service of Intervention Norms in the forest sector. This service is in charge of allocating annual quotas to logging companies and issuing CITES permits for export. The service is also concerned with elaborating, diffusion, and monitoring the respect of qualitative logging norms and forest certification norms.

❖ CITES Scientific Authority for flora

The National Forest Development Agency (ANAFOR), whose primary mission consists of assisting the public sector, private and local communities in developing plantation forests and forest concessions in the implementation of their management plans in Cameroon, was appointed in the March 2006 Decision to play the role of the CITES Scientific Authority for plants issues in Cameroon. Hence, its mission involves advising the CITES Management authority (ANAFOR, 2009).

2.16 Forestry law and legislative instruments in Cameroon

The forestry law N° 94/ 01 of 20 January 1994 divides the national forest estate into permanent and non-permanent forests. This law ensures that the permanent forest category covers 30% of

the national territory. The permanent forest estate comprises lands solely for forestry or as a wildlife habitat. It is subdivided into State and council forests. State forests are divided into two categories: Wildlife Reserves and Forest Reserves. Wildlife Reserves include national parks, game reserves, hunting areas, game ranches, wildlife sanctuaries, buffer zones and zoological gardens belonging to the State.

In contrast, Forest Reserves include integral ecological reserves, production forests, protection forests, recreation forests, teaching and research forests, plant life sanctuaries, botanical gardens and forest plantations. Finally, non-permanent forest estate comprises forest lands that may be used for purposes other than forestry and are divided into national forests subject to future conversion into other forest management and agropastoral areas; community forests allocated by the State to communities that request them for collective leadership following a simple management plan; and private forests which are planted and owned by individual or group of individuals or corporate bodies according to laws and regulations in force (TRAFFIC, 2017). Below is a diagrammatic presentation of the categorization of the forest estate in Cameroon.

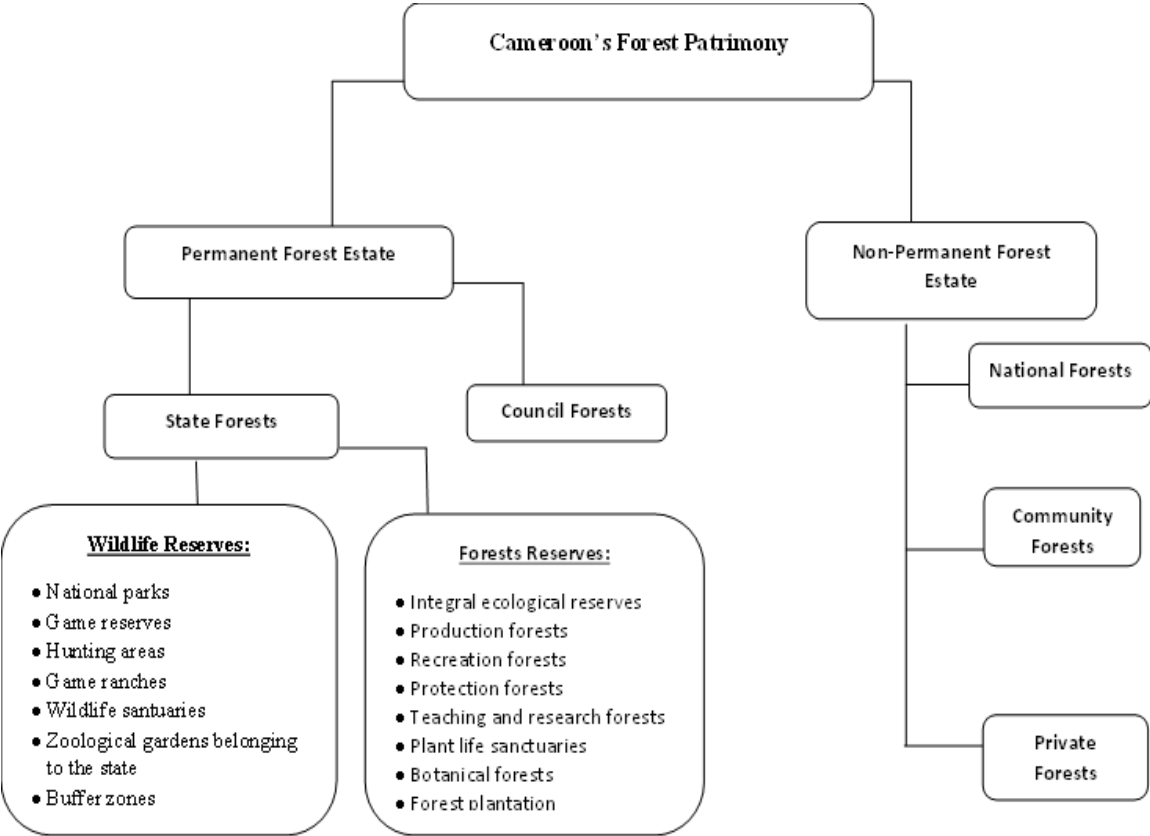


Figure 2.3: Categorisation of Cameroon’s Forests Estates.
Source: Adapted from the Law n° 94/01 of 20/01/1994 to lay down forestry and wildlife regulations.

Therefore, the January 1994 law laying down Forestry, Wildlife and Fisheries regulations is one of the key instruments used to develop a set of principles, criteria and indicators of legality in Cameroon.

2.17 Classification of special forest and non-timber forest products (NTFP)

Special forest products and NTFP are classified into three categories according to Decision N° 0209/D/MINFOF/CAB of 26 April 2019:

Category A are Forest products that are threatened, with a high economic value and a high socio-cultural significance.

Category B are less threatened and are medium-scale traded forest product, having medium socio-cultural importance with high commercial value.

Category C are non-threatened forest products

3. METHODOLOGY

3.1 Presentation of the study zone

3.1.1 Geographical location

This research focused on *Pterocarpus erinaceus* in the North Region of Cameroon located between 7°30' – 10°5'N and 12°00 – 15°7' E. It is bounded to the north by the Far North Region, to the east by the Republic of Chad and the Central African Republic, to the south by the Adamawa Region and to the west by the Federal Republic of Nigeria. It covers a surface area of 66 090 km² and has a population of 2 050 229 inhabitants (2010 estimates). It is made up of the following Divisions: Benue (our study area), Faro, Mayo – Louti, Mayo – Rey.

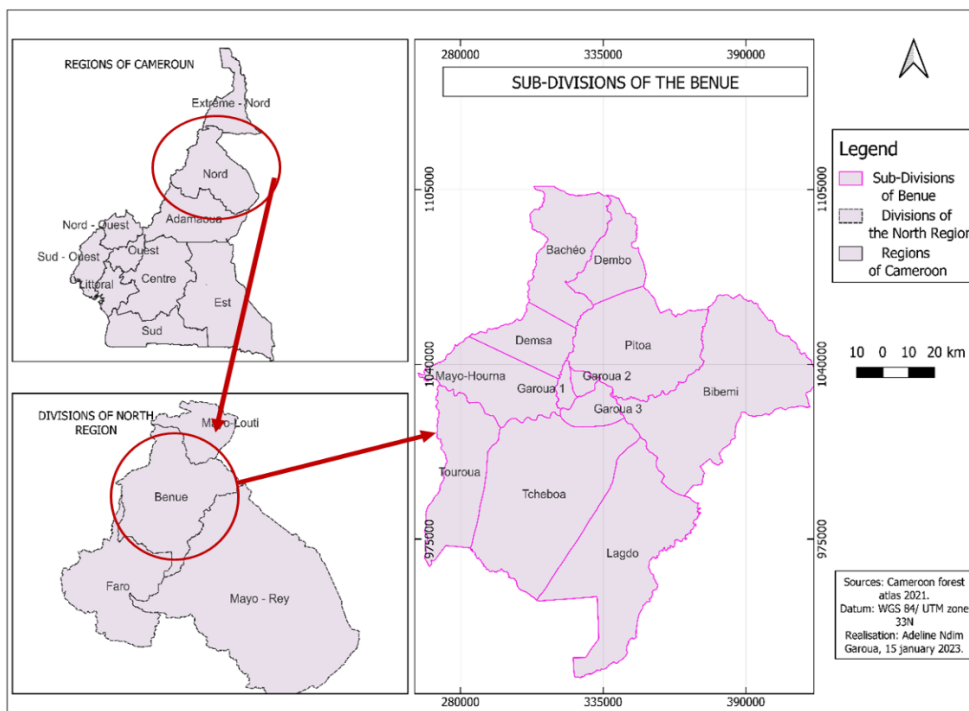


Figure 3.1: Map showing the location of study area

3.1.2 Climate

The lower latitude of the North Region comprises the Sudanian climate and moving northwards it gradually transforms to the Sahelo-Sudanian climate type. The Benue depression constitutes the North Region's primary land feature. The climate is Sudanese with high temperatures averaging 24 °C in the south along the plateau. In the Depression, they rise to 26 °C. North of the depression, average temperatures climb as high as 28 °C. The average rainfall is between 900–1200 mm per year, decreasing from south to north due to elevation. Garoua, the major city, thus receives between 500–1000 mm per year. Rainfall in the Benue basin is unpredictable,

though it rarely drops to less than 1000 mm in any one year. Six months of dry season, cold from November to February, following months of increasingly strong heat until the arrival of the rains. North of the Benue basin, a Sahel climate prevails. Here, the dry season lasts longer, and temperatures reach even higher levels. The rainy season starts in mid-May and goes to early September with July and August recording the highest precipitation (600-900 mm). The temperature of the area ranges between 27 and 43 °C at the peak of the dry season.

3.1.3 Vegetation

The North Region is a land of savanna. This begins with the wooded savanna on the Adamawa Plateau with its thick grasses and isolated copses of trees. This territory was once heavily forested, but repeated burning and livestock trampling has left this original vegetation only in the valleys. Moving north, the wooded savanna gradually gives way to the Sudan savanna or parkland savanna in the Benue Depression. Here grass cover thins out, trees become fewer and more isolated, and stunted shrubs become more prevalent

Species such as *Combretum glutinosum*, *Terminalia avicennioides*, *Acacia dudgeon* etc characterise shrubby or wooded savannahs on rocky or hard-pan soils. The different soil types of varying depths are dominated by species such as *Acacia seyal*, *Anogeissus leiocarpus*, *Vitellaria paradoxa* etc. The wooded savannahs and open forests comprise *Anogeissus leiocarpus*, *Isobertinia doka*, *Pterocarpus erinaceus*, *Parkia biglobosa*, *Boswellia dalzielii*, *Balanites aegyptiaca* etc. The gallery forests are concentrated in depressions, where the dominant trees prevent grass growth. They are not generally affected by bush fires and comprise trees between 15-30m tall, such as *Azalia Africana*, *Daniellia oliveri*, *Khaya senegalensis*, *Acacia polyacantha* etc. There are also bushy shrubs between 4-10m tall like *Sarcocephalus latifolius*, *Keetia venosa* etc and scrambling shrubs like *Paulinia pinnata*, *Opilia celtidifolia* etc.

3.1.4 Relief

The Benue Depression constitutes the North Region's primary land feature. This basin runs along the Mayo Kébi and Benue River and has an elevation of between zero and 200 metres. South of the Benue Depression lies the Adamawa Plateau. This descends to the Depression in escarpments and peaks of between 1000–2000 metres that follow a major fault. Past this frontier region, the plateau slopes south and southeast into the Adamawa Region and Chad. The North's third significant land feature is the Mandara Mountains and their southern extension, the Atlantika Mountains, the likely results of tectonic activity. These chains form most of the

western edge of the region, with peaks as high as 1000 metres. The mountains continue north into the Far North Region and Nigeria, though their elevations gradually drop to as low as 500 metres. The North's highest elevation is Hosséré Vokré, an isolated peak of 2,049 meters.

3.1.5 Hydrology

The Benue being the main river basin is fed by tributaries from three catchment areas: the western highlands, the Adamawa highlands and the Mandara mountains. These streams flow into the river Benue before joining the Niger in Nigeria. It rises from the central northern slopes of the Adamawa. The tributaries which originate from the eastern sector are the Mayo Rey and Mayo Godi. From the central region is the Mayo Farda from the Poli mountains. The Faro, Mayo Njal and Mayo Deo, which form the western arm of the tributaries of the Benue, all converge to join the Benue at the exit point into Nigeria. The main tributary from the Mandara mountains is the Mayo Louti. To the south of the Diamare plain is the Mayo Kebi and its tributaries flow through the Republic of Chad before meeting with Mayo Kebbi.

3.1.6 Soils

The soils are of the ferruginous type. The subsoil consists of Gneiss. The most frequent soils are characterized here by a clayey, sandy, clayey-sandy texture and are hydromorphic with very low levels of chemical fertility. Vertisols are present in localities traversed by Mayos and permanent rivers. The strong presence of clay or clay-sandy soils in the Benue basin requires the presence of flood-prone marshy areas. The soils of the region are granitic, metamorphic and sedimentary due to past volcanic activity. Well-drained ferralitic soils, hydromorphic mineral soils and tropical ferruginous soils are the different soil types in the area.

3.1.7 Wildlife and protected areas

The North Region is composed of three National Parks (Benue 180,000 ha, Faro 330,000 ha, Boubou Ndjidda 220,000 ha) and 27 hunting zones (ZIC) or hunting reserves.

