

Population Status, Trade and Sustainable Management of African Rosewood, *Pterocarpus erinaceus* in Ghana



Accra, Ghana
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Executive Summary

Pterocarpus erinaceus is a rosewood species native to the semi-arid Sudan-Guinea savanna forests of West Africa. The last few years have seen a dramatic increase in international trade of *P. erinaceus* timber, in response to rising demand in Asia for rosewood furniture. The Conference of the Parties to the CITES mandates the Animal and Plants committees in co-operation with the secretariat and experts and in consultation with range states to regularly undertake Review of Significant Trade (RST); RST procedure is applied when trade in a species is suspected to be unsustainable and a threat to wild populations. This RST procedure allows the review of biological, trade and other relevant information on Appendix II species subject to significant levels of trade. This report is in fulfilment of a request by CITES Secretariat for Ghana to provide scientific information to justify that international trade in *P. erinaceus* from the country is not detrimental to the survival of the species and that the trade is compliant with Article IV of CITES.

The Faculty of Renewable Natural Resources, College of Agriculture and Natural Resources, Kwame Nkrumah University of Science and Technology, Kumasi is the Scientific Authority for CITES in Ghana. It coordinates efforts in the conduct of Non-detriment Findings (NDF) for species in international trade from Ghana. The Scientific Authority works closely with Wildlife Division of the Forestry Commission (CITES Management Authority) and other private and government research institutions, and Agencies to undertake NDF for species. Some keys aspects of the NDF for *P. erinaceus* is as follows:

Species distribution and population estimate and trends: Based on population inventories conducted in 2013, 2017 and 2021 in Ghana, *Pterocarpus erinaceus* has been identified to occur mostly in the forest-savannah transition zone and parts of the northern savannah woodland ecological zone of Ghana. The 2021 inventory data estimated the total number of stems of *P. erinaceus* to be 35,979,296 (stem \geq 20 cm dbh) equivalent to a stand volume of 25,591,358.12 m³ in fallow and farmlands. This population excludes those in conservation areas (Wildlife protected and forest reserves) that are prohibited from harvesting. The current figure indicates a 50% reduction in both total stem numbers (71,660,961) and stem volume (50, 879,282.31 m³) estimated in 2013.

Threats: Felling of the small diameter size-class tree for charcoal making and illegal logging of bigger diameter size-class trees fuelled by international trade remains the biggest threats to the survival of the species in the wild. Saplings are also destroyed by wildfires and inappropriate agricultural practices.

Trade and illegal exploitation: Data from the Timber Industry Development Division (TIDD) of the Forestry Commission revealed actual export of the species increased from 125.5 m³ in 2008 to 40,998.7 m³ in 2013. Following a decline in export between 2014 and 2015, export volumes increased rapidly to 81,958.7 m³ in 2016 and then progressively declined to 10,021.2 m³ in 2019. A total of 293,519 m³ of *P. erinaceus* timber valued at 187,720,557 Euros have been exported by Ghana between 2008-2019. The total volume of illegal *P. erinaceus* timber confiscated was 6,070 m³ in 2019 and 21,154 m³ in 2020.

Export quota in place for the species: While Ghana has no established quota system for export of the species because it was not regarded as one of the traditional timber species exported, the Government of Ghana banned the harvesting and exporting of the species since 2012. The ban makes it illegal to harvest and export the species and offenders are fined and/or prosecuted.

Following consecutive inventory of *P. erinaceus* populations on fallow and farmlands, Ghana has adopted an indicative national quota of 52,917 m³ (i.e. 50% of the estimated felling quota of 105,832.43 m³) to be implemented from January 2022.

Species management and conservation: 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 in Ghana. This includes the strict prohibition of species harvest in wildlife conservation areas (Wildlife protected areas and forest reserves), enforcement of a national ban on harvesting and export of *P. erinaceus*, establishment of research, monitoring and plantation development programmes, encouraging citizen planting (e.g. Green Ghana program), 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 custom officers.

National laws and regulations: The Constitution of Ghana makes provisions relating to the requirement of Parliamentary ratification of agreements alluding to the grant of a right or concession for the exploitation of any natural resources (Article 268) and establishes natural resources commissions [Forestry Commission] which shall be responsible for the regulation and management of the utilisation of the natural resources concerned and the coordination of policies in relation to them (Article 269). There are also Primary Legislations defining forest offences and prescribed sanctions and/or penalties for such offences (Forest Protection Decree, 1974 (N.R.C.D. 243), provision for the grant of timber rights in a manner that secures the sustainable management and utilisation of timber resources – Timber Resources Management Act 1997 (Act 547), and that empowering plantation growers, both in the public and private sectors to participate in forest plantation development (The Forest Plantation Development Fund (Amendment) Act 2002. Subsidiary Legislations such as Timber Resources Management and Legality Licensing Regulation LI 2254 of 2017, outlines conditions under which a product containing wood sourced and/or processed in Ghana can be licenced for sale within Ghana or for export from Ghana.

In conclusion, Ghana, has established a comprehensive system to manage and monitor the populations of *P. erinaceus* including plantation development to promote conservation of the species. The adoption of a quota system to regulate the harvest and trade of the species will ensure sustainable trade and conservation of the species in the wild.

The implementation of Ghana's Legality Assurance Systems also considers the legal framework that governs the management, law enforcement and trade of the species. The passing of the subsidiary legislation -Timber Resources Management and Legality Licensing Regulation LI 2254 of 2017, outlines conditions under which a product containing wood sourced and/or processed in Ghana can be licenced for sale within Ghana or for export from Ghana. Finally, the commitment and willingness of the different Divisions of the FC to implement the management and legal systems will ensure that the trade is done sustainably and not detrimental to populations in the wild.

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Thanks to all staff of the Forestry Commission who contributed to the development of this report.

1.0. Introduction

Pterocarpus erinaceus is a rosewood species native to the semi-arid Sudan-Guinea savanna forests of West Africa^{1,2}. The last few years have seen a dramatic increase in trade of *Pterocarpus erinaceus* timber, first in response to rising demand in Asia for rosewood furniture and second, the increasing scarcity of other officially recognized 'rosewood' species (several of which are listed on the CITES Appendices). It is reported that widespread illegal and unsustainable harvesting of the species across its range may have led many range States to enact total ban on harvesting and trade of the species in recent years, in an attempt to prevent commercial extinction, yet high volumes of international trade in the species continues. The species is currently listed in Appendix II of the Convention on International Trade in Endangered species of Wild Flora and Fauna (CITES) in order to regulate international trade in the species.

When international trade in a species is suspected to be unsustainable and a threat to wild populations, the Conference of the Parties to the CITES mandates the Animal and Plants committees in co-operation with the secretariat and experts and in consultation with range states to regularly undertake Review of Significant Trade (RST); RST procedure (defined in Resolution Conf. 12.8 (Rev. CoP17)). This is to identify species that may be subject to unsustainable levels of international trade, and to identify problems and solutions concerning effective implementation of the Convention. This RST procedure allows the review of biological, trade and other relevant information on Appendix II species subject to significant levels of trade.

