



## **Socio-economic Impact of Commercial Production of Rosewood (*P. erinaceus*) in Taraba State, Nigeria**

**Y. M. Ahmed<sup>1</sup>, E. D. Oruonye<sup>1\*</sup> and H. K. Ayuba<sup>2</sup>**

<sup>1</sup>Department of Geography, Taraba State University, P.M.B. 1167, Jalingo, Taraba State, Nigeria.

<sup>2</sup>Department of Geography, Nassarawa State University, Keffi, Nassarawa State, Nigeria.

### **Authors' contributions**

This work was jointly carried out by the authors. Author YMA came up with the research problem and made all the contact, interviews and fieldwork. Author EDO designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author HKA managed the literature and proofreading and structuring of the ideas. All authors read and approved the final manuscript.

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### **ABSTRACT**

The logging of *P. erinaceus* popularly known as the African rosewood has increased at an unprecedented rate in recent times in Taraba State. This is in spite of the fact that the tree is a protected species, a status which made felling/local consumption and export of the species strictly prohibited. Despite the unprecedented exploitation of the tree, no research has been done in the state to understand and document the dynamics of rosewood exploitation in terms of the harvest, trade, revenue and benefit sharing as well as the socioeconomic impacts in the State. This study has examined the dynamics of rosewood production and trade in Taraba state. Data for the study were generated through the use of interview schedule and discussion with forestry officials, local community members and key informants in the study area. The findings of the study shows that this high exploitation of *P. erinaceus* is like a 'rush for gold' in which the activity is highly organized in a coordinated network that have defied all existing forestry regulations in the State. The exploitation of the log wood provided employment opportunity to many young unemployed youths in the area, thereby alleviating poverty of the rural communities grappling with endemic poverty.

\*Corresponding author: E-mail: [eoruonye@gmail.com](mailto:eoruonye@gmail.com);

Almost every member of the communities involved benefitted directly or indirectly from the rosewood exploitation activities. The high revenue generated by the government, forestry officials and traditional rulers gave legitimacy to the logging activities and explains why the activity persisted despite the existing forest regulations. The activities have resulted in the depletion of the rosewood species in the early sites and a shift to other parts of the State. This has resulted in loss of biodiversity, animal fodder and important timber resources in the State. The study recommends enforcement of forestry legislation and banning of rosewood export in all forms.

**Keywords:** *Exploitation; P. erinaceus; rosewood; Taraba; Nigeria.*

## 1. INTRODUCTION

Recent years have seen a dramatic increase in the production and trade of *P. erinaceus* timber in West Africa, Nigeria and Taraba State in particular. The quarterly value of China's imports of rosewood from West Africa, which totaled just 12,000 dollars (USD) in the first quarter of 2009, exceeded 180 million dollars (USD) during the third quarter of 2014, a 15,000-fold growth [1]. The same explosive trend is obviously reflected in the volumes of rosewood exported from other West African countries to the Asian continent and especially China. There is strong evidence to indicate that a series of illegal practices were implemented in order to meet this growing demand, including in particular, the illegal harvesting and unsustainable exploitation of specimens as well as complex phenomena of smuggling at the regional level [2]. There have been several reports from different countries of West Africa highlighting the persistent flow of illegal forest products especially *P. erinaceus* from the region. Nigeria leads in this trade in rosewood as at now (from 2011 to date). Despite the existence of forestry regulation and its implementation in the country, there is a rise in the illegal exploitation and large scale trading of the *P. erinaceus* in Nigeria.

The recent discovery and exploitation of rosewood (*P. erinaceus*) in the sub humid savanna lands of Taraba state has generated a lot of concern. The high rate of exploitation of this forest tree species and the large traffic flow of this wood timber across the State is a source of concern because of its likely consequence on the environment. The harvesting and trading of rosewood involves a complex web of actors and trade value chains, coupled with a weak enforcement of the forest regulatory frameworks as well as weak monitoring and enforcement regimes [2]. There is concern that the increasing illegal and unsustainable exploitation of *P. erinaceus* across the State will lead to extremely serious harmful consequences for the species,

for the environment where it grows and for human populations in the locality whose subsistence depends on it.

Although, *P. erinaceus* is a protected species in Taraba State, a status which made felling/local consumption and export of the species strictly prohibited [1], the logging of this tree is on the increase daily. This phenomena have been observed in different countries of West Africa. In the wake of this development, many countries in the region have adopted and implemented at, an early stage, regulatory measures to protect the species (through total bans on harvesting and export, or very strict control of them). Unfortunately, it is clear that these national measures often remained inadequate and failed to address regional and intercontinental drivers of illegal and unsustainable exploitation of the species [2].