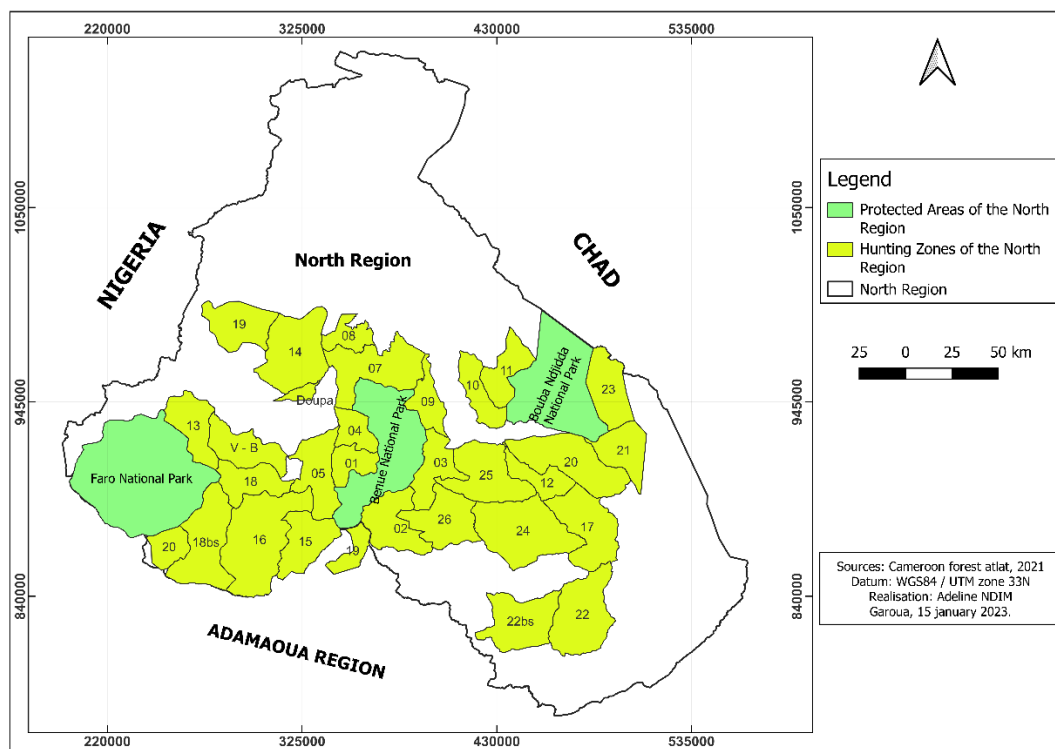


Figure 3.2: National Parks and Hunting zones in the North Region

This vast network of protected areas represents nearly three million hectares, or 44% of the region's territory. They straddle between three of the four Divisions, namely the Benue 13,614 km², Faro 11,785 km², and Mayo-Rey 36,520 km², the 4,162 km² of Mayo-Louti are not concerned. The main environmental constraint in this savannah area is drought and strong anthropogenic pressure in the parks and hunting areas. The geographical location of this Region between the forest and Sahelian domains explains the wildlife potential of the region. However, population growth, combined with the consequences of a series of successive droughts, has enhance overexploitation of free agricultural and pastoral land thereby promoting illegal activities in the protected areas. Wildlife species of large and medium mammals present in these protected areas include the savanna elephant, lions, giraffes, panthers, hyenas, bush pigs, hippopotamus, buffon's kob, wild dogs, etc.

3.1.8 Human communities

Regional communities are composed of many ethnic groups, farmers such as the Dourou, the Koma and the Laka, in the south, the Guidar and the Daba in the north, the Fali in the center, politically dominated by the Fulani (or Fulbé), farmers-herders, trading ethnic groups such as the Hausa and the Bornouan. The migrant ethnic groups are mainly from the Far North Region and Chad. These ethnic groups include the Guiziga, the Toupouri, the Mafa or Matakam, the Moufou, the Moudang, the Massa, the Laka, the Gambaye, the Sara, the Lélé, and the Bororo.

Migrant ethnic group from Chad includes the Lakas, Lamés, Gambais, Keras, Mambaïs, Saras, Marbas while the Hausa come from Nigeria. The indigenous ethnic groups are the Fulbe, the Fali and the Bata. The Fulbe are Muslims, while the Fali are animists.

3.1.9 Agriculture and livestock rearing

The North region with 600-1000 mm of rainfall is dominated by crop cultivation. Agriculture and livestock employ 90% of the population. The main crops produced are cotton, groundnuts, cereals (maize, white millet, red millet, sorghum, soybeans), tubers (yams, cassava). There is also a minor mixed crop-livestock farm system where semi-nomadic or sedentary livestock farmers who cannot afford to maintain their animals through the dry season, but have to entrust them to nomadic herdsman due to a shortage of forage during the dry season especially in the months of January to April. During this period most of the scanty vegetation in the Sahelian zone becomes desiccated and the standing hay is often completely destroyed by animals and bush burning so the nomadic herdsman migrate from the Sahelian north to the Sudanian south in search of grazing grounds, thus causing social conflicts with the sedentary crop farmers.

3.2 Methods

3.2.1 Choice of the study area

According to Betti, (2020), *P. erinaceus* is present in six regions of Cameroon namely Adamawa, East, Extreme North, North, North West and South West Regions. A high concentration of natural stands has been observed in the Adamawa and the North Regions (GBIF, 2013). The North Region was selected for this study because it lies within two phytogeographic zones where *P. erinaceus* grows. At the north of the Region is the Sudano-Sahelian zone and at the south is the Guineo-Sudanian zone.

Information from the North Regional Delegation of Forestry and Wildlife showed that stands of *P. erinaceus* are present in the 04 Divisions of the Region (see Figure 3.1) but the Faro and the Benue Divisions which share a porous border with neighbouring Nigeria present a high concentration of the species and illegal exploitation of the species has been felt in these zones. For this study, data collection focused only on the Benue Division because it is the Division with a high distribution of *P. erinaceus* and has witnessed the highest level of illegal exploitation of the species in the region.

3.3 Sampling and data collection

3.3.1 Sampling

Data collected from the Benue Divisional Delegation of Forestry and Wildlife showed the occurrence of *P. erinaceus* in eight out of the twelve sub-Divisions that make up the Division. Among these eight sub-Divisions, data was collected from four sub-Divisions for our study namely: Demsa, Mayo Haourna, Tcheboa and Touroua (Table 3.1). This was based on the abundance and the level of illegal practices that have been ongoing on the species especially in these sub-Divisions as indicated by the Divisional service in charge of forestry in the Benue.

Table 3.1: Sampled sub-Divisions of the Benue Division.

Column 1 identifies the sub-divisions in the Benue Division. Column 2 identifies which subdivisions in the Benue have stands of *P. erinaceus*. Column 3 identifies which divisions were sampled for this study.

I. Sub-Divisions of the Benue	II. Sub-Divisions with stands of <i>P.</i> <i>erinaceus</i>	III. Sampled sub- Divisions
1) Bascheo	X	
2) Bibem		
3) Dembo	X	
4) Demsa	X	X
5) Garoua I	X	
6) Garoua II		
7) Lagdo		
8) Mayo Hourna	X	X
9) Pitoa	X	
10) Tcheboa	X	X
11) Touroua	X	X

The number of villages with stands of *P. erinaceus* in each sub-Division was shortlisted with the help of each village chief and the forestry chief of post of the zone. From each list, three villages were selected using a random method for our sample villages in each sub-Division. A total of twelve villages from the four sub-Divisions were drawn to carry out our study (Table

3.2). A discussion forum was set up within each village involving the chief, his councillors and a cross section of the population of different age groups engaged in different activities.

Table 3.2: Sampled villages from each sub-Division

Sub-Division	Sampled villages	Sub-Division	Sampled villages
Demsa	Bamanga Mayo-Doumsi Mayo-Sahel	Tchéboa	Mala Mafa-Tchéboa Djoutalecdé
Mayo-Hourna	Barndaké Guéréte Tchalaché	Touroua	Kaya Koza Lougoundé

Table 3.3: Sampled rate of villages per sub-Division

Sub-Division	Number of villages with stands of <i>P. erinaceus</i>	Sampled villages	Sampling rate
Demsa	11	03	27.2%
Mayo-Hourna	08	03	37.5%
Tchéboa	11	03	27.2%
Touroua	15	03	20%

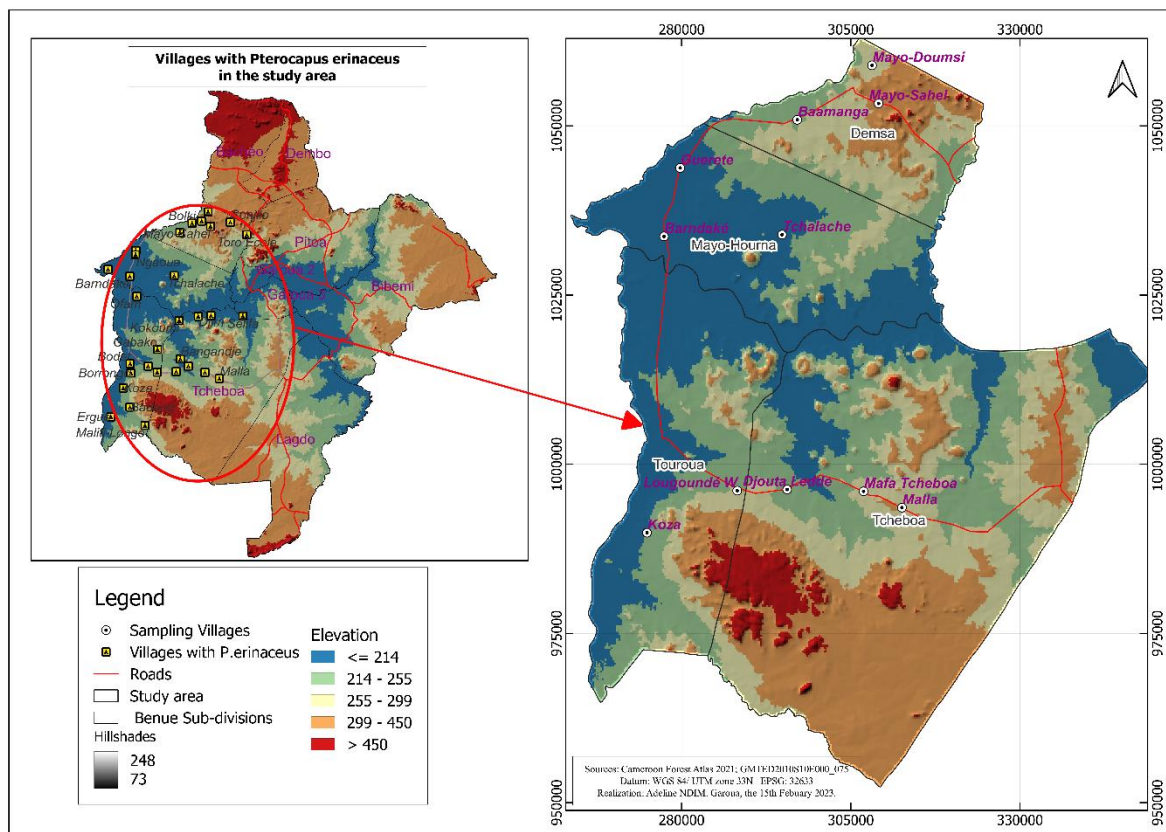


Figure 3.3: Map of sampled villages in the study area

3.4 Data collection

Both primary and secondary data were collected to meet the objectives of this research. A review of existing knowledge on *P. erinaceus* and interviews carried out with resource persons involved in the management of the species.

3.4.1 Secondary data

Internet searches were the main approach used to collect secondary data prior to the field survey, and these were complemented during the field survey by documents provided by resource persons who were interviewed. A review of existing policies, legislation and literature on wildlife conservation, CITES implementation and wildlife trade issues was our focus. Moreso, the library of the Garoua Wildlife College served us with more literature on the species.

3.4.2 Primary data

Primary data was collected based on two major methods: interviews with resource persons and focus group meetings accompanied with field observations. Individual interviews using questionnaires were conducted with the focal point of the CITES Management Authority (MA) and with the Scientific Authority (SA) for flora - ANAFOR (Agence Nationale de

Développement des Forêts), in the capital city to evaluate CITES implementation and policies put in place for the management of forest resources. At the level of the North Region where our study area is situated, individual interviews using questionnaires were conducted with the Regional Delegate for forestry and wildlife (MINFOF) and with the Benue Divisional Delegate for MINFOF to evaluate their knowledge on CITES and the implementation of policies put in place for forest management. Interviews were also administered to the customs agents at the borders with Nigeria to grade their understanding of, and implementation of CITES on forest and wildlife products crossing the borders. Twelve focus group meetings were held in different localities. These meetings were aimed at grading the knowledge of the local communities concerning *P. erinaceus*, precisely the habitat, uses, trade and threats to the species as well as asses their knowledge on the policies put in place concerning the species. In each village, a prior meeting with the chief was held to present the purpose of the study as well as the category of people needed for the meeting. Figure 3.4 represents the composition of members of the different focus group meetings in each locality. These focus groups took into consideration gender, local authorities and forestry officers. The number of participants ranged from 20 to 36 persons.

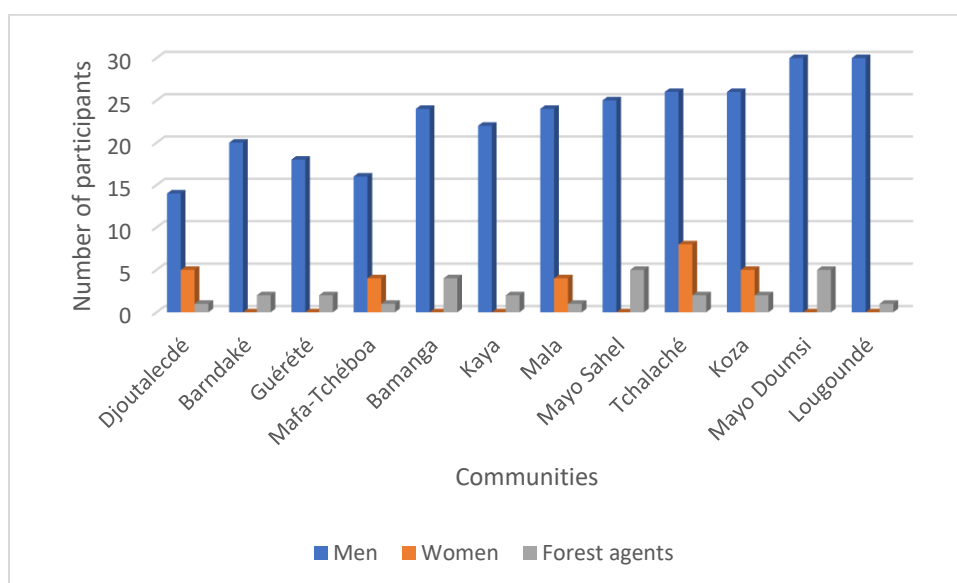


Figure 3.4: Composition of focus group members

3.4.2.1 Evaluate the management framework of *Pterocarpus erinaceus* in Cameroon.

Data to evaluate the management framework for *P. erinaceus* were recorded through guided interviews with Cameroon's CITES MA and the CITES SA for flora. Interview participants were asked to describe the framework set up for the management of forest species in Cameroon, by looking at the strength, weaknesses, opportunities and possible threats of the legal

instruments put in place for the management of *P. erinaceus* in Cameroon and in compliance with CITES. At the regional level, information was collected at the Regional and Divisional Delegations of MINFOF for the North Region through guided questionnaires. Interview participants were asked to describe how the forestry law of Cameroon are implemented in compliance with CITES for the management and sustainability of *P. erinaceus* in the North Region, the measures taken to fight illegal practices and to ensure the sustainability of the species as well as the constraints in the implementation of the legal instruments put in place for the management of the species. Interviews were also conducted with the forestry chief of posts in the study area on their level of understanding of CITES, the execution of legal instruments on the management of *P. erinaceus* and the challenges faced on the implementation of the legislations on the field. These interviews helped us to assess the strength of the law and the limits in the management of this Appendix II listed species.