The provisions in the RST procedure require that a Scientific Authority makes a scientific assessment that international trade will not be detrimental to the survival of the species concerned. This assessment is often referred to as making a "non-detriment finding". The Standing Committee at its 70th meeting (SC70, Sochi, October 2018) requested the Plants Committee to consider the inclusion of *Pterocarpus erinaceus* from all range States in the Review of Significant Trade and report its findings and recommendations to the 73rd meeting of the Standing Committee. In addition, the Conference of the Parties at its 18th meeting (CoP18, Geneva, 2019) adopted Decision 18.92 on Wildlife crime enforcement support in West and Central Africa. Paragraph b of that Decision instructs the Standing Committee to "consider any report from the Plants Committee, in response to the recommendation agreed at its 70th meeting, concerning the inclusion of *Pterocarpus erinaceus* from all range States in the Review of Significant Trade and make recommendations as required".

In support of Decision 18.92, the Secretariat submitted for consideration of the Plants Committee at its 25th meeting (PC25, online, June 2021), documents PC25 Doc. 15.5 and its Addendum. Document PC25 Doc. 15.5 presents a report on the conservation status of and trade in *Pterocarpus erinaceus* in all range States, and its Addendum presents information provided by several range States of *Pterocarpus erinaceus*. Based on this, the Plants Committee decided at PC25 which *Pterocarpus erinaceus*/country combinations should remain in the RST process. At PC25, the

¹ Dumenu, W.K.2019. Assessing the impact of felling/export ban and CITES designation on exploitation of African rosewood (*Pterocarpus erinaceus*). Biological Conservation 236 (2019) 124–133.

² Kossi, A., Towanou, H., Habou, R., Kossi Novinyo, S., Komla Elikplim, A., Benziwa Nathalie, J., Pyoabalo, A., Christine A.I. Nougbodé, O., Akossioa Marie-Luce, Q., Adzo Dzifa, K., Ali, M., & Kouami, K. (2019). Challenges of Conservation and Sustainable Management of African Rosewood (*Pterocarpus erinaceus*) in West Africa.

Plants Committee determined that action is needed for *Pterocarpus erinaceus* from Ghana and to therefore include it in Stage 2 of the RST process. The Committee also agreed to refer all *Pterocarpus erinaceus* range States to the Standing Committee for further consideration under Decision 18.92, based on documented, widespread and pervasive illegal trade [see PC25 Summary 4 (Rev. 1)].

Recognising the urgency of the matter, the Plants Committee agreed to move the RST process forward via intersessional decision-making, in accordance with Rule 19 of the Plants Committee's Rules of Procedure. Accordingly, the CITES Secretariat is undertaking relevant consultations with range States and will make available to the Plants Committee an updated report on *Pterocarpus erinaceus* based on any additional information provided by range States.

To this end, the CITES Secretariat requested Ghana to provide the scientific basis by which Ghana established that exports of *Pterocarpus erinaceus* from the country are not detrimental to the survival of the species concerned and are compliant with Article IV of CITES, as well as identifying any challenges that might impede the implementation of Article IV. This report seeks to provide the CITES Secretariat with information required to assess the implementation of Article IV, paragraphs 2(a), 3 and 6(a) with regard to exports of *Pterocarpus erinaceus* from Ghana, including any information regarding potential illegal trade.

2.0. Non- Detriment Finding Decision-making (NDF) process in Ghana

The Faculty of Renewable Natural Resources, College of Agriculture and Natural Resources, Kwame Nkrumah University of Science and Technology, Kumasi (KNUST) is the Scientific Authority for CITES in Ghana. It conducts Non-Detriment Findings (NDF) to scientifically evaluate parameters such as species distribution and habitats, population status and trends, harvest practices, as well as volumes and impact of trade in target species. The findings result in the issuance of a positive or a negative recommendation to the CITES Management Authority of the Ghana. Generally, the Scientific Authority goes through a series of cycles as showed in Figure 1 to conduct an NDF. In summary, it starts with a preliminary evaluation exercise to ascertain if a detailed, science-based NDF is needed for the species and specimens concerned. If it warrants a science-based NDF, then there is the evaluation of conservation concerns and potential biological risks. Assessments at these steps set the context of risk that the harvest, trade and management should be considered (Figure 1). The procedure continues with a detailed evaluation of harvest impacts, and trade impacts relevant to the species concerned as well as an evaluation of whether the management measures in place are sufficiently rigorous to mitigate the concerns, risks, and impacts identified. The overall findings of these process culminate in a positive or negative NDF recommendation to Management Authority.

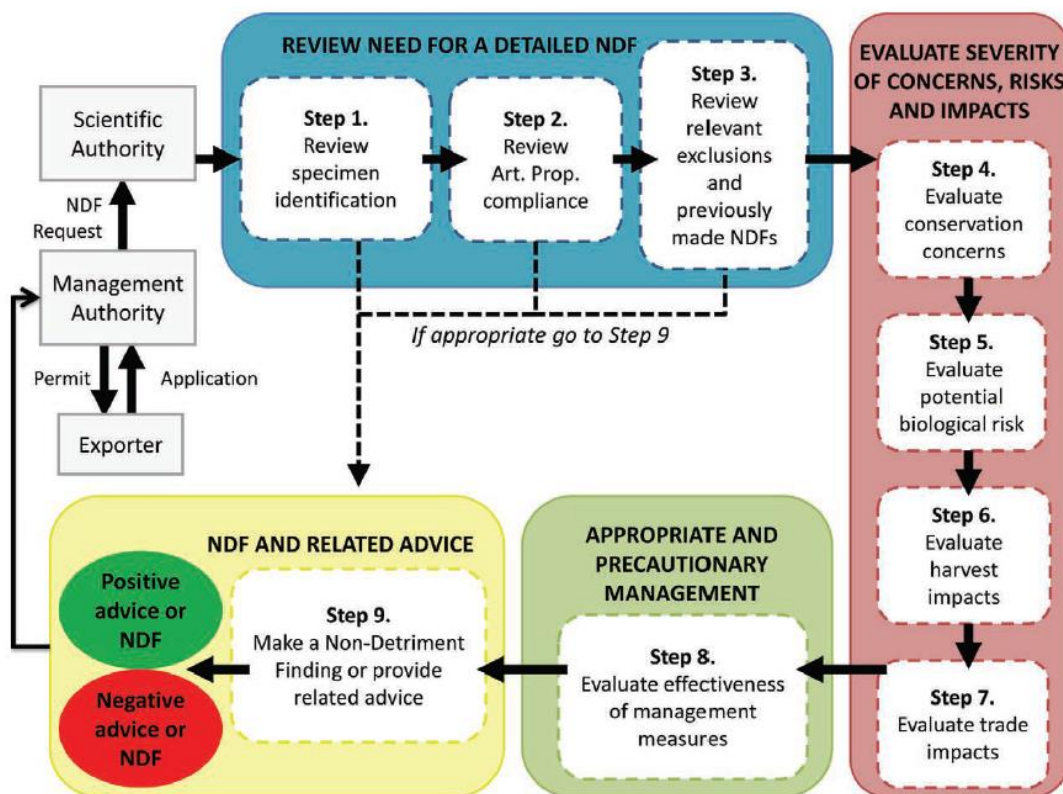


Figure 1. Simplified pathway adopted by the Scientific Authority for making NDF for Timber/Tree species listed in CITES Appendix II (Adopted from Wolf et al. 2018)³

³Wolf D, Oldfield T E.E. and McGough N (2018). CITES Non-detriment Findings for Timber. A nine-step process to support CITES Scientific Authorities making science-based non-detriment findings (NDFs) for timber/tree species listed in CITES Appendix II Version 3.0 (BfN-Skripten 504).