Despite the fact that logging activities in the area are mostly through informal operations and permit and conveyance arrangements, no research has been done in Taraba State to understand and document the dynamics of harvest, trade, revenue and benefit sharing as well as understand the social and economic impacts to the state and areas affected by these tree felling activities. This study therefore attempts to fill this knowledge gap. The study seeks to better understand the dynamics, causes and impacts of the increase in logging of rosewood trees in the study area. The primary focus is to provide a good understanding of sudden increase in the logging and export of rosewood to China, the economic, legal, social and environmental implications.

### 1.1 Economic Importance of *P. erinaceus*

*P. erinaceus* is a rosewood species that is native to the semi-arid Sudan-Guinea savanna forests of West Africa. The tree has multiple utilization (fodder, fuel, pharmacopoeia, lumber, timber among others). The species play a key role for

human populations (particularly rural). In parts of West African countries where the species is found, it grows naturally. The tree is known to have multiple economic importance and utilizations. *P. erinaceus* is one of the most sought-after in West African dry forests, both for its color (varying from pink-red to dark brown, with dark streaks) and its technological qualities that make it an ideal wood for furniture manufacturing, decorative panels, flooring and various utensils [3]. The species has also been used locally as construction lumber (heavy construction) and for exterior joinery (including doors and windows) [4]. The resin from the tree species is used for dyeing traditional fabrics, giving them a dark purplish color that is much appreciated. The species is also harvested for charcoal making because of its excellent calorific value. In livestock management, the species is highly nutritious for animal feeding [1]. The leaves, once dried, provide fodder of high nutritious quality (energy-rich, rich in proteins and minerals such as phosphorus). For this reason, farmers usually prune trees and integrate leaves in their agropastoral system, enabling the livestock to survive the dry season. This fodder is highly sought in the major urban markets of the region. There has been reported cases of shortage of *P. erinaceus* fresh leaves in some countries of West Africa to meet the livestock feed requirement in urban areas [5]. Medically speaking, there are several pharmacological utilizations of the species. A number of studies demonstrated the importance of *P. erinaceus* in yellow fever and antimicrobial treatments [6]. The leaves, in particular, are used to treat fever, the bark would help to fight against oral infections and the resin would overcome severe diarrhea and dysentery.

### 1.2 Trend in Demand for Rosewood (*P. erinaceus*)

Chinese imports of *P. erinaceus* from West Africa increased by more than 3,000-fold in value: from 21,250 US dollars (total of Chinese imports during the first quarter of 2010) to 63,943,732 US dollars (total Chinese imports during the first quarter of 2015) [1]. These imports increased by more than 1,700 in volume from 50 m<sup>3</sup> (total Chinese imports during the first quarter of 2010) to 89,301 m<sup>3</sup> (total Chinese imports during the first quarter of 2015). During the first quarter of 2015, nearly 30% of the total value of China's imports of rosewood and nearly 55% of the volume of Chinese imports of rosewood came from West Africa [1]. This quantity was negligible

four years ago. West Africa is now competing with the Southeast Asia as the main exporting region of rosewood to China. Available information indicates that Chinese imports of rosewood from West Africa are in fact presently focused on a single species: *P. erinaceus* [7]. The major exporting countries of West Africa from September 2014 to August 2015 are (in descending order): Nigeria (38% of total regional exports in value), Ghana (18%), Gambia (11%), Côte d'Ivoire (11%), Guinea-Bissau (8%), Benin (7%) and Togo (5%) [1].

In order to meet the growing international demand and the sharp increase in the prices being offered for shipments of freshly felled specimens of timber from West African forests, many commercial networks have chosen to work on the fringes of legality. This situation is obviously reminiscent of the way the trade of rosewood gradually anchored around illegal felling, transportation and export practices in Southeast Asia [8].

The first signs of overexploitation of the species due to multiple local utilizations have been observed in several West African countries, especially in Benin, Burkina Faso, Ghana and Togo [1]. In the absence of a rapid and appropriate response, there is concern that the illegal and unsustainable exploitation of the *P. erinaceus* across its range leads to extremely harmful consequences for the species, the fragile forest ecosystems in which it grows and West African human populations which depend on it.