3.4.2.2 Examine the knowledge, inventory the uses and analyse the threats on *P. erinaceus* by the local communities in Benue Division;

Data were collected through focus group meetings held in twelve different villages of the study area where participants varied between twenty and thirty-six, composed by men, women, youths and chief of posts in attendance. Discussions were interactive where members expressed themselves freely and asked questions where necessary. Discussions were geared towards how much they know about *P. erinaceus*, the importance of the species in each locality, the rate of exploitation of the species and the threats they observe on the species and in its habitat over time.



Figure 3.5: Focus group meeting at Koza village.
Photo Ngwa, 2023

Data was also collected from forestry chief of posts through guided interviews concerning the exploitation and the possible threats they observe on the species during their patrols. This was accompanied with some field observations to measure the degree of the threats. Concerning the

movement of the species across borders, interviews with the custom agents at the borders in our study zone were conducted to evaluate the quantity of the wood crossing the borders.



Figure 3.6: Interview with the forestry Chief of Post
Photo Ngwa, 2022

3.5 Data Analysis

To analyse the first objective, the SWOT analysis was used (Maggie W, 2022). It is a strategic analysis tool that combines the study of the strengths and weaknesses of a structure or organization with that of the opportunities and threats related to its environment, in order to help define a management strategy. The SWOT analysis was therefore used as a strategy to measure the strengths, weaknesses, opportunities and threats of the legal instruments put in place by the State in the implementation of CITES in Cameroon for sustainable management of forest resource.

A qualitative content analysis method (Eunice R, 2020) which is a method that is used to group large amounts of text into codes, summarise them into categories, and possibly even tabulate the data to calculate the frequency of certain concepts or variables, was used to integrate data collected concerning the knowledge of the local communities on the species and the uses of the species by the population. Here, qualitative data was sorted, labelled and coded to identify relevant variables, concepts and themes to obtain our results. Content analysis also provides a small splash of quantitative thinking within a qualitative method. So quantitative data was analysed using Microsoft Excel to produce bar charts and pie charts. Frequencies were calculated by using the formular $f(x) = \frac{n}{N} \times 100$.

The SWOT analysis in combination with the content analysis and field observations, guided in the advancement of measures and recommendations needed to achieve effective implementation of CITES regulations in Cameroon.

ArcGIS version 10.6 was used to produce the map of the study area and also to show the sample villages in the study area.

4 RESULTS AND DISCUSSIONS

4.1 Results

4.1.1 Evaluation of the management framework of *P. erinaceus* in Cameroon

Management of forest resources in Cameroon is guided by a legal and regulatory framework put in place by the State and an institutional framework set up for the execution of the legal instruments. Several regulatory instruments, frameworks and guidance notes have been developed to ensure proper management, monitoring and control of forests and forest resources in Cameroon (see Annex F). Therefore, the strategy, maximizing the potential of strengths and opportunities and minimizing the effects of weaknesses and threats need to be taken into account for the sustainable management of *P. erinaceus* and proper implementation of CITES in Cameroon.

4.1.1.1 Evaluating the strength of the legal, regulatory and institutional framework in Cameroon

1. The forestry law of Cameroon

The management of forest resources in Cameroon is regulated by Law No. 94/01 of 20 January 1994 on forestry, wildlife and fisheries signed by the President of the Republic. Its implementing instruments include, among others Decree No. 95/53/PM of 23 August 1995 fixing the procedure for implementing the forestry regime. These legal instruments comply with those of international Conventions ratified by Cameroon in the domain of sustainable management and trade in forest and wildlife resources, one of which is the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).

2. Implementation of CITES in Cameroon

The Ministry of Forests and Wildlife performs the function of the CITES Management Authority (MA) in Cameroon with the Departments of Forests and that of Wildlife and Protected Areas being the CITES focal points. The MA is accompanied by four Scientific Authorities, three for flora and one for wildlife. The expertise of the MA has led to the inclusion of sixteen (16) forest species of Cameroon into the CITES appendices (see figure 4.1).

Cameroon signed the CITES Convention in June 1981 and ratified it in September of the same year. To guarantee the effective implementation of this Convention, and in pursuance of the relevant provisions of its Articles 8 and 9, Cameroon adopted three legislations: on the

enactment of a number of provisions of the Convention, the organisational set-up and operational procedure of the Inter-ministerial Coordination and Monitoring Committee for the implementation of the Convention and another on providing the designation and definition of the role of the CITES Scientific Authority in Cameroon (see Annex F).

3. Classification of forest products

The 1994 forest law provide for the classification of special forest products and NTFP in three categories (A, B and C). Decision N° 0209/D/MINFOF/CAB of 26 April 2019 enact this law. A forest product can be reclassified taking in to considerations its classification at the level of CITES where species are classified in App I, II and III. This was the case with *P. erinaceus* which was formally not classified in the list of protected species in Cameroon but when it was upgraded to App II in CITES in 2016, eventually it was directly classified in category ‘A’ as a special product following a Ministerial Decision of February 2022 (see Annex).

4. Exploitation of forest products

According to the forestry law of 1994, forest products can be exploited in the permanent and non-permanent forest estate.

In the permanent forests estate, which are lands that are used solely for forestry and/or as a wildlife habitat, species can be exploited from:

- a) Council forests which is forest zoned within the permanent forest domain, classified on behalf of the local council or is forest that has been planted by a local council. In order to retain title to the forest area, the commune must abide by the management plan.
- b) Forest Management Units (FMU) which are forests that are zoned for biodiversity conservation and sustainable management. It requires a forest management plan approved by a relevant authority as stipulated by article 46 of Decree n°95/53/PM of 23 August 1995. Exploitation of the wood can only be accorded through an Inter-ministerial Commission which accord a quota in compliance with the abiding regulations of CITES.

In a non-permanent forest estate (unclassified land), in accordance with the forestry law, a forest species can be exploited from:

- a) Sales of Standing Volume (SSV) which are forests zoned for timber extraction, agricultural, mining, and other uses. SSVs are allocated by a competitive bidding

process for a maximum of 3 years, not exceeding 2,500 ha, and do not require a management plan as stipulated in the forestry law.

- b) Community Forests (CF) which are areas zoned for use by village communities not exceeding 5,000 ha. These forests must have simple management plans approved by the services in charge of forest and proceeds from such forest management are used for community development projects.

Only nine community forests are in the Benue Division but are not functional because of no management plans.

5. The Ministry of Forestry and Wildlife (MINFOF)

The Ministry of Forestry and Wildlife (MINFOF) is in charge of the management of the forest and wildlife sector in Cameroon. It has a well-structured system and also functions in close collaboration with other ministerial institutions and partner NGOs which provide technical and financial support to the proper management of forest resources.

a) Services in the Central Administration

Decree N°2004/320 of 08 December 2004 defines the Organisational Chart of MINFOF and specifies the services involved in monitoring and control of forest resources as follows:

- **The General Inspectorate** which controls the internal functioning of services hence the monitoring of the respect of control procedures by competent services;
- **The National Brigade for Control and Anti-Poaching (NCB)** in charge of the implementation of Government Strategy on forestry and wildlife control, control of the implementation of regulations, monitoring of offences.
- **Department of Forestry** according to the forest code of 1994 is in charge among other things undertaking an inventory of forest resources, verification of the conformity of forest activities with inventories; monitoring the implementation of detailed and simple management plans.
- **Department of Promotion and Transformation** is in charge of monitoring the respect of processing norms, exploitation and commercialisation of NTFP, respect of norms for export of forest products (CITES, dimensional standards, and quotas). the implementation of management plans.
- **The Legal Unit** participates in the elaboration of the National Brigade for Control and anti-poaching (NCB) mission reports in conformity with the recommendations of the

Review Committee, assist control structures in taking statements of offenders. control officers in judicial and legal procedures.

b) The External Services of the Ministry

They represent the Central Administration where they undertake the same and/or similar roles and responsibilities in their respective territories.

- Technical Operation Units (TOU) are in charge of monitoring and control within their geographical limits.
- Forestry and wildlife control posts are in charge of monitoring and control of the application of forestry and wildlife legislations in their jurisdiction; physical control (hammering, inspection of limits) of logging permits; control of hunting zones and hunters within their territories of competence.
- At checkpoints in their territory, the legality of transported forest products is verified.

c) Other Ministerial Services involved in forest management

- The Ministry of Defence, Secretary of State for Defence in charge of Gendarmerie (SSD) who support the staff of MINFOF in operations against poaching and illegal loggers.
- The General Directorate for Public Security (DGSN) being judicial police officers with general jurisdiction, have the responsibility to control illegally exploited forest products as well as assisting MINFOF staff when requested to conduct searches, arrest offenders and keep them under probationary custody.
- The Ministry of Justice and Keeper of Seals (MINJUSTICE) who coordinates the actions of all judicial police officers in his jurisdiction, including the MINFOF controllers who are judicial police with special jurisdiction.
- The Ministry of Finance (MINFI) through the General Directorate of Customs who control certificates of origin for forest and wildlife products for export, timber specifications, export taxes and CITES permits.

d) Partners to MINFOF:

- **National and International Civil Society Organizations:** They provide technical and financial support, capacity building and law enforcement assistance. They include international NGOs like IUCN, WWF, WCS, TRAFFIC and national NGOs like Cameroon Environmental Watch (CEW), Centre for Environment and Development (CED).

- **Regional organisations:** COMIFAC has the mandate to assist its member countries of the Central Africa sub-region to manage their forest ecosystems.
- **Local communities and indigenous people:** They have a role in the surveillance of forests in their territories by denouncing all forms of illegal activities.
- **Decentralise communities (councils):** They create forest management units that control all activities in the forest including monitoring and control.

6. Forest species in Cameroon listed in CITES

Before CoP19 held in Panama City last November 2022, Cameroon had 5 timber-producing species registered in the CITES App II listings. Among the 52 Proposals submitted by Parties and reviewed and analysed by the CITES Secretariat, three genera of timber-producing tree species submitted by Cameroon were validated namely *Pterocarpus*, *Azelia* and *Khaya*. Cameroon now has 16 timber species from 6 genera belonging to 3 different families listed in CITES all in App II as seen in table 4.1. This number put Cameroon among the countries with the highest number of species listed in App II. 11 of these species were just recently listed and are still pending the elaboration of robust NDFs.

Table 4.1: Cameroon timber producing species in CITES

Family	Genera	Species	Appendix	NDFs	Export permits	Ecosystem
FABACEAE	<i>Guibourtia</i>	<i>Guibourtia demeusei</i>	II	Yes	Yes	Forest
		<i>Guibourtia pelligreniana</i>	II	Yes	Yes	Forest
		<i>Guibourtia tessmannii</i>	II	Yes	Yes	Forest
FABACEAE	<i>Pericopsis</i>	<i>Pericopsis elata</i>	II	Yes	Yes	Forest
ROSACEAE	<i>Prunus</i>	<i>Prunus africana</i>	II	Yes	Yes	Savanna/dry forest
FABACEAE		<i>Pterocarpus erinaceus</i>	II	No	No	Savanna
		<i>Pterocarpus mildbraedii</i>	II	No	No	Forest
		<i>Pterocarpus soyauxii</i>	II	No	No	Forest

	<i>Pterocarpus</i>	<i>Pterocarpus zenkeri</i>	II	No	No	Forest
MELIACEAE	<i>Khaya</i>	<i>Khaya senegalensis</i>	II	No	No	Savanna
		<i>Khaya anthoteca,</i>	II	No	No	Forest
		<i>Khaya ivorensis</i>	II	No	No	Forest
FABACEAE	<i>Afzelia</i>	<i>Afzelia africana</i>	II	No	No	Savanna
		<i>Afzelia bella,</i>	II	No	No	Forest
		<i>Afzelia bipindensis</i>	II	No	No	Forest
		<i>Afzelia pachyloba</i>	II	No	No	Forest

Source: Ngwa, 2023

4.1.1.2 Weaknesses of the legal, regulatory and institutional framework

1. The 1994 forestry law which seems to be outdated in relation to the current context of decentralization and consideration of the legitimate needs and respect for the rights of local populations;
2. All legal and technical instruments for the sustainable management of natural production forest are available and of good quality but the main problem is execution, that is, making people to apply the text put in place;
3. Knowledge on CITES limited to a few working directly in the Management and Scientific authorities giving a lot of ignorance on CITES issues by those involved in forest and wildlife management;
4. The 1994 law and its decree of application does not take into considerations the exploitation of species on permanent and non-permanent forest in the savanna zone of Cameroon where species are of low densities;
5. Insufficient trained CITES personnel to handle tasks in the MA and SA of CITES especially in the elaboration of non-detriment findings, species identification, identification of fake permits, etc;
6. Insufficient trained personnel especially at the technical operation units in the external services of MINFOF to carry out field operations as well as limited materials for field operations;
7. Non-respect of exploitation norms and quotas;
8. Poor knowledge in identification of forest products at border and internal control posts both by foresters and custom controllers especially when they have been transformed;
9. Difficult procedure to acquire forest management plans.

4.1.1.3 Opportunities in the legal and institutional framework

1. The MINFOF, through the MA focal points should organise training workshops for MA and SA staffs on matters of CITES especially as new species have been included in the CITES Appendix II.
2. With the two training schools under the MINFOF (the Forestry School of Mbalmayo and the Garoua Wildlife School), more youths should be trained and the government recruited them and deploy in the field.
3. With the presence of many international partners, the government can lobby for field materials and vehicles to equip those in charge of the execution of the legal instruments on the field.
4. With the high value of rosewood and the high demand in the international market, the government through the MINFOF should promote the creation of plantations of *P. erinaceus* as well as arboretums. This will as well help in the fight against desertification in the fragile ecosystem of the sudanianSudanian and Sahelian zone of Cameroon where this species is native to.