2.1. Institution(s)/expert(s)/stakeholder(s) involved in making the NDF, other than your designated Scientific Authority.

The CITES Scientific Authority in Ghana plays a lead and co-ordinating roles in undertaking NDF for species in trade in Ghana. It co-ordinates activities of other governmental and non-government research organisations as well as collaborate with private consulting companies and wildlife traders. To undertake the NDF for *Pterocarpus erinaceus*, the following Agencies contributed significantly to this report;

- **Wildlife Division of the Forestry Commission (WD):** It is responsible for management and conservation of all wildlife resources in the country and administers 16 Wildlife-Protected Areas (PAs), 5 Coastal Ramsar Sites and the Accra and Kumasi Zoos. It also assists with the running of 2 community owned Wildlife Sanctuaries and promotion of the Community Resource Management Area concept in Ghana. The WD is the CITES Management Authority in Ghana.
- **Resource Management Support Centre of the Forestry Commission (RMSC)** is the technical wing of the Forestry Commission (FC) with responsibility to explore, develop, facilitate and support the implementation and monitoring of effective and affordable forest management systems in Ghana. The Centre as part of its mandate conducted inventories of *Pterocarpus erinaceus* populations across distribution range of the species in Ghana in 2013, 2017 and 2021. The Centre collaborates with Scientific Authority to set felling and export quotas for the species exploitations.
- **Forest Services Division of the Forestry Commission (FSD):** The Forest Services Division is responsible for the implementation of policies, laws, regulations and procedures guiding the management and exploitation of forest resources in Ghana. A fundamental activity of the FSD under the **Ghana's Legality Assurance System (GhLAS)** is the grant of rights to harvest timber. Such rights are of four main categories including: 1. Timber Utilization Contract, 2. Timber Utilization Permits, 3. Salvage Permits, 4. Special Permits.

Before the right of exploitation is given out, the FSD conducts 'Stock Enumeration' to ascertain quantitative information which will be used to determine whether or not a given compartment can be harvested. The FSD is also in charge of generating information about all trees that are felled through the use of Tree Information Forms (TIF) and Log Information Forms (LIF). Similar tree and log information are captured in the case of Plantation estates. Before all trees could be transported, the FSD is the authority to issue (Log Measurement Conveyance Certificate-LMCC) which is the legal document to permit transportation of logs overland. The FSD is also leading the establishment of *Pterocarpus erinaceus* plantations in Ghana.

- **Timber Industry Development Division of Forestry Commission (TIDD):** TIDD is responsible for establishing guiding price systems for the vetting of contracts of export of wood products. It conducts pre-shipment inspection and examination of wood products and issue permits for the export of timber and wood products. TIDD is also responsible for publishing market intelligence in order to inform industry, government and public

regarding pricing, trade and product trends that could impact on the sector, track the movement of logs from forest gates after the issuance of conveyance certificates. While TIDD provides management and technical training for the wood industry and undertake the certification and registration of authorized timber graders and establish levels of certification for such graders, it monitors the supply of lumber to the local market by recognized millers with the support of the Forest Services Division. Additionally, TIDD advises on approvals to establish new processing mills and register timber processors and traders in timber and wood products, and collaborate with international and timber associations on marketing and utilisation of wood products as well as coordinate foreign technical assistance aimed at improving efficiency with the industry.

- **Viridis Environmental Consult:** Viridis is a private consulting firm specialized in environmental research and rural development in Ghana. It offers services in Natural Resources Management and Agricultural development. It supports the Scientific Authority in the conduct of NDF research on international trade in plants and animals.

2.2. Scientific Authority monitoring of species export levels

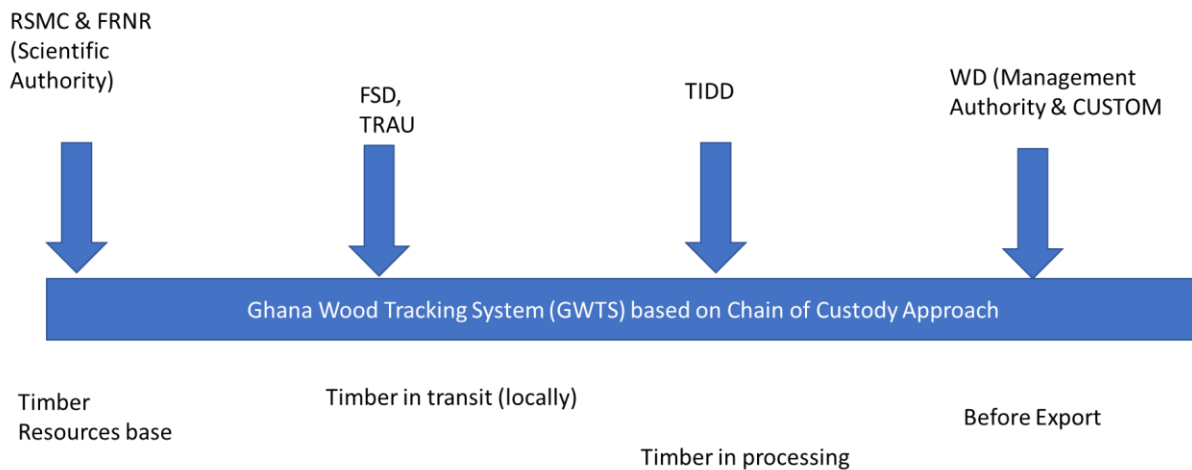


Figure 2. Monitoring population and volumes of *P. erinaceus* through the Chain of Custody approach

The Scientific Authority monitors the level of export through (Figure 2);

- RMSC monitors the stocking rate and density of species in the wild.
- FSD monitors volumes being conveyed for processing or direct export through Lumber Monitoring Conveyance Certificate (LMCC) systems.
- TIDD monitors volumes of timber exported both processed or in the direct form
- WD issues CITES permits for Timber in international trade
- Custom Services at port monitors export containers and documentation for specified volumes.