### 1.3 Objective of Study

This study examines the dynamics of indiscriminate exploitation of rosewood trees in the study area. The focus of the study is to provide a good understanding of sudden increase in the logging and export of rosewood to China, the economic, legal, social and environmental implications of the logging activities.

## 2. MATERIALS AND METHODS

The survey design method was adopted in this study. Data on species distribution, key actors, benefits as well as socio-economic impact of harvesting and trade of rosewood were generated through the use of interview schedule and discussions with forestry officials in the State. Discussions and oral interview were held with key informants and community members in localities where these activities are ongoing.

Some of the key informants include persons engaged in the logging, opinion leaders in selected communities, rosewood buyers, chainsaw operators, truck owners and even family members of buyers and chainsaw operators. Information on chainsaw operations, mode and means of transport as well as the transportation routes were gathered from remote surveillance and monitoring and corroborated with discussions with key informants who are directly engaged in the trade. Information on revenue and benefit sharing arrangements put in place to facilitate the trades were gathered from discussion with key informants and review of receipts from legal permits. Efforts were made to validate the reliability of all information collected. Data on species and log wood production activity as well as data on transportation routes were analyzed using descriptive statistics. Photographs of activities were taken as evidence on various aspects of the logging activities and trade in *P. erinaceus* in the state.

### 3. RESULTS AND DISCUSSION

Findings from the study shows that although logging of forest trees have been going on in Taraba state since the postcolonial era as a result of its rich natural endowment of forest resources, the increasing spate of logging witnessed in recent times in the State is unprecedented. The logging of *P. erinaceus* in Bali LGA of Taraba state was initiated by Alhaji Ali, an indigene of Gassol LGA who worked with the Chinese rosewood trade merchant at Kogi state and western part of Nigeria in 2013. The traders mobilized the youths in the community with motorized chainsaw and loans which are repaid from the proceeds of the activity. This loan ranges between ₦1 m to ₦10 m (USD3,570 to USD35,710 – at an exchange rates of ₦280 per USD \$1).

Findings from the study revealed that the State has never witnessed an explosion in indiscriminate felling of forest trees which is selective and targeted at *P. erinaceus*, popularly known as the African rosewood and *Madobiya* or *Madrid* in Hausa language (local name) before now. This high exploitation of *P. erinaceus* is like a rush gold in which the activity is highly organized in a coordinated network that have defied all existing forestry regulations in the state. This explains the difficulty of having statistics of the volume of logs exploited in the last 3 years in Taraba state. The study findings

show that in most West African countries where this large scale felling of *P. erinaceus* has taken place, it has created serious socioeconomic problems such as in Mali, Burkina Faso and Gambia where shortage of fresh leaves from the species used for animal fodder has been reported. This has made countries like Senegal to write to CITES requesting for the inclusion of *P. erinaceus* into the list of endangered species of flora.

### 3.1 Social Impact of the Rosewood Trade

#### 3.1.1 Employment

The commercial production of rosewood in the study area was a very lucrative economic activity that benefitted almost every member of the community. The activity provided employment opportunity to more than one thousand youths in one community (Mayo Kam) alone who are directly engaged in different aspects of the production such as explorer, operator, roller, loader and transporter. The multiplier effects extend to people rendering services and selling food and other basic items to the key operators. So many people migrated into the production communities to carry out trading activities. They made quite a life time profit which could be invested in other smaller businesses. The commercial production of rosewood in the area acted as poverty alleviation intervention opportunity to rural communities with prevalence of endemic poverty. According to National Bureau of Statistics (NBS) [9], Taraba state has a poverty prevalence rate of 69% and unemployment rate of 26%. So many people in the area therefore made a quick money from the rush business that lasted for a short time.

At the peak of the production last year 2015, petty traders, artisans, farmers and commercial transport workers particularly members of the Nigerian Union of Road Transport Workers (NURTW) abandoned their work to join in the lucrative business of the day. The explorers that goes about in search of the location of rosewood normally get rewarded with token amount as commission which ranges between ₦10,000 to ₦50,000 (USD35 to USD180 - present exchange rates). The operators with chainsaw were given fuel for the machine and paid ₦700 (USD 3) per rosewood tree felled, while an operator without chainsaw is given a chainsaw and fuel and paid ₦500 (USD 2) per tree felled. This amount is multiplied to the number of trees felled per day.