4.1.1.4 Threats on the legal and institutional framework of management

1. Corruption of forest officials as a result of non-respect of legal instruments is felt at all levels;
2. The long and porous border between Cameroon and Nigeria facilitating illegal activities;
3. Low educational levels of the local communities and limited means of subsistence;
4. Climatic factors (long dry seasons that give rise complete shading of leaves of most species, frequent bushfires, fragility of the soils)

4.1.2 Knowledge of local communities on *P. erinaceus* species in the Benue Division of the North Region of Cameroon

This result was obtained based on the understanding of the local population on the behavioural pattern of *P. erinaceus* species, its habitat and sociability with other species.

4.1.2.1 Prior knowledge on the species

All the communities in the study have a basic knowledge on *P. erinaceus* species. It is worth noting that the indigenes knew about this species through their ancestors who were using it most specially to boost the blood level of those who were anaemic especially children and pregnant women. Some immigrants knew about this species from the multiple medicinal uses

it serves to the indigenous population. The communities all have different appellations (Table 4.2) for the species which are all translated as ‘blood tree’ according to their different ethnic languages.

Table 4.2: Local appellation of *P. erinaceus* by different communities

Locality	Local name for <i>P. erinaceus</i>	Local language	Locality	Local name for <i>P. erinaceus</i>	Local language
<i>Guéréké</i>	Iyami	Fulfulde	<i>Mayo Doumsi</i>	Pounoudji, kalahi	
<i>Lougoundé</i>	Banuhi	Fulfulde	<i>Kaya</i>	Iyamwal Goko	Fulfulde
<i>Mafa-Tchéboa</i>	Ndozo	Mafa	<i>Koza</i>	Tsnacdok Ndoozog	Mafa
<i>Djoutalecdé</i>	Gooko	namji	<i>Tcharatche</i>	Kochi	Toupouri
<i>Mala</i>	Kohal Banuhi	Matan Fulfulde	<i>Mayo Sahel</i>	Iyami	Fulfulde
<i>Bamanga</i>	Iyami	Fulfulde			

Source: Ngwa, 2023

4.1.2.2 Knowledge on the habitat of *P. erinaceus* in the Benue Division

According to the respondents, *P. erinaceus* grows on different topographies and also on different soil types as seen in figure 4.1.

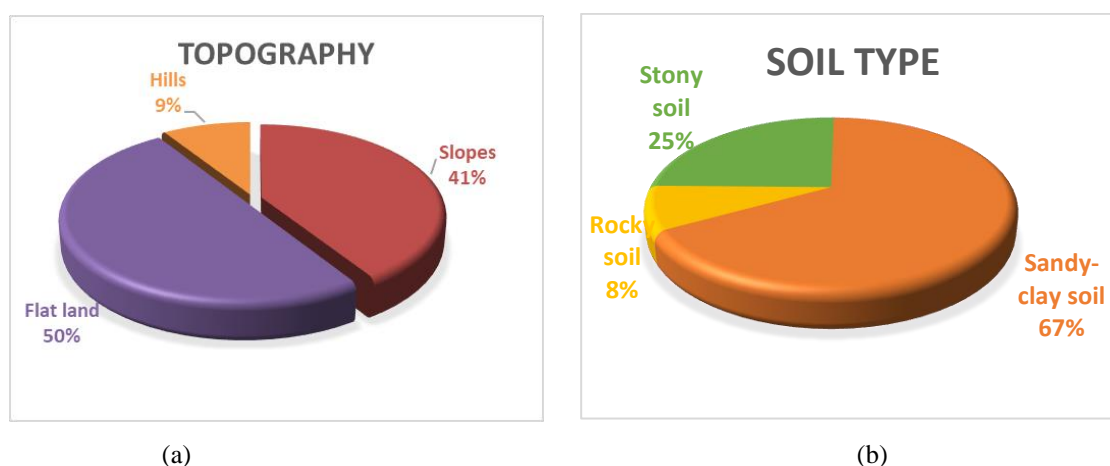


Figure 4.1: (a) Proportion of communities about the habitat of *P. erinaceus*

The communities surveyed indicated that *P. erinaceus* grows on flatland, slopes and hilly areas (Figure 4.1a). However, 50% of the communities indicated best development of the species on flatland areas contrary to 41% of the communities who indicated sloppy areas as best for the

species meanwhile a minority of the communities (9%) acknowledged hilly areas being the best for its growth.

It was also indicated from the communities surveyed that *P. erinaceus* grows on sandy clay, stony and rocky soils (Figure 4.1b) but grows best on sandy clay soils as indicated by 67 % of the communities contrary to 8% of the communities who indicated rocky soils as best for its growth. Their judgement on the habitat of the species were given based on the locality of their village as well as where they find big trunks of the species.

Low land areas or flatland are sites that are mostly characterised by sandy clay soils. This explains why *P. erinaceus* grow best in such a habitat and does better on slopes that are mostly characterised by stony soils whereas it is not really noticed on hilly areas which are characterised by rocky soils.

4.1.2.3 Distribution zones of *P. erinaceus* in the Benue Division

Different zones were indicated by different local communities as areas where stands of *P. erinaceus* can be observed as shown in figure 4.2.

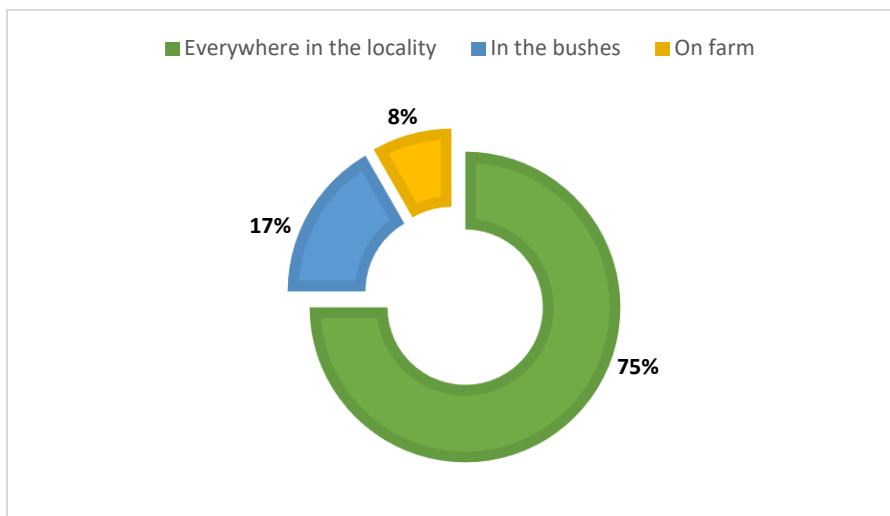


Figure 4.2: Areas with stands of *P. erinaceus* as observed by different communities

Seventy five percent (75%) of the communities affirmed that *P. erinaceus* is distributed everywhere in their localities (Figure 4.2), but only the saplings can well be seen in the far bushes for the fact that the mature stems have all been illegal exploited. Areas of a concentration of the species can then be noticed less than 2 km away from their localities. These are the areas they carry out their farming activities. The leaves of the species add the fertility of the soil as they say and they obtain good yield from agricultural activities in such zones. So, they jealously protect the species in such areas. Seventeen percent (17%) of the communities said stands of *P.*

erinaceus can be found far from habitation areas because most of the trees around habitations have been fell due to population expansion and agricultural expansion. Respondent noted that there are still stands of *P. erinaceus* protected in the bushes because of sensitizations from the forestry chief of post and the collaboration of the local population with the village chief to denounce any illegal exploitation of the species. However, eight percent (8%) of the communities responded that *P. erinaceus* can be seen only on the farms because these are frequenting areas by the population whereas the stands in the bushes were illegally harvested. These are communities located closest to the borders with Nigeria where the illegal exploitation started and before they became aware of this, all the stands in their bushes were already harvested.

4.1.2.4 Sociability of other species with *P. erinaceus*

There are many species that grow in association with *P. erinaceus* thereby sharing the same environmental conditions and habitat. A total of 10 different species were listed as growing in the same habitat with *P. erinaceus*. Figure 4.3 presents the most common species and their level of sociability according to different communities.

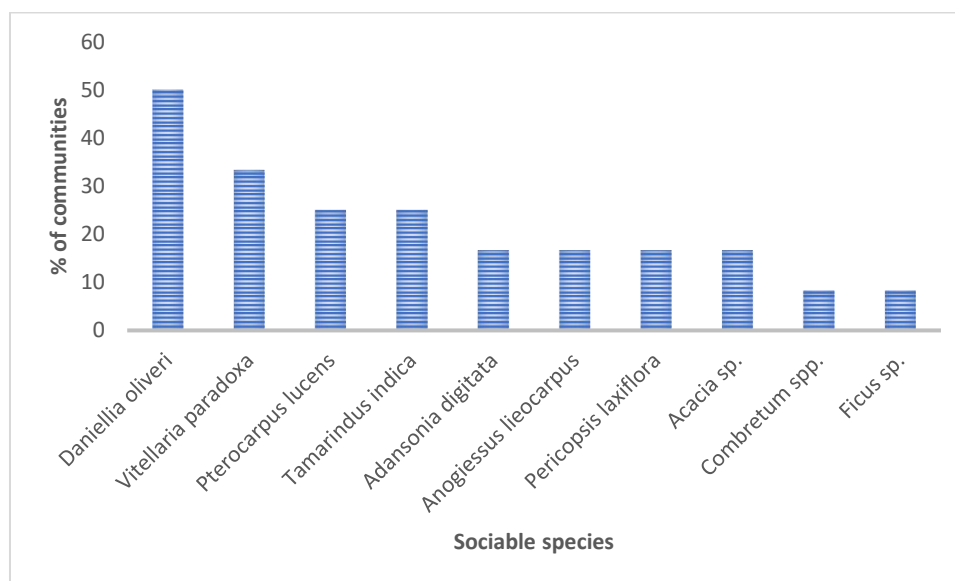


Figure 4.3: Proportion of communities concerning the sociability of other species with *P. erinaceus*

All the species in figure 4.3 are common species found in the same habitat with *P. erinaceus*. However, 50% of the communities indicated *Daniellia oliveri* as the most common in the habitat. This is an indication that they share in the same climatic conditions, soil type and topography for their growth. *Combretum spp.* and *Ficus sp.* are least common as only 10% of the communities indicated their sociability with *P. erinaceus*. This means some of the habitat for the growth of *P. erinaceus* are not favourable for their growth.

These species do not only share the same habitat with *P. erinaceus* but most of their foliage is exploited by the local communities either for fodder, as vegetable or for medicinal purposes as well as the bark. The leaves of all these species are harvested as fodder by herders and for their livestock, so this help to reduce the degree of harvest of the leaves of *P. erinaceus* even as they give preference to it with the reason that *P. erinaceus* leaves are richer in protein for their animals.

4.1.2.6 Fertilization of the Soil

Farming activities are carried out in most habitats of *P. erinaceus*. All the communities acknowledged that crops do very well in the habitats of the species and the leaves are prune before any farming activities especially when the canopy is dense. The leaves and rhytidome play a great role in soil fertility as indicated by the communities in figure 4.4.

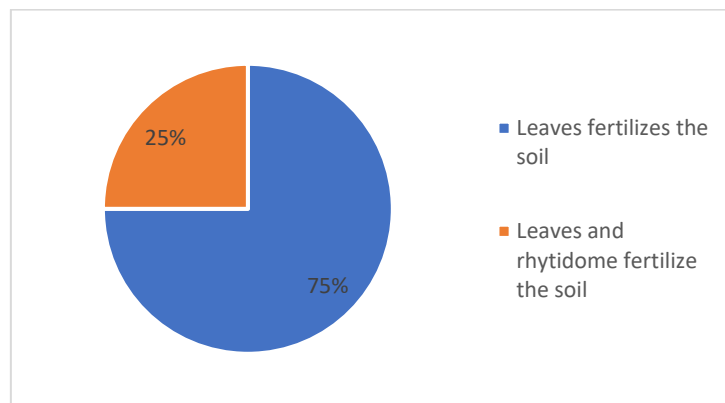


Figure 4.4: Proportion of communities as to the fertilization of soil by *P. erinaceus*

All the communities in the study area acknowledge that the leaves of *P. erinaceus* enrich soil fertility. However, 25% of the communities indicated that in addition to the leaves, the rhytidome also fertilizes the soil (figure 4.4). This is most remarkable in areas where the species have attended maturity or where the trees are not constantly pruned. Farmers do prune the leaves either to reduce the canopy under the crops or to use as fodder for their small ruminants that are usually restricted from moving about during the farming season.

4.1.2.5 Knowledge on the legal instruments governing *P. erinaceus*

All the local communities in the study area are still ignorant of the legal instruments put in place by the State to govern the exploitation of natural resources especially *P. erinaceus* as indicated in each focus group meetings. Furthermore, they do not know the different categories of protected species found in their locality. However, they are aware that authorization is needed from the forestry service before the harvesting of any wood for commercial purposes. On the

other hand, the Chief of Post (CP) who works directly with these local communities are aware of the Decision classifying *P. erinaceus* in Category A under the forestry law but all declared a low knowledge of CITES, and have never worked with issues concerning CITES.

4.1.3 Uses and analyses of threats on the survivor of *P. erinaceus* in the Benue Division of the North Region

4.1.3.1 Uses of *P. erinaceus* in the Benue Division

To inventory the uses of *P. erinaceus*, we sorted out from our respondent the different parts that are used, what they are used for, the ecosystem services rendered by the species in their area and also sort to know the parts that are most commonly exploited by the local communities.

❖ *Parts of P. erinaceus used in the study area*

The local communities depend on many parts of the tree for economic, cultural and medicinal purposes. The bark, leaves, trunk, branches roots and sap are used and the uses vary from one community to another. In all the communities in the study area, the bark of *P. erinaceus* is exploited for different uses while the leaves are exploited by 92% of the communities as indicated in figure 4.3. The other parts are used by just few communities.

Table 4.3: Proportion of communities using various parts of *P. erinaceus*

Parts	% of communities
Bark	100%
Leaves	92%
Trunk	33%
Roots	25%
Branches	25%
Sap	25%

❖ *Different uses of parts of P. erinaceus in the study zone*

Results from respondents indicated a multidimensional use of the different parts of *P. erinaceus* in the study area. The part with the highest multiple use is the bark seconded by the trunk, meanwhile the leaves, sap and roots have just three main uses each as seen on table 4.4.