Currently, Ghana is implementing a system or systems (Ghana Wood Tracking System) to verify that timber products for shipment have been legally-produced and that only shipments verified as

such are exported to the international market. The system for verification includes checks of compliance in order to provide assurance that the timber products destined for export to the international market have been legally produced and that legality licences are not issued in respect of shipments of timber that have not been legally-produced, or are of unknown sources. The system also includes procedures to ensure that timber of illegal or unknown origin does not enter the supply chain.

3.0. Ecology and population Status of *Pterocarpus erinaceus* Poir in Ghana

3.1 Species Profile

Nomenclature:

Pterocarpus erinaceus Poir. Syn. *Drepanocarpus senegalensis* T.Nees & C.H.Eberm., *Echinodiscus erinaceus* Benth. ex Walp., *Lingoum erinaceum* Kuntze, *Pterocarpus adansonii* DC., *Pterocarpus africanus* Hook., *Pterocarpus senegalensis* Vahl, *Pterocarpus senegalensis* Vahl ex DC.

Kingdom: Plantae
Phylum: Tracheophyta
Class: Magnoliopsida
Order: Fabales
Family: Fabaceae
Genus: *Pterocarpus* Jacq
Species: *Pterocarpus erinaceus* Poir

Common names:

English: ko African kino, African rosewood, African-teak, Barwood, Gambian kino, Senegal rosewood, West African kino, West African rosewood, Black camwood, Madobia

Français: bois de vène, palissandre du Sénégal Portugais: pau de sangue Ghana: krayie / kpatro
 Gambie: keno / kino Fulfulde (B.Faso): bani / banuhi Bambara: gwani / n'gueni Djerma: tolo
 Gourmantché: bu natombo Moré: noega, noeka, pempelaga Sérér: ban Wolof: ven, yirk Autres: muninga, barwood, mukwa.

3.2. Botany and Ecology

Pterocarpus erinaceus Poir. is a small to medium-sized tree 12–15 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 6–8 m long or more can be found⁴. Exceptionally tall trees reaching 35 m height have been reported⁵ (von Maydell 1983). The bark of the trunk is dark gray and rough, with scales that curl up at the ends. Its branches are light gray and smooth. The leaves are once-compound, imparipinnate, and 30 cm long. There are 10–15 alternate or subopposite leaflets, 6–11 cm long and 3–6 cm wide⁶. The flowering tree is showy and very attractive, with masses of golden-yellow flowers that completely cover the canopy. In its native range, *Pterocarpus erinaceus* flowers from December to February⁷. The fruit is 4–7 cm in diameter, indehiscent, and broadly winged, 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.

Pterocarpus erinaceus is found in open dry forests of semiarid and subhumid lands with mean annual rainfall of 600–1200 mm and a moderately to very long dry season that can last 8–9 months. 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) and thrives even on shallow soils. It is drought tolerant and once established it survives yearly dry seasons. It also survives the yearly

⁴ Lely, H. V. 1925. The useful trees of northern Nigeria. Crown Agents for the Colonies, London. 128 p

⁵ von Maydell, H.J. 1983. Arbes et arbustes du Sahel. Leurs caractéristiques et leurs utilisations. Eschnorn, GTZ. 531 p

⁶ Hutchinson, J., J.M. Dalziel, and R.W.J. Keay. 1958. Flora of west tropical Africa. Vol. 1, part 2. Crown Agents for Overseas Governments and Administrations, London. 531 p.

⁷ ICRAF. 1998. Agroforestry tree database (CD ROM). ICRAF, Nairobi.

savanna bush fires and readily colonizes fallow lands. *Parkia biglobosa* and *P. erinaceus* are believed to be surviving species of the former dense, dry forest of the Sudanian zone⁸.

3.3. Global and local species distribution

The species is native to the Guinean Forest-Savanna Mosaic ecoregion of West Africa, which lies between the Guinean rainforest and the Sudanian savannah (Figure 3)⁹. It has been recorded as occurring across the region, including in Senegal, Gambia, Guinea-Bissau, Guinea, Mali, Côte d'Ivoire, Burkina Faso, Ghana, Niger, Benin, Togo, Nigeria and Cameroon¹⁰. It is distributed up to 14°N but is a stunted, small tree at this latitude, where another species, *Pterocarpus lucens*, takes over and becomes more abundant (Figure 1). Southward, the range extends to the limit of the humid forest in Cote d'Ivoire and the humid coastal savannas in Guinea, Togo, and Benin, where a gallery-forest species, *Pterocarpus santalinoides*, is common along rivers and temporary watercourses. The species is not known to have been introduced outside its native region¹¹

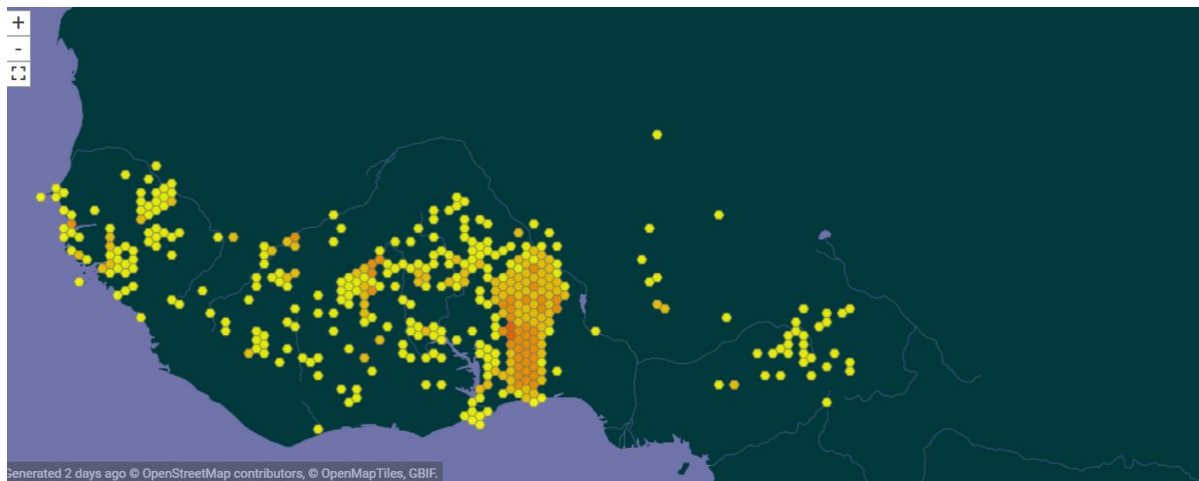


Figure 3. Global distribution of *P. erinaceus* across West Africa (GBIF, 2021)

In Ghana, inventories conducted shows significant populations of the species are found in the Upper East, Upper West, Northern (Currently split into North East, Savanna and Northern regions), Brong-Ahafo (Currently split into Bono, Bono East and Ahafo regions), Volta (Currently split into Volta and Oti regions), and parts of Ashanti and Eastern regions (Figure 4).