**Plate 1. Logs carefully packed and ready for shipment to the port of export at Mayo Kam**

Most of the trees are felled from the hilltop and rolled downslope. The rollers are paid ₦1,500 (USD 5.5) per log of wood successfully rolled down the hill. About 10 to 20 persons are required to load the logs into the trailer (long vehicle used to transport the logs) (Plate 2). The trailers can carry 170 to 200 logs of wood depending on the type of long vehicle. The loaders were paid ₦500 (USD 2) per log of wood loaded which translate to ₦85,000 (USD 304) per trailer or more depending on the number the trailer can contain. Each loader goes home with not less than ₦5000 (USD 18) per trailer successfully loaded. In major town like Bali, more than 100 trailers can be loaded in one day. When the logs are collected, the traders invite the trailer drivers from Yola town (360km) up north to come and evacuate them to the port of export in Lagos.

### **3.2 Revenue and Benefit Sharing from Rosewood Production**

Almost every member of the community benefit directly from the proceeds of the commercial rosewood production in the communities. The traders pay several forms of fee some of which were receipted while others were not. For example, at Mayo Kam community of Bali LGA, there were three loading points. At each of this loading point, the traders pay the following fees presented in Table 1.

The Table 1 shows that the trade merchant pay Timber contractor Union fee of ₦20,000 (USD 72), community youths fee (they have youth

association) ₦5000 (USD 18) and community leadership fee ₦5000 (USD 18) to the District/Village Head and Ward Head (District/Village Head - ₦4000 (USD 14), Ward Head - ₦1000 (USD 4). We also have the Local Government Forestry Department fee of ₦30,000 (USD 108) and hammering fee of ₦400 (USD 1.5) which are usually collected by the State forestry checking points. These are all receipted. The land owners on whose lands the rosewood species were found were usually paid an amount that ranges between ₦50,000 (USD 180) to ₦200,000 (USD 715) depending on the size of the land and concentration of the tree species. The motorcyclist riders who transport the operators, explorers and traders collect as much as ₦3,500 (USD 13) depending on the distance which could be up to 50km or more. The officials of NURTW also collect revenue fee of ₦20,000 (USD 72) per trailer load which is also receipted. The trade merchant is divided into different categories. The main trade merchant from China and other Asian countries at the beginning do come to the state to purchase the log woods directly but were immediately overshadowed by the Nigerian merchant. The foreign merchant therefore stay at Lagos while the Nigerian merchant, mainly the Yoruba ethnic groups and their partners from the northern state including Taraba state visit the various site of production for purchase of the log wood. At the production site in the local communities, we have the main dealers and sub dealers. The Sub dealers are individual members of the community that buys the log wood in small quantity and sale



**Plate 2. Loaders loading log woods and a Foreign trade merchant at Mayo Kam site**

**Table 1. Types of fees paid for Rosewood exploitation**

S/No	Type of Fee paid	Amount (₦)
1	Timber contractor Union fee	₦20,000 (USD 72)
2	Community youths fee	₦5000 (USD 18)
3	Community leadership fee (Village/District Heads)	₦5000 (USD 18)
4	Local Government Forestry Department fee	₦30,000 (USD 108)
5	Hammering fee	₦400 (USD 1.5)
6	Land owners on whose lands the rosewood species were found	₦50,000 (USD 180) to ₦200,000 (USD 715)
7	Motorcyclist riders	₦3,500 (USD 13)
8	Officials of NURTW	₦20,000 (USD 72)
9	State Government fee	₦400,000 (USD 1,430)

Source: Fieldwork 2016

to the main dealers who have larger capital to buy in larger quantity to resale to the Nigerian merchant. A good quality log wood sawn into rectangular shape of 2.1 m length (Plate 1) cost ₦7,000 (USD 25) while the poor quality log wood is sold at ₦6,500 (USD 23). Two good log wood of the above dimension can be cut out of a single tree stand depending on the height and shape of the tree. A trailer load of log wood cost about ₦1,190,000 (USD 4,250) or more depending on the number of logs it can contain and the quality. The government officials in the state collect revenue from the rosewood traders at the designated checking points. The government collect ₦400,000 (USD 1,430) on each trailer loaded with rosewood logs. About 30 trailer loads of logs move out of Mayo Kam community which will translate into ₦2,800,000 (USD 10,000) revenue to the State government weekly,

₦12,000,000 (USD 42,860) monthly and ₦144,000,000 (USD 514,300) per annum. In Bali town where 200 trailers can be loaded in one day, that will translate to ₦80,000,000 (USD 285,715). There are many sites where production and loading are taking place simultaneously at the same time. This revenue collected by the government gave legitimacy to the logging activities and explains why the activity persisted despite the existing forest regulations.