Table 4.4: Different parts of *P. erinaceus* and their uses by the local population

Parts	Uses	Parts	Uses	
leaves	fodder	trunk	production of charcoal	
	Soil fertility		manufacture of beds	
	human consumption		manufacture of drums	
bark	treatment of anaemia		manufacture of wooden spoons	
	treatment of fatigue		manufacturing of mortars	
	treatment of malaria		manufacturing of canoes	
	deworm livestock and children		manufacture of troughs	
	Vitamin supplement for animal		manufacture of local instruments	
	treatment of dysentery		branches	manufacture of tool handles
	treatment of heart problems			manufacturing of pestles
antibiotic for abdominal pains	fuel wood			
Soil fertility	sap	treatment of dysentery and diarrhoea		
treatment of chronic wounds		medico-magic (female sterility)		
magico-religious		Magico-religious (Sexual impotence)		
treatment of heart problems				
treatment of hernia				
	treatment of cough			

The different uses of *P. erinaceus* can be grouped as ecosystem services. Figure 4.5 shows a representation of the uses of *P. erinaceus* categorised by ecosystem services.

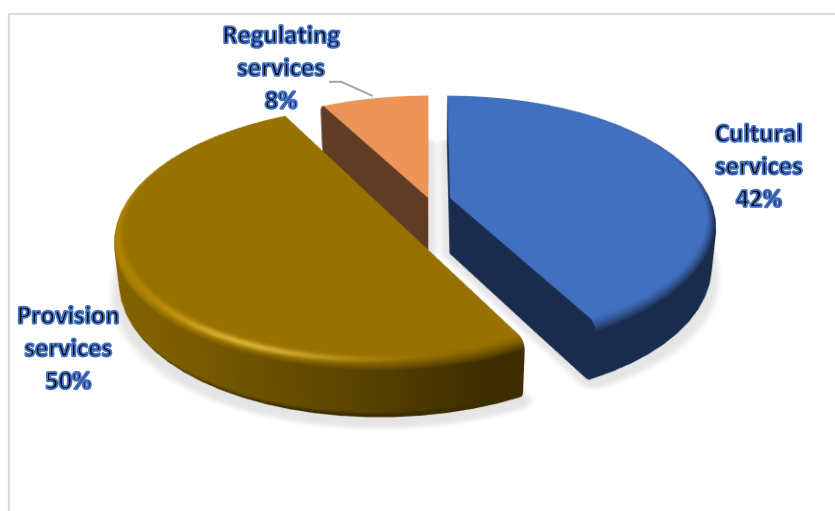


Figure 4.5: Proportion of ecosystem services provided from uses of *P. erinaceus*

Pterocarpus have several uses. Provisioning services such as firewood, charcoal, furniture, construction material, handicrafts accounted for fifty percent (50%) of the uses and the cultural services accounted for forty two percent (42%) of its use for medicinal and magico-religious purposes while eight percent (8%) of the uses serves as regulating service to the ecosystem as it enriches the soil fertility. Improvement in the fertility of the soil increases its nitrogen content and enhances the development of the vegetal cover which helps to stabilize the soil from erosion.

❖ *Parts and derivatives of P. erinaceus commercialised*

P. erinaceus is a multifunctional species. Even as the trunk is exploited and smuggled to neighbouring Nigeria, some parts and derivatives of the species are commercialised locally and out of the study area. Figure 4.12 represents the different parts traded by different communities.

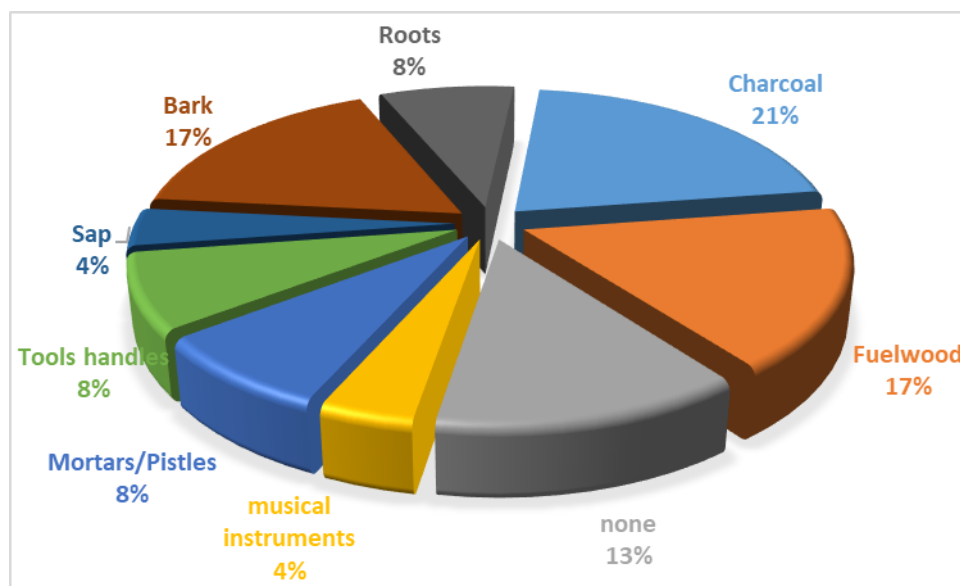


Figure 4.6: Exploitation of parts and derivatives of *P. erinaceus* for commerce by local communities

Twenty one percent (21%) of the local communities fabricate charcoal from the trunk and big branches of *P. erinaceus* and commercialise to nearby towns like Garoua and Ngong to sustain their livelihood (figure 4.6). Because of the hard texture of the wood, its charcoal is most appreciated by the consumers. 17% of the communities cut the branches and sell as fuelwood to other localities while the bark is collected and sold to even distant towns like Ngaoundere and Yaounde. 4% of the communities collect the sap to sell to traditional healers in neighbouring towns while 13% of the communities declared that they do not commercialise any part of the tree. Harvesting of wood for fuelwood and production of charcoal is increasing

and poses a big threat to the species especially as the human population is increasing and the level of poverty in these localities is high.

Result from the different interviews conducted shows that the local communities and indigenes have local and traditional knowledge associated to the use of the species. However, the effects of the uses are felt by surrounding local communities and towns, many of whom rely on the species for fuel, medicine and livelihoods through income generation. The listing of this specie in Appendix II is focused mostly on the export of the timber from this species which is not yet income generation in Cameroon (zero quota) as indicated by resource persons. However, local communities use it for other non-timber purposes such as for traditional rituals, medicinal, energy source for fuelwood and charcoal production as well as raw materials for construction of local instruments. The increasing demand of the species in recent years is threatening the country's forest resources, ecosystem, and its ability to adapt to climate change.

❖ Most common uses of *P. erinaceus* in the Benue Division.

The most common uses of *P. erinaceus* by the local population is for therapeutic purposes and as fodder for livestock in the study area as seen in figure 4.7.

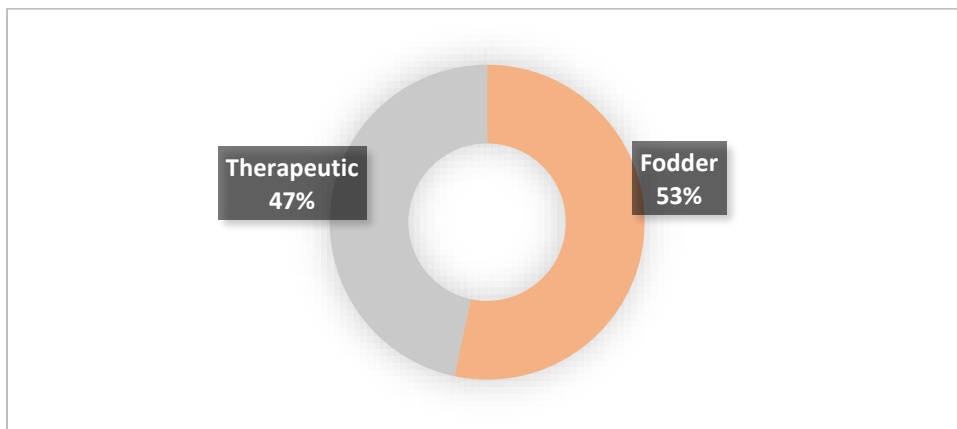


Figure 4.7: The most common uses of *P. erinaceus* as rated by the communities

In all the communities of the study area, fifty three percent (53%) of them indicated that the greatest part of the species used in their local communities are the leaves for animal fodder (figure 4.7). This is because every household owns small ruminants and these animals are restricted from moving around during farming seasons. ‘The leaves of the species is best preferred by our animals because it is rich in nutrient compared to other species and even Fulani herdsmen know this. That is why they harvest all the leaves when they come across the tree’. This was declared by the chief of Kaya village during the focus group meeting. The excessive

harvesting of the leaves makes the species to develop with difficulties. On the other hand, forty seven percent (47%) of the communities attested that the bark of *P. erinaceus* is the part most commonly used in their localities for therapeutic purposes. Because of poverty to go for medical treatment, most people depend on the tree for treatment of many sicknesses traditionally.

❖ Medicinal uses of *P. erinaceus* in the Benue Division

Seventeen (17) different health disorders were identified as being treated using some parts of *P. erinaceus* (bark, roots and sap) in the various communities of the study area as seen in figure 4.8.

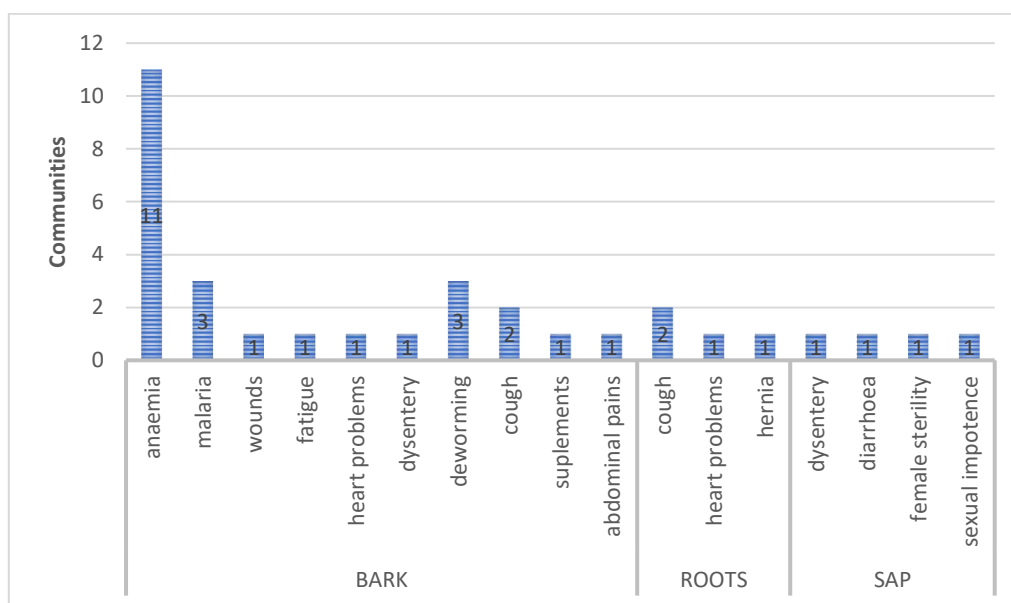


Figure 4.8: Sicknesses treated with different parts of *P. erinaceus*

The bark of *P. erinaceus* is the part most used for the treatment of several sicknesses in the study area (figure 4.8). In all fifty eight percent (58%) of sicknesses identified are treated using the bark of *P. erinaceus*. Anaemia is the principal sickness common in eleven out of the twelve communities in the study area that is treated using the bark. This explains why the tree is called ‘blood tree’ in the different local languages. The second most common sickness that is also treated using the bark is malaria. Eighteen percent (18%) of the sicknesses are treated using the roots and, in some cases, they are used in combination with the bark as in the case of cough. Meanwhile, twenty three percent of sicknesses are treated using the sap. In some communities, the sap and the bark are combined for the treatment of dysentery. However, most communities use the roots and the sap for many different magico-religious purposes which they kept secret.

4.1.3.2 Analysing threats to the survivor of *P. erinaceus* in the Benue Division

Some key main threats to the sustainable use of *P. erinaceus* and its ecosystem were deduced from interviews with resource persons and through focus group discussions in the different local communities which include: the illegal exportation of the wood to neighbouring Nigeria being the major threat to the species, the anarchical exploitation of parts of the tree especially the leaves and the bark and the threats on the ecosystem of the species.

1) Illegal exploitation and export of *P. erinaceus*

Discussions with the CITES SA and MA revealed that Cameroon has never published any CITES export quotas for the commerce of *P. erinaceus*. A review of the literature indicated that within the period 2009-2018, a total of 3416 m³ of *P. erinaceus* and/or *Diospyros crassiflora* was imported to China from Cameroon (CITES PC25 Doc.15.5). However, a series of field reports were received from the forest administration in the regions on illegal exploitation and trade on the species as declared by the CITES MA. The Environmental Investigation Agency (EIA) reported that the illegal market for the wood started in late 2016 and has been serving as a trading hub for timber illegally smuggled from Cameroon to Nigeria and 20 trailers of logs (equivalent to 7000 logs) were being supplied to Nigeria per month (EIA, 2017). Because of these malpractices on the species which are common in all range States, they are currently subject to an export suspension with regard to compliance and enforcement of the CITES for *P. erinaceus*, awaiting the production of a robust NDF on the species by each range State. The exploiters do not only illegally harvest in the non-permanent forest areas but also in the state forest areas in the study zone. In reserve areas like ZIB 14, a reserve allocated to the Garoua Wildlife School for teaching and research purposes, most of the mature stands have been logged as reported by the CP of the zone.

Information from the forestry Chief of Post (CP) in the different localities shows that exploitation of the wood occurs throughout the year. However, in areas with difficult terrain for the passage of their vehicles, harvesters fell the wood in the rainy season and only come back in the dry season to carry the logs. The CPs attested coming frequently across these logs lying in the bushes during their patrols. During festive periods, they do it with the complicity of some locals who master the areas of high densities of the wood. They receive bribes either to lead them to such areas or to log the wood and they only come to carry in lorries to Nigeria. Most of their illegal activities take place at the night. They usually come well-armed for this activity as reported by the CP. These results are a major factor contributing to the decrease in the

population of the species. However, the CP with the reinforcement of the Control Brigade and the Defence force have been able to successfully carry out a series of controls on the field and many seizures of the wood have been done. Legal measures were taken against defaulters meanwhile the seized logs are packed at the forestry unit of the Region (figure 4.9). The highest quantity ever seized in a single patrol is 41 logs as reported by the Control Brigade for the North Region.

Interviews with the customs agents at the borders of the study area revealed that they have never intercepted any wood at their control post due to the porous nature of the borders.