⁸ Aubreville, A. (1950) Sudano-Guinean Forest Flora. Afrique Occidentale Francaise Cameroon-Afrique Est Francaise. Edition Géographie Colonial et Mari-Time, Paris, 523

⁹ WWF. 2015. Western Africa: Stretching from Nigeria to Senegal. Ecoregion profile, available online at <http://www.worldwildlife.org/ecoregions/at0707>. Accessed 20th Sept 2021

¹⁰ GBIF, 2021 <https://www.gbif.org>. Occurrence map assessed on September 24, 2021

¹¹ Winrock. 1999. A quick guide to multipurpose trees from around the world: *Pterocarpus erinaceus*: an important legume tree in African savannas. Forest, Farm and Community Tree Network (FACT Net) FACT Sheet, FACT 99-03, Available at http://factnet.winrock.org/fnrm/factnet/factpub/FACTSH/P_erinaceus.html (accessed 20th September 2021)

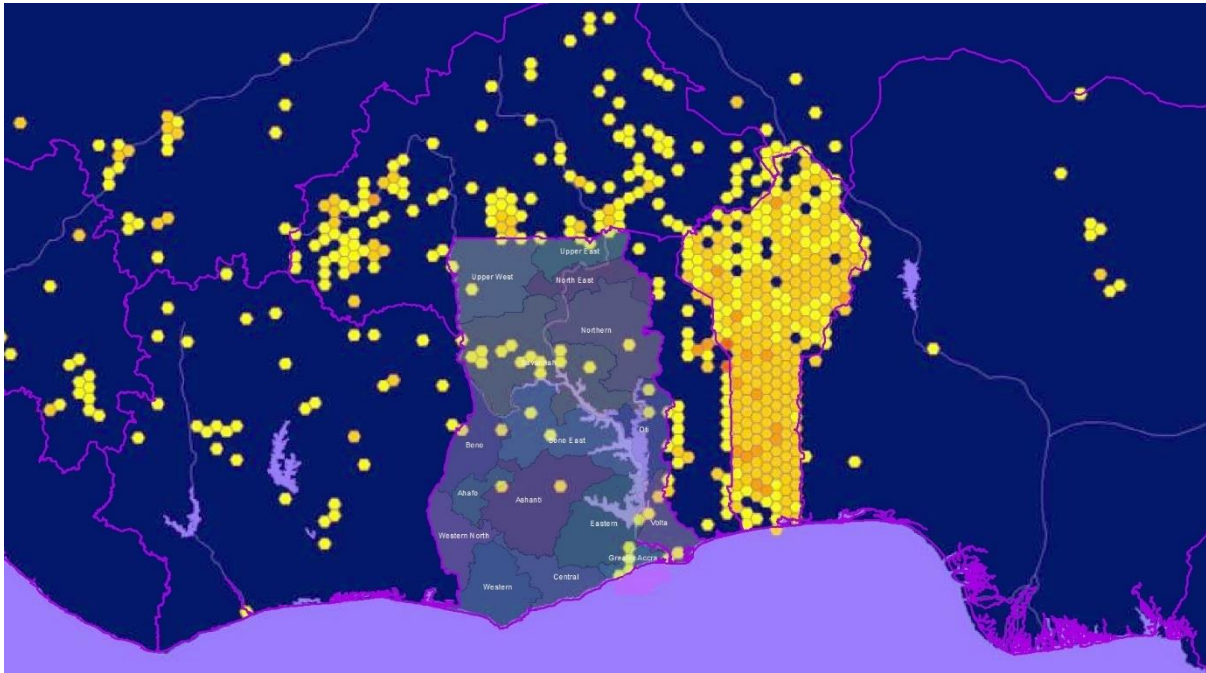


Figure 4. The distribution of significant population of *P. erinaceus* in Ghana.

3.4. Population status, estimate and trends

The Resource Management and Support Centre (RMSC) is the technical wing of the Forestry Commission (FC) with responsibility to explore, develop, facilitate and Implementation and monitoring of effective and affordable forest management systems in Ghana. The Centre as part of its mandate conducted inventories of *Pterocarpus erinaceus* population across the species distribution range in Ghana in 2013, 2017 and 2021. **The inventory focused on populations in off-reserves areas (fallow and farmlands) where the Forestry Commission controls the exploitation of the resources but has limited role in its management.** These populations were mostly harvested for international timber trade. The species populations in conservation areas are prohibited from being harvested and are fully protected from exploitation and thus were not included in the inventory.

In summary, the fallow and farmlands inventory approach involved taking species population parameters in rectangular plots (40 m x 1000 m) randomly laid in rosewood endemic areas across different political districts in five regions (Upper East, Upper West, Northern, Ashanti and Brong-Ahafo) in Ghana. The rectangular plot approach creates the opportunity to capture data on *P. erinaceus* in all land use types associated with off reserve areas.

The 2021 inventory revealed significant populations of *P. erinaceus* in the northern, Brong- Ahafo and Upper East and West regions of Ghana (Table 1). The 2021 inventory data estimated the total number of stems of *P. erinaceus* to be 35,979,296 (stem ≥ 20 cm dbh) equivalent to a stand volume of 25,591,358.12 m³. This figure indicates a reduction in both total stem numbers (71,660,961) and volume (71,714,647 m³) estimated in 2013. The current figure indicates a 50% reduction in both total stem numbers (71,660,961) in stem volume (50, 879,282.31 m³).

Table 1. Mean stem numbers and volume (m³) estimates per Km² for the *P. erinaceus* in different regions of Ghana

Regions	Forest District	Political District	Stems>=Flimit	Sampling error (%)	Vol>=Flimit (m ³ /ha)	Sampling error (%)
Ashanti	1	2	52	20.5	37.26	72.6
Brong Ahafo	3	5	385	48.9	235.48	54.3
Northern	3	8	1079	44.7	671.07	48.1
Upper East	1	3	455	4.0	422.34	3.5
Upper West	2	5	633	86.6	562.25	88.8

The 2021 inventory showed populations of *P. erinaceus* in all the ranges surveyed (Figure 5). High densities of the species were recorded in the North Gonja and Saboba districts (Northern Region), Sene West and Krachi West districts (Brong-Ahafo region) and Sisala West district of the Upper West Region (Figure 5). While medium population density areas were widespread, low density of the species occurred in the Asante Akim North district (Ashanti Region) and Mion districts in the northern Region (Figure 5).