### 3.3 Economic Impact of the Rosewood Trade in the State

The commercial production of rosewood in the study area attracted large influx of people from different parts of the country who engage in various aspects of the log wood production activities. Within the period of the production,

there has been significant boost in financial capital available to different segment of the communities. Some key actors in the production and trade were reported to have acquired certain assets that hitherto they were not able to afford. Many people built houses, some bought new vehicles and motorcycles for commercial transport as well as marry new wives. The activity boosted the financial standing of key actors and significantly improved their household budgets. Operators of businesses such as guest houses, provision shops, fuel service, mechanic shops, restaurants and food vendors saw an increase in patronage for their businesses. At the peak of the business, some home owners rented out single rooms to these operators who paid rent on a daily basis in most cases. Some other actors like the operators and loaders were reported to have purchased CD players, Satellite decoders, TVs, and mobile phones, just to name a few. The proceeds from the youth fee are collected and later shared to members of the community. Some part of the money were given to the mosque and churches in the community, while the rest of the money were shared to each adult members of the households in the community. The activity thus impacted positively on the rural economy and social life of the affected communities as petty theft were reported to have reduced drastically if not completely stopped. The affected communities also witness increase in social events like wedding ceremonies, parties and celebrations as a result of upliftment in the social and economic status of members of the communities.

### **3.4 Depletion of Forest Resources**

The findings of the study show that about 30 trailer loads of the log wood or more are transported from a single site Mayo Kam weekly. This gives an estimated 2,250 stands of *P. erinaceus* trees that are felled weekly and 132,600 stands felled annually. Invariably, not less than 400,000 stands of *P. erinaceus* trees have been felled in this single site in the last 3 years that the activity has thrived in the area. Within the state, the tree is found mostly in central senatorial district. High densities of *Pterocarpus* sp, can be found between Ardo Kola, Garba Chede, Mutum Biyu, Gassol, Bali, Gashaka, Kurimi and Takum LGAs (Fig. 1). In Bali town alone, over 100 trailers can be loaded in one day. The findings of the study show that the logging activities have subsided drastically in most of the early sites of the production as a result of depletion of the specie and the activities

have shifted to other sites within the state especially Gashaka LGA where the largest National Park in West Africa, Gashaka-Gumti National Park is located.

### **3.5 Risk Factors involved in Rosewood Exploitation**

The risk factors involved in the indiscriminate exploitation of rosewood in the study area are divided into direct and indirect risk.

#### **3.5.1 Direct risk**

These are risk that are directly associated with rosewood log production. They include;

- i. Accidents from rolling of log from hilltop downslope can result in trampling and triggering of rock fall that could injure people and vehicles parked at the foot of the hill. There have been few cases recorded in some of the sites.
- ii. Injuries from chainsaw cutting as a result of the hardness of the tree has been reported in some of the sites in the study area especially for people handling the machine for the first time.
- iii. Outbreak of fire from generators. Some of the operators smoke cigarette or hemp while working and fuelling the chainsaw machine, which in some cases have cause outbreak of fire and burnt.
- iv. There are incidences of tree falling on the operators as a result of poor knowledge of the techniques of felling the trees.
- v. Accidents from loading can result from log wood falling on individual because of the relative weight of the log.

#### **3.5.2 Indirect risk**

These are risk that was indirectly related to the rosewood log exploitation. The indirect risks include accidents from motorbike. Since the sites of tree felling are very far into the forest, the motorcyclist in the course of transporting the operators, explorers and traders over speed which often results in accidents and injuries. There were cases of kidnap and demanding of ransom from some of the traders because of lack of Banks in some of the rural communities that necessitate traveling with bulk cash. Dust and smokes from the chainsaw machine affect the health of the operators as most of them do not use protective mask while working.