Figure 4.9:Photo of some seized logs of *P. erinaceus* impounded at the Forestry service in the North
Photo: Ngwa, 2023

✓ **Insufficient control mechanisms**

The illegal exploitation of *P. erinaceus* is the key threat to the species in Cameroon. This threat comes as a result of insufficient control measures. The number of personnel of the forestry service in charge of carrying out controls in the field are small from observations in all the study area where only one chief of post and three foresters are sent to control a full sub-Division. Secondly, these personnel lack munitions and the necessary resources to carry out patrols including vehicles. The porosity of the borders and the nature of the terrain facilitate transborder illegal activities- The ineffective implementation of policies and regulations to the detriment of the species' survival like weak enforcement of forestry law to regulate excessive exploitation of species is a contributing factor to the threat to the species.

2) Anarchical exploitation of parts of *P. erinaceus*

Poor techniques or excessive harvesting of foliage for livestock fodder in the dry season, such as by lopping off branches or through aerial pruning pose another serious threat to the species. Results from focus group discussions and resource persons indicated that the parts of the tree most commonly exploited are the leaves followed by the bark. Farmers harvest

the leaves in the rainy season and cattle herdsman especially transhumant harvest them in the dry seasons without any mastery of the techniques of harvesting. The tree is constantly in shock and regenerates with difficulties. Secondly, it no longer bears fruits due to this phenomenon and the sustainability of the species is questioned. On the other hand, the bark is harvested mostly in the dry season for a wide variety of uses and also for commercial purposes where it is sold in other towns as well as some derivatives of the tree. This affects the development of the tree especially as some of the locals lack the techniques of debarking. These activities pose serious threats to the sustainability of the species in the Benue Division.



Figure 4.10: Field observation on anarchical debarking and pruning of leaves of *P. erinaceus*
Photo: Ngwa, 2022

✓ *Regeneration of P. erinaceus*

All the communities in the study area affirmed that when the trunk of *P. erinaceus* is cut down, the stump no longer regenerates in the case of mature trees but regeneration can take place on the saplings if the trunk is harvested at the chest level. Also, 100% of the communities attested that when the bark and the leaves are exploited in a systematically, regeneration of the bark will occur after many years while the regeneration of new leaves will start after two months. When parts the species are unable to regenerate, it becomes a threat to the survival of the species. Livestock farmers are interested in the regeneration of the leaves because of the foliage they

use for their cattle during the drought period but this activity is a threat to the development and fruitification of the tree.

All respondents during the discussions attested that for the past ten years, the level of exploitation of the *P. erinaceus* has kept increasing as more people are discovering its different value meanwhile the population of the species has kept decreasing with time. This is an indication that the species is under threat and control is needed to ensure that legal measures put in place are respected as well as measures to increase the population of the species.



Figure 4.11: Dead stump of *P. erinaceus* after harvest of the trunk

3) Threats on the ecosystem of *P. erinaceus*

✓ Level of evolution of *P. erinaceus*

Figure 4.11 shows the view of the local communities on the evolution in the population of *P. erinaceus* over the past 10 years in the study area.

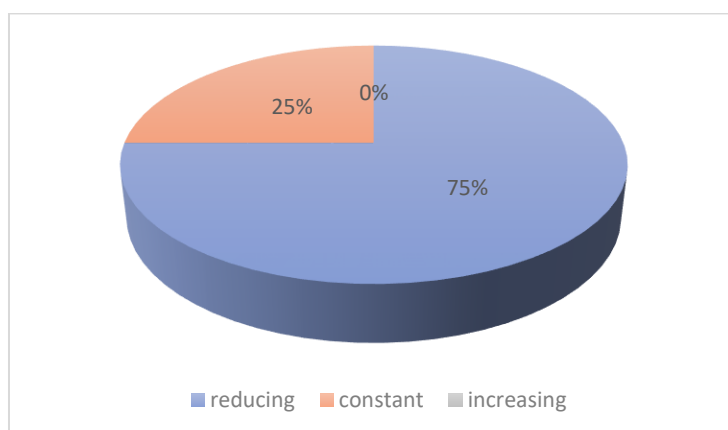


Figure 4.12: Communities' rating on the evolution of the population of *P. erinaceus*

Seventy five percent (75%) of communities in the study area affirmed a continues decline in the population of *P. erinaceus* over the past 10 years due to illegal exploitation of the big trunks (figure 4.11). Twenty five percent (25%) attested that there has been no change in the distribution, with reasons that young trees are growing and replacing the bigger ones that are illegally harvested. A negative increase in the population of the species in the population of the species within this duration is an indication of threats to the species and its ecosystem.

Even though *P. erinaceus* is a fire-resistant species, and frequent bushfires especially when it is put late in the dry season may end up consuming the tree. The habitat of the species becomes fragile as the soil is exposed to erosion and can become modified to the disadvantage of the species and its ecosystem (figure 4.12). This can even cause the disappearance of the species and the installation of new species modifying the ecosystem. The effect of bushfires is as well felt at the level of the fruitification of the tree. Bushfire consumes the fruits of the tree especially as it is violent when it is put late and thus reduces the level of the dissemination of the fruits. This affects the spread of the species and also the destruction of the ecosystem of this species.



Figure 4.13: Effect of constant bushfire on *P. erinaceus* and its ecosystem
Photo: Ngwa, 2023

The habitat of the species is also disturbed because of the expansion and inappropriate agricultural practices. This is due to population expansion.

4.1.4 Proposed measures for proper management and sustainability of *P. erinaceus* in Cameroon in compliance with CITES

❖ **Creation and monitoring of Council Forests:** The exploitation of Council Forest is regulated by Law n° 94/01 of 20/01/1994 to lay down forestry, wildlife and fisheries regulations and Decree N°95/531/PM of August 23, 1995, to determine the conditions of implementation of forestry regulations. These forests are expected to contribute resources for the management of the local councils. The creation of council forests with stands of *P.*

erinaceus and also plantation forests for *P. erinaceus* in the Gashiga, Barndake, Ngong and Touroua council areas should be encouraged by the forest administration. They should also facilitate these councils in the acquisition of the management plan for the council forest and there should be a strict follow by the forest administration to verify the full implementation of this management plan especially concerning the technical, environmental, wildlife, NTFP and their social obligations aspects. The government should allocate funds to enable the forest administration to monitor and control these forests strictly.

- ❖ **Creation and monitoring of community forests (CF):** The few community forests with Kosso stands created in some localities are not functional because their management plans have not been approved by the Minister in charge of the forest because they are not up to standards. The service in charge of the forest needs to facilitate the acquisition of a management plan for any CF so that they can properly control the exploitation of species in these forest areas. The forest administration should promote the creation of other community forests which has the stands of Kosso by sensitizing the local communities of their adjacent benefits to these resources. CFs should never be sub-contracted to any concessionaires to the detriment of the local population but a strict follow-up with respect to the management plan should be done by the Department of Promotion and Transformation in the MINFOF.
- ❖ **Creation of an arboretum:** The Garoua Wildlife School covers 24 ha of land which is big enough to use a portion of it for an arboretum and a portion of the teaching and research forest for the school that covers 214 000 ha of land can be used to set up a plantation forest or an arboretum for the school. Thorough surveillance and follow-up of their growth and development will be guaranteed since it will also serve for practical work for the students. With authorisation from MINFOF and the support of partner organisations, these projects can be set up which will constitute CITES species from the savannah zone including *P. erinaceus*. The installation of the arboretum will enhance sustainability and promote research work on the species.
- ❖ **Proactive decisions:** The MA of Cameroon should be proactive to take preventive measures on a species by complying with the measures taken by CITES to classify that species especially if data on the species is unknown. *P. erinaceus* of Cameroon origin was registered in CITES at CoP 19 in November 2022. This measure has only been taken after the tree has faced threats due to serious illegal exportation of the wood to neighbouring Nigeria.
- ❖ **Inventory:** The government through the MA of CITES provide the means for the SA to carry out a national inventory of *P. erinaceus* to know the potential and the spatial distribution of the species in Cameroon. This inventory will contribute to the elaboration of

NDFs of *P. erinaceus* so as to be in compliance with the demands of the App. II listing in CITES. The result will enable the SA to be able to propose a quota on the species.

- ❖ **Alternative measures:** Seized logs of *P. erinaceus* wood from illegal exploiters are packed down at the Delegations of Forestry and Wildlife in the North and Adamawa Delegations. According to Circular letter No. 0003/LC/MINFOF/CAB of 09/01/2015 right is given for public auction of the illegally seized wood. Since it is a Cat A species as well as a CITES App II species, a new Ministerial order demands that the seized product should be incinerated for fear that if auctioned, it can still be resold to the illegal exploiters. The government should place an order for any seized wood to be split for fuel wood and auctioned to the public instead of incinerating the wood. This will reduce the harvesting of wood for fuel and will also raise the State's coffers.
- ❖ **Recruitment of forest guards:** The number of forest controllers in the field is very few to be able to cover the vast areas under their control. The government should valorise the two training institutions on wildlife and forestry under the MINFOF (The Garoua Wildlife School (EFG) and the Forestry School of Mbalmayo (ENEF)) by encouraging the training of citizens in the domain of forest and wildlife, and later on, absorb them in the public service and deploy them to the field as forest agents. This will help to fight illegal exploitation.
- ❖ **Budget increase:** The forest does not only provide revenue to the State but it plays a key role in regulating the climate and ecosystem balance and it is a habitat for wildlife. The government, therefore, need to add the budget of the Forestry and Wildlife Ministry so that working materials can be provided to those in the field and even incentives to enable them to carry on proper management of the forest resources.
- ❖ **Capacity building:** For proper management of *P. erinaceus* as a CITES species, capacity building workshop programmes should always be organised by the CITES MA and SA involving the customs, the Gendarmes, the Judicial Police, the Judiciary, the heads of MINFOF external services and all who are involved in the management of CITES issues to keep them updated on CITES developments.
- ❖ The External Services of MINFOF with the support of Civil Society Organisations should organise capacity building workshops to train those in charge in the execution of the forestry regulations on the field (the forest chief of posts and his elements, the customs and police at the borders, the village chiefs and his councillors, presidents of community and local council forest and all who are involved in the management of forest product).
- ❖ **Sensitization campaigns:** The different localities should be aware of the protected species in their localities and the laws binding the exploitation of these species. This should be the

duty of the forest controllers on the field. The importance of the protection of the habitat of *P. erinaceus* should also be included in the campaigns.

- ❖ **Participatory management:** The North Region is endowed with three National Parks which are host to stands of *P. erinaceus*. These are areas under the private property of the State which also include the teaching and research forest of the Garoua Wildlife School in Tcheboa. These areas are constantly under the pressure of illegal exploitation of forest resources and wildlife. The Faro National Park and the research forest are situated closer to the borders with Nigeria and *P. erinaceus* has been largely exploited in these zones. These are potential areas where *P. erinaceus* seeds can well disseminate for the germination of new ones if well protected. The encroachment of the riverine population into these protected areas with their anthropic activities reduces the habitat of the species. A lot of transhumance is going on inside these protected areas and the leaves are poorly exploited for livestock. The forest administration with the support of Civil Society Organizations should improve on participatory management, promote income-generative activities, provide nurseries of *P. erinaceus* to the different local communities and do a follow-up to see the planting and care of the species in their areas, carry on sensitization meetings on the species.
- ❖ **Exploitation norms:** *P. erinaceus* is a savannah tree species exploited for timber. The government should set exploitation norms for the savannah ecosystem area separately from the forest ecosystem area taking into account the fragile nature of the savannah and the dispersed nature of trees. She should also follow up for the strict respect of these norms.
- ❖ **Quotas:** The CITES MA should strictly comply with quotas set by the Convention for the export of any species
- ❖ The MA should only issue an export permit on a species if an inventory has been carried out on the species and the SA recommend the trade.
- ❖ There should be respect for the interval set for an inventory of a species to set quotas.
- ❖ Many savanna species in Cameroon are now registered in the CITES Appendices. The government should create a Scientific Authority specifically for savanna species based in the Northern Region because these species have a specificity different from species from the forest zone.
- ❖ Capacity building workshops should be organised to train all who are concerned with the control of species for export to train them on how to field a CITES permit, how to identify a fake permit, and how to identify species at the control posts.
- ❖ **Local communities' bylaws:** Communities should formulate their own local laws with the aim of tackling illegal activities in their forests. This will permit them to effectively manage

their forest. In Sierra Leon, this method was used where defaulters were fine heavily and this cub illegal activities.

- ❖ **Co-management:** Community-based management units in the form of Co-management should be encouraged so that they can see themselves as key stakeholders involved in the management of forest resources and its benefits.
- ❖ **Collaboration efforts:** Collaboration between the regional forestry service, the forest chief of posts and the communities should be strengthened so that they can easily tackle the illegal harvesting of *P. erinaceus* and other protected species.
- ❖ **Sensitization:** Communities should be sensitized on the debarking and pruning of branches of species so that trees can be able to bear fruits; the farming methods that will not destroy the habitat of the species; the disadvantage of frequent bushfires on tree species.
- ❖ MINFOF and the Ministry of livestock and animal husbandry should agree on strict legal measures to be taken on any transhumance inside any protected area or forest reserve and on any abusive harvesting of the leaves by livestock rearing.

4.2 Discussions

Cameroon has established numerous laws and regulations for forest resource management and is party to various biodiversity protection Conventions. Multiple governmental institutions closely collaborate with the MINFOF through the Inter-ministerial Coordination and Monitoring Committee, established in June 2006 by a Prime Ministerial Order, to effectively implement CITES in Cameroon. While there are ample high-quality legal and technical instruments for sustainable forest resource management, execution remains a significant challenge. Forest agents and local populations must be made aware of these instruments, such as in the case of *P. erinaceus*.

P. erinaceus faces a high exploitation rate due to a lack of awareness among forestry agents and border customs officials regarding national and international legal instruments. To address this, the government should revise forestry laws to consider the unique characteristics of savanna species like *P. erinaceus*, which differ from those in forested areas. More savanna species in Cameroon are now listed in CITES Appendix II, requiring the nation to comply with the Convention's provisions for these species.

Though *P. erinaceus* is listed as a Category 'A' and CITES Appendix II species in Cameroon, simply listing it is insufficient to ensure its sustainability. The government must take action,

such as training more experts in CITES issues, conducting community sensitizations, establishing research, monitoring, and plantation development programs, and promoting citizen planting initiatives. Strict conservation measures should also be implemented, including prohibiting species harvest in protected areas, enhancing border surveillance to prevent smuggling, and learning from successful management efforts, such as those undertaken by the Forest Commission in Ghana.