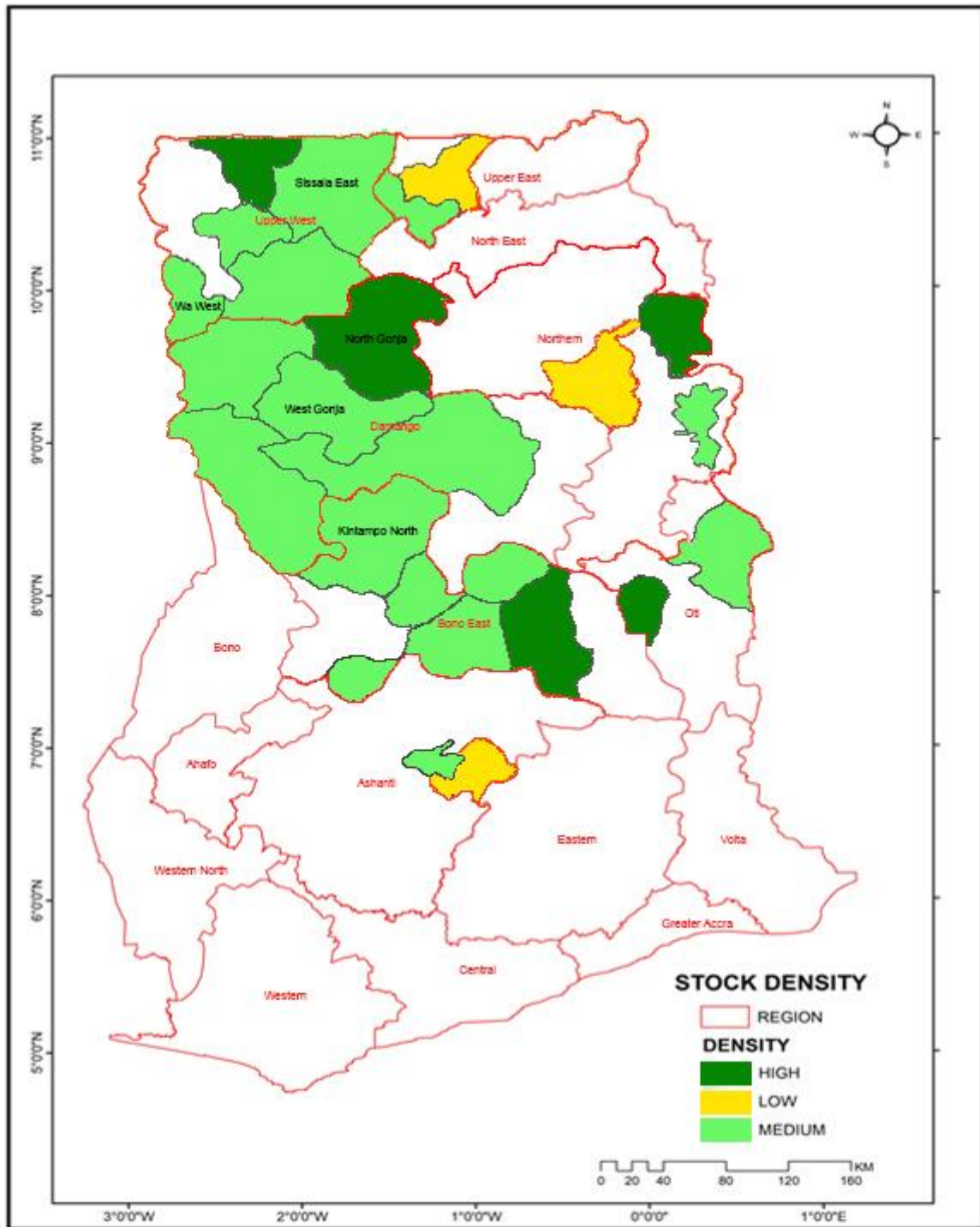


Figure 5. Stocking levels for *P. erinaceus* across Ghana

Considering the population structure, the 2021 inventory revealed that the species size-class of the population had predominantly greater number of small-sized trees relative to few big ones (Figure 6). Data from the 2021 inventory showed that 10-19.9 cm dbh size-class was the most abundant with a population density of 312 stems/km². Populations of *P. erinaceus* with size-classes greater than 60 cm dbh) had relatively low population density of 40 stems/km² (Figure 6).

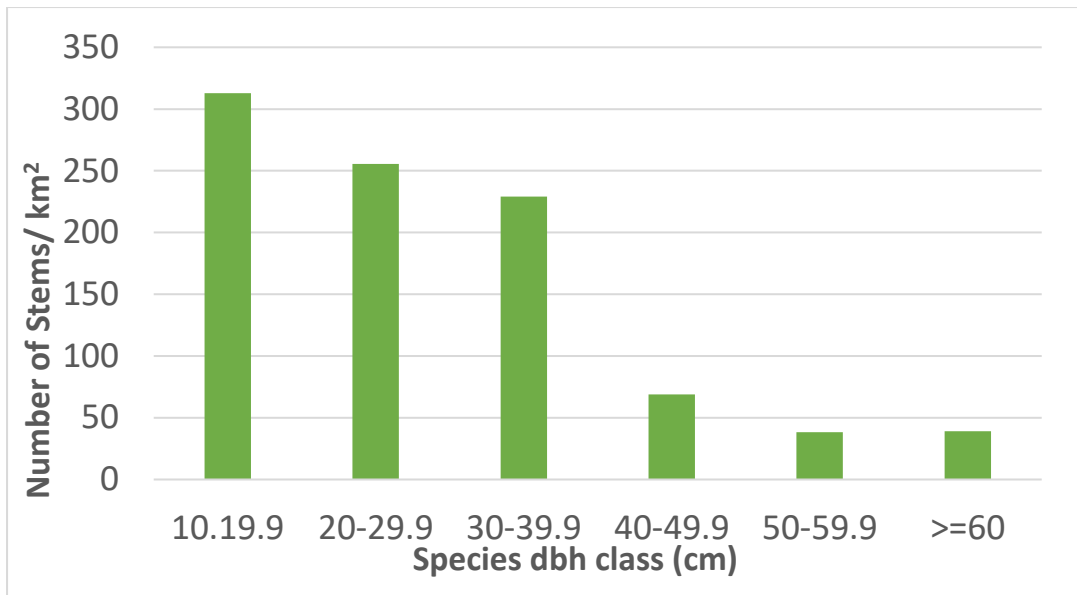


Figure 6. The size-class distribution of the *P. erinaceus* as revealed from the 2021 species inventory

Overall, the 2021 data shows reduction in the species population throughout its range (Figure 7).