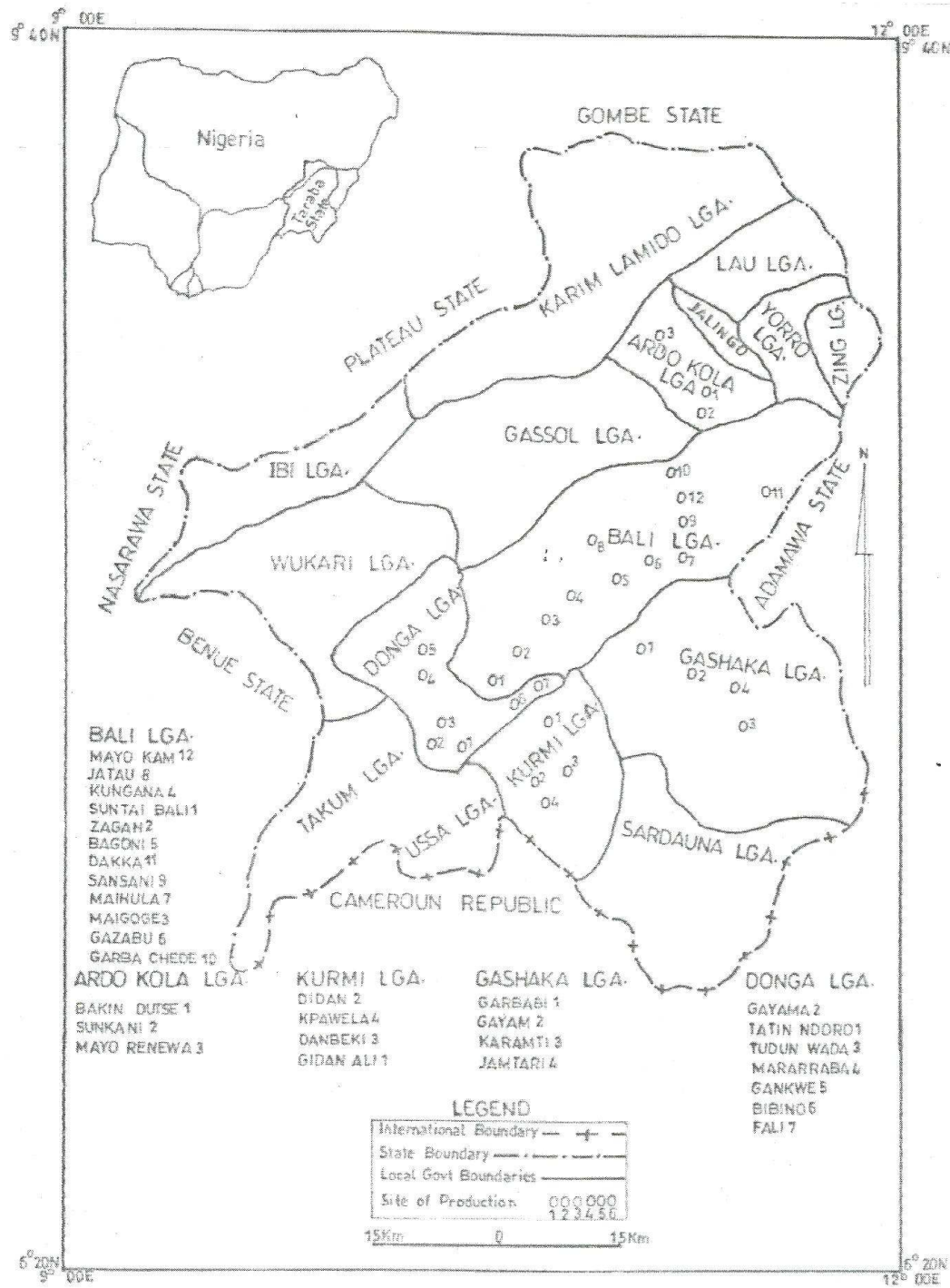


Fig. 1. Map of Taraba State showing some Rosewood production SITES

#### 4. CONCLUSIONS

The increase in the production and trade of rosewood in Taraba State is unprecedented over

the last four years. Although, there are benefits such as the provision of employment, poverty alleviation and revenue generation by government, the activities have resulted in the



depletion of rosewood species in the early sites and a shifts to other parts of the State. This has resulted in loss of biodiversity, animal fodder and important timber resources in the State. The depletion of rosewood and loss of biodiversity have been attributed to the highly syndicated nature of the logging, weak enforcement of the forestry legislation and illegal exports of the rosewood.

## 5. RECOMMENDATIONS

A few recommendations are proposed:

1. There is need to enforce the forestry legislation in order to stop the menace of rosewood harvesting and trade.
2. The government can do well by completely banning its export in all forms. Banning all exports, also mean that the necessary due diligence should be put in place to ensure that operations to collect abandoned logs at stump site does not lead to fresh cutting as the cycle has always been.
3. To forestall the future incidence of commercial exploitation of a particular species or ecosystem, the government should empower the forestry department to fully enforce the forestry laws and policies in Nigeria and Taraba State.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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