P. erinaceus is a gregarious plant species, but this characteristic is not evident in the study area due to overexploitation for therapeutic and fodder purposes. This overexploitation, along with detrimental harvesting practices, stunts growth and fruit production, threatening the species' sustainability. The local population needs increased awareness about the value of *P. erinaceus* and the consequences of their actions on its sustainability, including the indirect impact on soil fertility.

Poverty, ignorance of the species' value, and malpractice among some state agents contribute to illegal exploitation. To address this, the forestry service must enforce legal instruments, educate local communities, and provide income-generating alternatives to reduce reliance on forest products.

Bushfires threaten the habitat and sustainability of *P. erinaceus*, which is adapted to the fire-prone areas in which it grows. Local populations must be educated about the impact of yearly bushfires and fire regimes.

Increased demand for *P. erinaceus* wood has led to its designation as a high-value timber species, prompting illegal exploitation and trafficking. While Cameroon is not yet exporting the species due to non-compliance with CITES' requirements for Non-Detriment Findings, the government must take steps to control exploitation and ensure compliance with CITES.

Lastly, the porous borders with Nigeria, limited identification capacity among border officials, limited forestry personnel on the field, and general unawareness of national and international regulations for the species are challenges that need to be addressed by the government to ensure *P. erinaceus*' sustainability in Cameroon.

5 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study was aimed at contributing to the sustainable management of *P. erinaceus* in Cameroon, the case study being the Benue Division of the North Region; more specifically to evaluate the management framework of *P. erinaceus*; evaluate the knowledge of the local communities on the specie; inventory its uses, analyse the threats on the species and propose measures for sustainable management of the species in Cameroon.

Based on findings, the study established that the 1994 forestry law and its numerous implementation instruments are of good quality and are a plus for Cameroon in the proper management of its forest resources but its weakness is the execution of these instruments and making people respect the legislation put in place. It was also established that Cameroon has adopted some legislations to enact a number of provisions on the CITES Convention to guarantee the effective implementation of the Convention in Cameroon like in the domain of international and internal trade of forest, wildlife and fisheries products classified in App I, II and III of the Convention. However, there is low knowledge of CITES which hinders the proper implementation of the Convention. The Ministry of Forestry and Wildlife (MINFOF) with its good structured departments is charged with the full implementation of CITES in Cameroon. International NGOs and other partners in the domain of natural resource management are arms of support to MINFOF through capacity building, law enforcement, and the fight against illegal trade among others.

It was further established from the research that all the local communities in the study area have a good knowledge of *P. erinaceus*. It showed that flatland areas and sandy clay soils are the best habitats for the species among others. 75% of the communities also acknowledge that *P. erinaceus* is spread everywhere in the community and *Daniellia oliveri* is the most sociable to the species according to 50% of the communities. They all testified that the leaves of *P. erinaceus* fertilize their soil. However, all the local communities are ignorant of the legal instruments put in place for the management of the species. The research further established that the bark of *P. erinaceus* is exploited by all the communities and all the parts of the tree are useful in the different communities and it renders some ecosystem services to the population where 50% of the users render provision service to the population. Some parts and derivatives of *P. erinaceus* are commercialised locally and charcoal is the highest derivative

commercialised. 53% of the communities declared that the greatest use of the tree in their localities is the harvesting of the leaves for fodder. Meanwhile, the bark of *P. erinaceus* is used in the treatment of different sicknesses and anaemia is treated with the bark by 92% of the communities. Illegal logging and anarchical exploitation of the leaves and bark of the species are a threat to the sustainability of species.

National inventory, elaboration of NDFs, sensitizations, capacity building, promotion of plantations, and creation of community and council forests among others were some measures proposed for better management and sustainability of *P. erinaceus* in Cameroon. Training of more personnel in the domain of CITES, elaboration of NDFs on CITES-listed species, reinforcement of collaboration with law enforcement and customs in the fight against illegal export of species and stricter measures on the Judiciary were recommended for sustainable use of *P. erinaceus*.

5.2. Recommendations

In spite of the laudable efforts made by the government to stop the illegal exploitation of *P. erinaceus* including the classification of the species in App. II of CITES and as a special product in Cameroon, a lot more remains to be done to not only ensure its sustainability but also to permit the State of Cameroon to trade this species in the international market and even attain zero illegal activity on the species. This can only be possible if there is strong synergy in the actions of different stakeholders, good governance, increased involvement of civil society and especially the effective participation of local communities at all levels. Based on the above the following recommendation has been formulated for the various stakeholders.

For Decision makers:

The 1994 forestry policy should be revised to permit MINFOF correct some lapses and strengthen forest management. It should include

- The exploitation of forest species in the savannah ecosystem
- Increasing the penalty of some offences to deter offenders
- Increase the budget of the MINFOF so that more recruitments can be done

For MINFOF/CITES MA:

- Should take full responsibility to carry out nationwide inventory on *P. erinaceus*

- Should embark on sensitization campaigns to all local communities with stands of *P. erinaceus* on the challenges in the conservation of *P. erinaceus*
- Develop programs and mobilize resources for training personnel of the Management and Scientific Authorities, policy and decision makers to expand knowledge on CITES and how it works at different levels.
- Get personnel working in the different Scientific Authorities trained as CITES experts especially in elaborating an NDF.
- Should encourage and facilitate the creation of community and council forests and plantation forests of *P. erinaceus*
- Elaborate a management plan for the management of the population of *P. erinaceus*
- Train and recruit more forest guards and deploy them in the field
- Equip the forest agents on the field with transportation means, munitions and other materials to permit them to carry on patrols.
- Be proactive in taking decisions concerning the protection of a species
- Appoint a CITES Scientific Authority for flora specifically on savanna species
- Respect quotas set for the exportation of a species
- Promote participatory management especially in communities around protected areas

Law enforcement officers

- For good collaboration, they must give their support in the strict respect of text regulating their competencies as judicial police officers
- Surveillance at border areas should be reinforced to effect proper control.

For the Judiciary

- Should increase collaboration with MINFOF when taking decisions on cases of the forest/wildlife sector

Development partners

- They should continue their support to MINFOF in executing projects for capacity building and the fight against corruption
- There is a paucity of information on *P. erinaceus* in Cameroon. They should support research projects on the species.

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ANNEXES

ANNEX A: Interview guide addressed to the CITES Management Authority and Scientific Authority for Flora in Cameroon

Project Title: Management constraints and perspectives for sustainable use of *Pterocarpus erinaceus* in Cameroon

You are kindly invited to participate in the research study conducted by Ngwa Adeline epe Ndim under the supervision of Dr Rocio Hernandez Clemente, University of Cordoba, Spain and co-supervise by M, Babale Michel, Director of the Garoua Wildlife School.

The objective of the study is to inventory the uses and analyse the threats in the exploitation and commercialisation of *Pterocarpus erinaceus* in the North Region of Cameroon in order to contribute to the development of a non-detriment findings (NDF) on this CITES listed species in Cameroon.

The study is in partial fulfilment for a Master's degree in management and conservation of species in trade: The International Framework (14th edition).

The questions will focus on the management framework of *Pterocarpus erinaceus*, the distribution, threats, uses and the trade on the species.

Your participation in this study will be highly appreciated. You may decline to answer any question(s) you do not wish to answer. Do note that all responses provided are significantly correct and will be treated with utmost confidentiality.

Date of interview

Interviewee

Location

A. Knowledge on CITES

1. Have you worked directly on issues concerning CITES? Yes [] No []

2. What is your knowledge about CITES? High [] Moderate [] Low [] Non []

3. As a CITES SA/MA in Cameroon, what is actually your role? -----

4. Among the wooded species that are protected under the forestry law of Cameroon, how many of them are listed in the CITES appendices? Which are they?-----

5. Among the listed CITES species, which ones have you been issuing CITES permits for export? -----

6. How many of the CITES species have non-detriment findings? -----

B. Knowledge on Policies and legislations

7. Are there national/local laws that protect species against illegal and unsustainable trade?----

8. How effective are current policies and laws in protecting species against illegal trade? -----

9. a) In which category is *P. erinaceus* classified under the protected species of Cameroon?

b) What prompted the categorization? -----

c) What action is being taken to ensure the respect of policies binding protected species? -----

d) Any challenges? -----

C. Management of *Pterocarpus erinaceus* in Cameroon

10. Which services of MINFOF are in charge of managing the exploitation of forest species?

11. Are there any challenges in the collaboration? -----

12. Are there other Ministries that are involved in the exploitation chain of forest resources?

If yes, which? -----

What are their roles? -----

13. Has Cameroon carried out any trade on *P. erinaceus*? Yes [] No []

If yes, any trade data? -----

If no, why? -----

14. Are there reports of illegal practices on the species from the field? If yes, which measures are put in place to combat such illegal practices? -----

15. What sanctions are levied on any illegal exploitation of forestry products or non-respect of a given quota?

16. Any FMU with stands of *Pterocarpus*? Yes [] no [] If yes, in which region? Is exploitation of the species being carried out there? Yes [] no []

17. Any community or council forests in the North Region with stands of the species? Yes []
no []

If yes, do they have management plans and is there any follow-up for the strict respect of the management plan? -----

If no, why? What do you do to encourage the creation of such forests? -----

18. The CITES Plant Committee recommended all range States to produce a robust NDF on *P. erinaceus* before any export quota can be accorded on the species. What have been the challenges for Cameroon to produce a NDF on this species up till now? -----

19. How can proper management and sustainability of *Pterocarpus erinaceus* be handled in compliance with CITES?

Thank you for your time

ANNEX B: Interview guide addressed to the Regional Delegate and the Benue Divisional Delegate of MINFOF North

Project Title: Management constraints and perspectives for sustainable use of *Pterocarpus erinaceus* in Cameroon

You are kindly invited to participate in the research study conducted by Ngwa Adeline epse Ndim under the supervision of Dr Rocio Hernandez Clemente, University of Cordoba, Spain and co-supervise by M, Babale Michel, Director of the Garoua Wildlife School.

The objective of the study is to inventory the uses and analyse the threats in the exploitation and commercialisation of *Pterocarpus erinaceus* in the North Region of Cameroon in order to contribute to the development of a non-detriment findings (NDF) on this CITES listed species in Cameroon.

The study is in partial fulfilment for a Master's degree in management and conservation of species in trade: The International Framework (14th edition).

The questions will focus on the management framework of *Pterocarpus erinaceus*, the distribution, threats, uses and the trade on the species.

Your participation in this study will be highly appreciated. You may decline to answer any question(s) you do not wish to answer. Do note that all responses provided are significantly correct and will be treated with utmost confidentiality.

Date of interview

Interviewee

Location

A. Knowledge on CITES and Legal instruments on forest management

1. Grade your knowledge on CITES: High Moderate Low Non
2. Have you worked directly on issues concerning CITES? Yes No If yes, at which level? Management Authority Scientific Authority NGOs

3. Which plant species in the North are listed as protected species under the law in Cameroon? Which among them are CITES species?
4. What does it take to exploit CITES species and species protected under the forestry law of Cameroon?
5. Which ones are most exploited in your area of command?
6. Which are the legal instruments binding the exploitation of forest products in your area?
7. Is there any order or parameter stipulating the criteria to exploit savanna species as it is with forest species?
8. When was *Pterocarpus erinaceus* classified in category A? Why was it suddenly listed in category A, when it was not even among the list of protected species of Cameroon?

B. Exploitation of *P. erinaceus*

9. For the past years, the Region has witness illegal exploitation of *Pterocarpus erinaceus*.
 - a) Where has these illegal activities been highly felt in the Region?
 - b) Which period of the year are these activities mostly carried out?
 - c) Have you ever received any report from the field about the illegal practices? If yes, from who?
 - d) What is the highest quantity ever seized?
 - e) What do you do with the wood?
 - f) What happens to the illegal exploiters?
 - g) Where do they come from?
10. What measures are taken to stop this illegal exploitation?
11. Cameroon is a range State, is it meeting up with the criteria of CITES in the management of the species? If yes how? If no why?
12. Locally the leaves and bark of the species is abusively exploited by the villagers and herdsmen, how can this intense exploitation which fragilizes the species and its habitat be limited?

13. Seeing the high demand of this species in the international market, what do you think can be done to increase its population?
14. 17. Any community or council forests in the North Region with stands of the species?
Yes [] no []
15. If yes, do they have management plans and is there any follow-up for the strict respect of the management plan?
16. If no, why? What do you do to encourage the creation of such forests?
17. What are the constraints in the protection of the species?
18. How can proper management and sustainability of the species be handled?

ANNEX C: Interview guide addressed to forestry chief of Posts on the Topic: Management Constraints and Perspectives for Sustainable Use of Pterocarpus Erinaceus in Cameroon

Date of interview

Interviewee

Location

Geo. Coordinates

1. Do you know the CITES Convention?Yes [] No []

If yes, how? (through reading of documents, training workshops, discussions with people, media, in school, etc.)

2. Do you know the CITES Appendices? Yes [], No []

3. Are you able to identify species protected under the national law during a control?

a) For Plant: yes [] no [] some []

b) For animals: yes [] no [] some []

4. Are you able to identify a CITES plant or animal species during a control?

a) For Plant: yes [] no [] some []

b) For animals: yes [] no [] some []

5. a) Do you know plants species in your zone that are protected under the law? Yes [] No [] No idea [] If yes, which?

b) Do you know animal species in your zone that are protected under the law? Yes [] No [] No idea [] If yes which?

6. Do you know in which class Kosso is categorised

a) the forestry law of Cameroon Yes [] No [] If yes what does this mean to you?

b) the CITES Appendices? Yes [] no [] If yes what does this mean to you?.....

7. Does the local community know the law governing the exploitation of species in Cameroon? Yes [] No []

8. If not what is done at your level to make sure people know and respect these laws?
.....
.....

9. Has Kosso wood been carrying out of the Cameroon borders in your area of control? Yes [] No []

Any presentation of a permit by the exporter? Yes [] No []

If not, what measures do you take?
.....
.....

10. Where do the exploiters come from?

11. How often are you confronted with illegal exploitation of Kosso in your area?
frequently [] at specific periods [] undetermined []

12. What is the highest quantity ever seized?

13. Which means is used to transport the wood?

14. What is Kosso used for locally and in the international market?
Locally.....
Internationally.....

15. Which parts of the tree are mostly exploited and for what purpose?
.....
.....

16. Apart from Kosso, which other protected plant species are illegally exploited in your zone?

17. At your level what do you do to reduce the illegal exploitation of plant species in your area of control?

.....