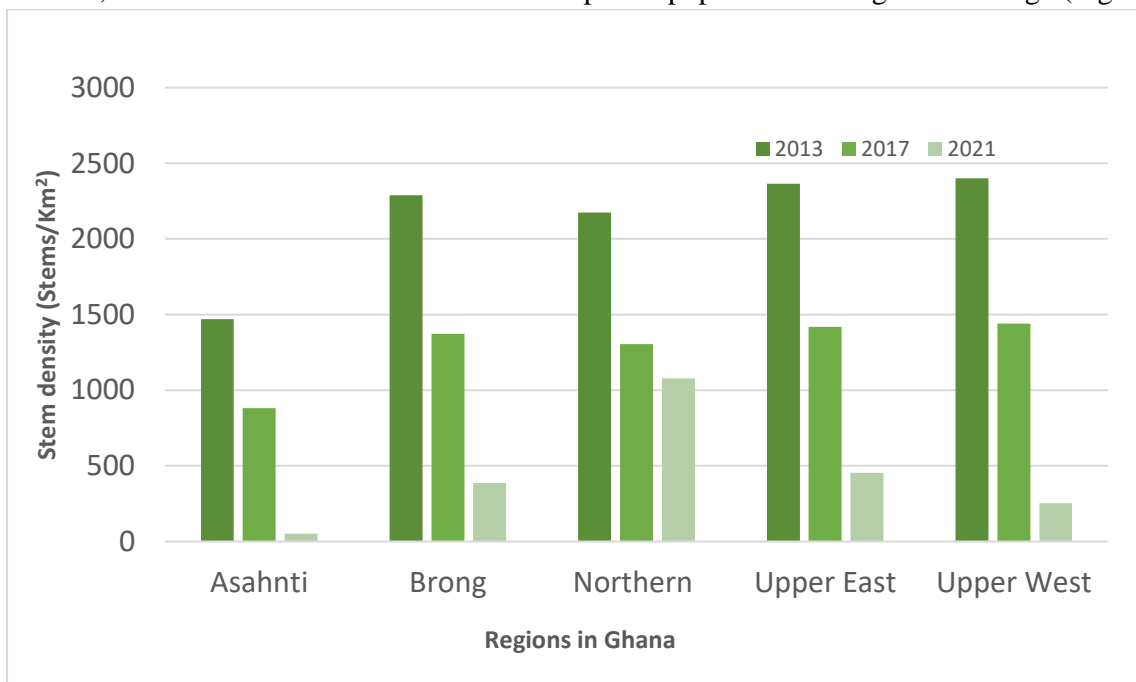


Figure 7. Comparison of mean stem density (over 2013, 2017, 2021) across different species ranges in Ghana.

4.0. Threats

The major threat to the species is illegal logging for international commercial trade. Farmers and illegal loggers harvest large diameter (>60 cm dbh) altering the population structure of the species in off reserve areas (see Figure 8). Similarly, because of the relatively higher wood density, charcoal producers have resulted to using the species for charcoal production thus contributing to population decline (See Figure 7).

Inappropriate agricultural practices, frequent bushfires and fuelwood collection by rural dwellers also contribute to the destruction of the species from saplings to matured trees. To reduce the threats above, the Forestry Commission has embarked on number of activities. These include sensitisation of the communities on the need to protect the species, how to identify the species and also educating them on the use of non-threatened species as an alternative for charcoal burning and firewood. Communities are also encouraged and supported to established woodlots for fuelwood and Charcoal burning. Other conservation measures are discussed under species management section (Section 6.0)



Figure 8. Illegal harvesting of the African Rosewood, *P. erinaceus* by rural dwellers fuelled by high international trade demand for the species.

5.0. Trade

Data from Timber Industry Development Division (TIDD) of the Forestry Commission revealed export of the species increased from 125.5 m³ in 2008 to 40,998.7 m³ in 2013. Following a decline in export between 2014 and 2015, export volumes increased rapidly to 81,958.7 m³ in 2016 and then progressively declined to 43,714 m³ in 2018. Based on these figures, a total of 283,498 m³ of *P. erinaceus* timber valued at 180,840,201 Euros have been exported by Ghana between 2008 - 2018 (Figure 9). The total volume of illegal *P. erinaceus* timber confiscated was 6,070 m³ in 2019 and 21,154 m³ in 2020. (Figure 11).

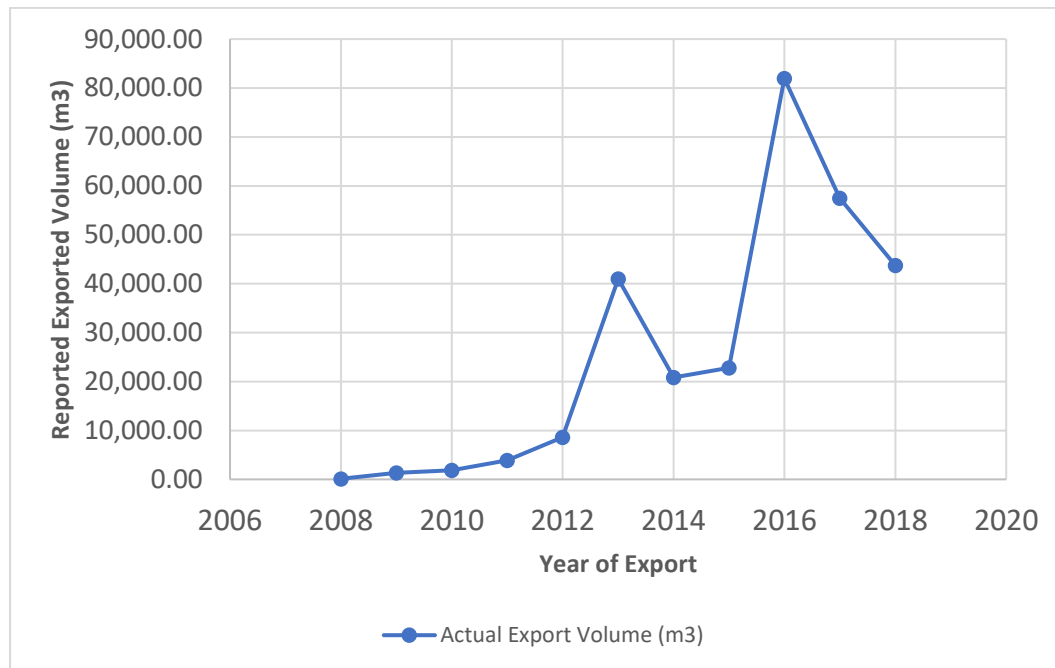


Figure 9. Official export volumes and export value for *P. erinaceus* from Ghana from 2008 -2018 is as reported by TIDD.

5.1 Provide any information available on the levels of illegal trade (known, inferred, projected, estimated).

For the year 2019, a total of 6,070 m³ of *P. erinaceus* was seized and evacuated from Volta, Upper East, Upper West Northern and Brong-Ahafo regions (Figure 10). The highest volume of wood seized was recorded in Upper West region (2,700 m³) followed by Northern region (1,260 m³) and the Upper East region had the least quantities of 120 m³ (Figure 10).