18. How is the hierarchy ensured that decisions signed concerning the exploitation of a species is properly implemented in the field?

.....

.....

19. What difficulties do you face in the field?

.....

.....

20. What recommendations can you make to the hierarchy for a proper control and better management of protected species in your zone of competence?

.....

.....

.....

ANNEX D: Interview guide addressed to Custom controllers on the Topic: Management Constraints and Perspectives for Sustainable Use of Pterocarpus Erinaceus in Cameroon

Date of interview.....

Location.....

- 1. Have you ever heard about CITES? Yes No
- 2. If yes, through which means? Workshops Media in documents
by conversation others
- 3. Have you ever heard of the CITES permit? Yes [] no [] If yes, are you able to use it?
Yes [] no []
- 4. Do you know the role of the custom in CITES? Yes [] no []
- 5. Are there any products of fauna or flora that you have had to control at the border zone?
Yes No If yes, which ones?
.....
.....
- 6. What action do you take when you intercept these products?
.....
.....
.....
- 7. Have you heard about Kosso before? Yes No If yes, can you identify
it? yes [] no []
- 8. Are you aware that this species is protected under the forestry law? Yes [] No []
- 9. How many times have you intercepted Kosso crossing the borders? Once [] twice []
more than twice []
- 10. What is the highest quantity ever intercepted?
- 11. What means are used to transport the product?
- 12. Which parts of the tree is transported?

13. Do you know what the wood is used for? Yes [] no []
14. Do you know the measures taken on illegal exportation of the species? Yes [] no []

ANNEX E: Interview Guide for Focus Group Discussion with Communities on the Topic: Management Constraints and Perspectives for Sustainable Use of Pterocarpus Erinaceus in Cameroon

1. Date of interview
2. Community
3. Sub-Division
- Geo. Coordinates

Knowledge of *Pterocarpus erinaceus*: habitats, distribution, uses, threats and trade

Section 1: Habitat, distribution and threat

1.1 Do you know *Pterocarpus erinaceus* (*Kosso, bani, banuhi*)?

Yes No

1.2 Where can we find stands of Kosso in your locality?

In protected areas on farm land in the bushes around the habitation areas Everywhere in the locality

1.3 What can be the estimated distance from the village to the zones of high concentrations?

Less than 1km 1-5 km 6-10 km above 10 km

1.4 On which type of soils do we observe optimum growth? Clay soil sandy soil sandy-clay soil rocky soil stony soil

1.5 How can you describe the topography of the species? On hills on slopes in valleys on plains

1.6 Does it grow in association with other species? Yes No If Yes which ones -----

1.7 Can you find the species gregarious in some areas in your locality? Yes [] No []

1.8 Do crops do well in the habitats of the species? Yes No Any reason for your response? -----

1.9 Before farming on sites where Kosso is found, do you burn, cut down or prune the trees? -----

1.10 When the trunk is cut down, does it regenerate new shoots?.....

1.11 How long does a young plant takes to become a mature tree? 3-5 yrs [] 5-8yrs [] 8-10yrs [] above 10yrs []

1.12 When the bark is removed, does it regenerate or the tree dies off?.....

1.13 When the branches are pruned, how long does new leaves take to regenerate? Less than one month [] 1-2 months [] 2-3months [] more than 3 months []

1.14 Do you think continues pruning of the tree affect the development of the tree in any way? yes [] no [] If yes, how?

1.15 Estimated range of the height of a mature tree in your locality? Between 1-5m [] 6-9m [] 10-13m [] 14-17m [] 18m and above []

1.16 How has the distribution of the species evolved during the past 10 years in terms of distance between individuals? reducing [] constant [] increasing []. Any reason?

Section 2

2. Uses of Kosso

2.1 Which parts of kosso (*Pterocarpus erinaceus*) are useful in your locality and what are they used for?

.....
.....

.....
.....
.....

2.2 Which part in 2.1 is most commonly use in your community?
Why?

.....

2.3 What technique of extraction is use in 2.2 above?

.....

2.4 How can you evaluate the population of the species now to 5 years back in relation to it uses? Declining [] constant [] increasing []. Any reason?

.....
.....

2.5 Which uses of Kosso has an affect on the abundance of the species?

.....
.....

2.6 What is the reason of this observation in **Q 2.5** above?

.....
.....

2.7 What has been the trend in the utilisation of Kosso over time?

Increasing [] decreasing [] constant [] don't know []

2.8 Which period is Kosso most exploited/harvested within the year?

Rainy season [] Dry season [] All year round [] Unknown []

2.9 Are there periods of the year when it is exploited for a particular purpose? Yes [] No []

If yes, when and for what purpose?

2.10 What do you think about the current level of uses of Kosso and its effects on the species?

.....

2.11 Which other tree species are of great use in your locality? (In order of importance)

Species	Uses

Section 3:

3. Trade

3.1 Do you know that Kosso is a protected under the law in Cameroon? Yes [] No []

3.2 Are you aware that Kosso logs are being sold abroad? Yes [] No []

3.3 Which parts or products of Kosso is commercialised in your community?

.....

3.4 Do people come from other areas to harvest Kosso for sell? Yes [] No []

If yes, from where?

3.5 Which parts of the tree is mostly commercialised?

.....

3.6 How is the product transported?.....

3.7 Does harvesting of Kosso wood in your locality by a stranger need an authorisation?

Yes [] No []

3.8 If yes, from who?

3.9 If no, why?

.....

3.10 Does your community benefit in the sale of the kosso wood in any way?

.....

3.9 For how long has harvesting of kosso wood been going on in your locality? 2yrs [] 3yrs [] 4yrs [] over 5yrs []

ANNEX F: National legal and regulatory instruments (Extracted from TRAFFIC Report, August 2016)

- ❖ Law n° 94/01 of 20/01/1994 to lay down forestry, wildlife and fisheries regulations
- ❖ Framework law on the Environment;
- ❖ Criminal Procedure Code;
- ❖ Decree No. 95/531/PM of 23 August 1995 to determine the conditions for the implementation of Forestry Regulations;
- ❖ National Strategy for forestry and wildlife controls;
- ❖ The Forestry control guide adapted to the National control strategy and the criteria of FLEGT VPA;
- ❖ Decision No. 0108/D/MINEF/CAB of 19 February 1998 specifying norms of intervention in forestry milieu;
- ❖ Decision No. 1354/D/MINEF/CAB of 26 November 1999 setting forest classification procedures of the permanent forest domain of the Republic of Cameroon;
- ❖ Decision N° 0104/D/MINFOF/SG/DF/SDAFF/SN of 02 March 2006 providing the designation and definition of the role of the CITES Scientific Authority in Cameroon.
- ❖ Decision No. 08102/MINFOF/SG/DF of 10/02/2012 cancelling authorization for recuperation and timber removal;
- ❖ Decision no. 0004/MINFOF of 02 Feb 2013 laying down the criteria and procedures for issuing certificates of legality under the FLEGT licensing scheme;
- ❖ Ministerial Order N° 067/PM of 27 June 2006 providing the organisational set-up and operational procedure of the Inter-ministerial Coordination and Monitoring Committee for the implementation of the Convention on the International Trade in Endangered Species (CITES);
- ❖ Order No. 0000133/CF/MINFI of 23 August 2012 specifying Free On-Board values for timber logs for export;
- ❖ Circular letter No. 0147/LC/MINFOF/CAB of 12/06/2013 laying the procedure for auctioning seized timber and the applicable minimum price;
- ❖ Circular letter No. 0003/LC/MINFOF/CAB of 09/01/2015 related to illegal logging and public auctioning of seized timber;
- ❖ Circular letter No. 0170/LC/MINFOF/PCLCC/MCLCC of 18/09/2014 instituting the application of the rules of Best Practices in the procedure and methods of Control on road for ligneous and non-ligneous forest products;

- ❖ Circular letter N° 354 on timber recuperation

International Conventions linked to forest signed by Cameroon as well as Agreements with other Parties:

- ❖ Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)
- ❖ Convention on Biological Diversity
- ❖ Convention on Climate Change
- ❖ Algiers Convention
- ❖ UNESCO Convention (World Heritage)
- ❖ International Tropical Timber Agreement (ITTA)
- ❖ World Trade Organization, (WTO)

ANNEX F: Ministerial Decision classifying *Pterocarpus erinaceus* newly in Cat A and a list of the special forest and non-timber forest products in Cameroon.

REPUBLIC OF CAMEROON
Peace – Work – Fatherland
MINISTRY OF FORESTRY
AND WILDLIFE
CABINET

REPUBLIQUE DU CAMEROUN
Paix – Travail – Patrie
MINISTERE DES FORETS
ET DE LA FAUNE
CABINET

0088

18 FEB 2022

DECISION N° _____/D/MINFOF/CAB DU _____
Modifiant et complétant l'annexe à l'arrêté n°0209/D/MINFOF/CAB du 28 avril 2019 portant classification des Produits Forestiers Spéciaux et des Produits Forestiers Non Ligneux

Le Ministre des Forêts et de la Faune,

Vu la Constitution ;
Vu la loi n°94/01 du 20 janvier 1994 portant régime des forêts, de la faune et de la pêche, ensemble ses décrets d'application ;
Vu le décret n°2005/099 du 06 Avril 2005 portant organisation du Ministère des Forêts et de la Faune, modifié et complété par le décret n° 2005/495 du 31 décembre 2005 ;
Vu le décret n°2011/408 du 09 décembre 2011 portant organisation du Gouvernement, modifié et complété par le décret n° 2018/190 du 02 mars 2018 ;
Vu le décret n° 2018/191 du 2 mars 2018 portant réaménagement du Gouvernement ;
Vu la décision n° 2356/D/MINFOF/CAB du 30 Octobre 2012 rendant exécutoire le plan National de développement des Produits Forestiers Non Ligneux ;
Vu l'arrêté n°0209/D/MINFOF/CAB du 28 avril 2019 portant classification des Produits Forestiers Spéciaux et des Produits Forestiers Non Ligneux,

DECIDE :

Article 1 : (1) L'annexe à l'arrêté n°0209/D/MINFOF/CAB du 28 avril 2019 susvisé est modifié et complété ainsi qu'il suit, en ce qui concerne les produits forestiers spéciaux et les produits forestiers non ligneux ci-après :

- Kosso (*Pterocarpus erinaceus*) : classification nouvelle dans la Catégorie A ;
- Voacanga (*Voacanga africana*) : déclassification de la Catégorie A à la Catégorie C.

(2) Le Tableau présentant la liste des Produits Forestiers Spéciaux et des Produits Forestiers Non Ligneux est en conséquence modifié ainsi qu'il suit en annexe.

LE RESTE SANS CHANGEMENT

Article 2 : La présente décision sera enregistrée et publiée partout où besoin sera.

Fait à Yaoundé, le 18 FEB 2022

LE MINISTRE DES FORETS ET DE LA FAUNE

Jules Doret NDONGO

Ampliations :

- SG/PM
- CAB/SETAT
- SG/IG
- Toutes Dir.
- Tous DRFOF/DDFOF
- Archives/Chrono

ANNEXE

Tableau : Liste des Produits Forestiers Spéciaux et des Produits Forestiers Non Ligneux par catégorie

Catégorie	Nom pilote/commercial	Nom scientifique	Partie exploitée/récoltée/ramassée
A	Pygeum	<i>Prunus africa</i>	Ecorce
	Ebène	<i>Diospyros crassiflora</i>	Bois
	Yohimbe	<i>Pausinystalia yohimbe</i>	Ecorce
	Funtamia	<i>Funtamia africana</i>	Bois
	Kosso	<i>Pterocarpus erinaceus</i>	Bois
B	Eru, okok	<i>Gnetum spp</i>	Feuille
	Rotin, rattan	<i>Oncocalamus spp,</i> <i>Eremospatha spp,</i> <i>Laccosperma Spp</i>	Tige
	Candle stick	-	Tige
	Tooth stick	-	Tige
	Gomme arabique	<i>Acacias spp</i>	Exsudat
	Charbon de bois vert	-	Bois
C	Perches des bois des forêts naturelles	<i>Essences forestières non protégés</i>	Tige
	Bois de chauffe	-	Bois
	Ndo'o, mangue sauvage	<i>Irvingia gabonensis, i, wombulu</i>	Tige
	Feuilles de Maranthacées	<i>Maranthaceae</i>	Fruit
	Moabi	<i>Baillonella toxisperma</i>	Fruit, ecorce
	Allanblanckia	<i>Allanblanckia spp</i>	Graine, feuille, écorce
	Esekeseke, Apkwa, quatre cotés	<i>Tetrapleura tetratera</i>	Fruit
	Ebai, plat plat, mbalaka	<i>Pentaclethra macrophylla</i>	Graine
	Dattier	<i>Ballonites aegyptiaca</i>	Fruit
	Ezezang, njangsang	<i>Ricinodendron heudelatii</i>	Graine
	Bitter cola	<i>Garcinia cola</i>	Graine
	Poivre	<i>Piper guineensis</i>	Graine
	Olom	<i>Sclorodophleus zinkerii</i>	Ecorce et graine
	Bush onion/Rondelle	<i>Afrostryax lepidophylla</i>	Ecorce et graine
	Mbonho	<i>Aframomum spp</i>	Fruit
	Eku	<i>Alstonia boonei</i>	Ecorce
	Fruits noirs, alele	<i>Canarium schweinfurthii</i>	Fruit
	Noisettes	<i>Caula edulis</i>	Fruit
	Nding, ozek, denço	<i>Monodora myristica</i>	Graine
	Bambou	<i>Bambousa spp</i>	Tige
	Vanille sauvage	<i>Xylopi aethiopica</i>	Fruit
	Rauvolfia	<i>Rauvolfia vomitoria</i>	Fruit
	Ziziphus	<i>Ziziphus</i>	Graine
	Essok	<i>Garcinia lucida</i>	Ecorce
	Karité	<i>Vitellaria paradoxa</i>	Fruit
	Voacanga	<i>Voacanga africana</i>	Fruit
	Ginseng	<i>Vernonia guineensis</i>	Racine
	Raphia	<i>Raphia spp</i>	Fruit, sève, tige, nervure
	Rônier	<i>Borassus spp</i>	Fruit
	Tous les autres PFNL		Ecorce, feuille, fruit, xsudat....

ANNEX G: Photos of focus group discussions and Interviews with resource persons