For the year 2020, a total of 21,153.85 m³ of was seized and evacuated from Volta, Upper East, Upper West, Northern and Brong-Ahafo regions (Figure 10). The highest volume of wood seized was obtained in northern region (10,150.95 m³) followed by Upper west region (4,057.76 m³) and the Upper East region had the least quantities of 624.14 m³ (Figure 10)

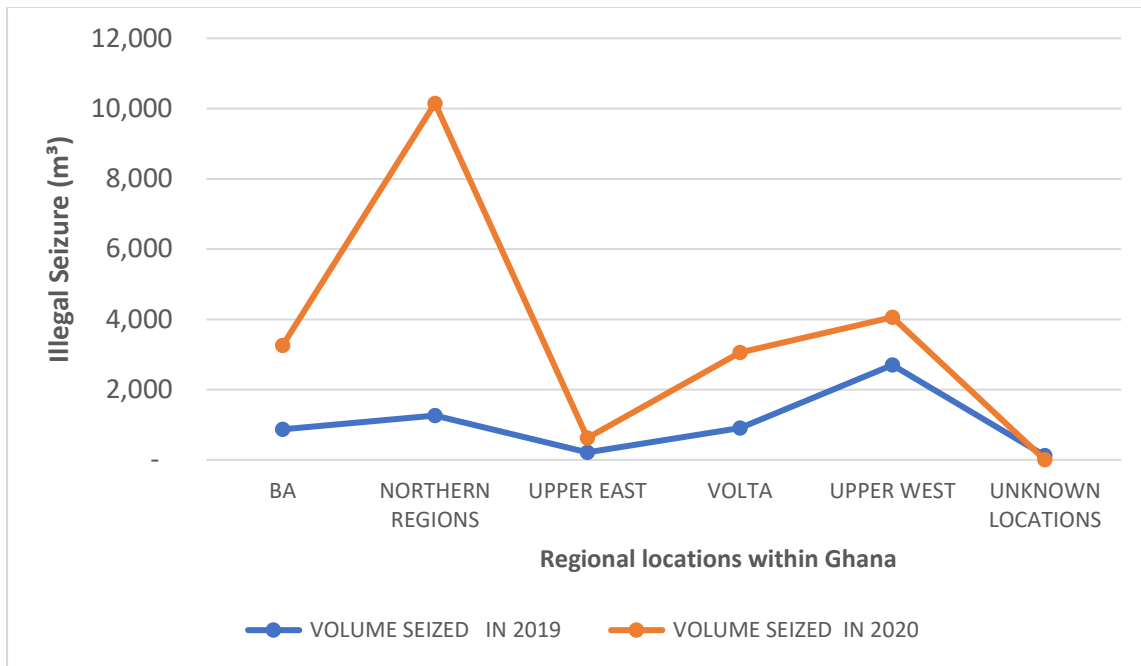


Figure 10. Volumes of illegal wood confiscated across Ghana in 2019 and 2020

5.2. Procedures for identification of specimens in trade to the species level

Specimens in trade are identified basically using the photo identification guide provided by CITES (ref.). Officers of the Forestry Commission are well trained in the identification of the species in the wild as a tree and also as a sawn timber. However, some community members and farmers are not able to identify the species especially, the sapling stage and sometimes destroy them unknowingly.

Another challenge is that, not all Enforcement Officers at the points of entry/exit of the country are able to identify the species. This potentially encourages traders to smuggle the species under disguise of non-restricted species. In addressing this issue at the port of entry, the Forestry Commission is embarking on training on species identification and sensitisation programmes for communities and farmers from the *P. erinaceus* range areas as well as Customs and other enforcement officers.

5.3 Export quota in place for the species and details for 5 most recent years

Ghana has no established quota system for export of the species. This is because it is not included in the traditional timber exported from Ghana. However, the Government of Ghana instituted a national ban on the harvesting and exporting of the species since 2012. The ban makes it illegal to harvest and export the species. Species consignments meant for export are salvaged logs as a result of projects undertaken by Government (road construction, dam construction etc.) and confiscated and auctioned via a court process (see Annex 1 for sample of the Court Order). Offenders are fined and prosecuted.

Ghana has adopted an indicative quota of **52,917 m³** which is 50% of the national felling quota of 105,832.43 m³ proposed by an inventory conducted by RMSC (See Table 4) to be implemented from January 2022.

6.0. Species management (wild harvest)

Species harvesting quota are proposed for the species based on inventory conducted for the species from 2013 to 2021. The estimated quota is based on the following assumptions;

- Population Dynamics (increment, regeneration / recruitment, mortality rates not included in the analysis).
- 40% of the gross area of each District Assembly is designated as towns, villages & other infrastructure development.
- Only stems above felling limit (≥ 20 cm dbh) were used in the analysis.
- 60% of all stems above Felling Limit (FL, ≥ 20 cm dbh) were retained and not considered in the analyses to cater for destruction such as, wildfire, clearance for farming, charcoal burning, domestic use.

Based on the following assumptions, the following scenarios for harvesting within different rotational periods is proposed in Table 2.

Table 2. Proposed annual national scenarios and options (Felling quotas)

Scenario	Option 1 (Mean value)		Option 2 (Lower limit of mean sampling error)	
	Stem Nos.	Volume (m ³)	Stem Nos.	Volume (m ³)
50-year	287,834	204,730.86	142,318	105,832.43
40-year	359,793	255,913.58	171,896	116,952.51
30-year	479,724	341,218.11	213,648	155,936.68

Table 3. Proposed annual national harvesting scenarios and options (Felling quotas) within species endemic districts within the northern region of Ghana

No.	Political District	Scenario 1. 50yrs		Scenario 2. 40yrs		Scenario 3. 30yrs	
		Stem Nos.	Vol (m ³)	Stem Nos.	Vol (m ³)	Stem Nos.	Vol (m ³)
1	North Gonja	45,946	25,037.03	57,433	31,296.29	76,577	41,728.38
2	Sissala East	34,694	29,804.38	43,367	37,255.47	57,823	49,673.96
3	West Gonja	28,929	15,718.10	36,161	19,647.62	48,215	26,196.83
4	Central Gonja	28,337	14,979.10	35,422	18,723.87	47,229	24,965.16
5	Zabzugu	23,152	18,822.03	28,940	23,527.53	38,58	31,370.04

Given the decrease in population density (Number of stems and volume), of the species, the most conservative 50-year life span scenario was adopted. Thus, an indicative quota of 50% (52,917

m³) of the national felling quota of 105,832.43 m³ is proposed commencing January 2022 (Table 3).

6.1. Species conservation measures in Ghana

6.1.1. Prohibition of species harvest in protected and Conservation Areas

In Ghana, populations of *P. erinaceus* harvested and exported internationally is restricted to fallow and farm lands off-forest reserves. Large populations of the species present in forest reserves and conservation areas are actively protected from logging by armed conservation areas guards. Significant populations of *P. erinaceus* are found and protected in conservation areas such as the Bui National Park (1,821km²), Mole Natural Park (4,840 km²), Gbele Resources Reserves (565 km²), Digya National Park (3,743 km²), Kyabobo National Park (306 Km²) and Kogyae Strict Nature Reserve (386 km²). Several forest reserves (e.g. Kanikani, Yearada, Yakunbo, Sissala, Red Volta Valley and Gambaga Forest Reserves) in the savanna and savanna-forest transition vegetation zones where the species occur are strictly prohibited from commercial harvesting.

The Community Resources Management Areas (CREMAs) concept spearheaded by the Wildlife Division of the Forestry Commission empowers communities to protect important faunal and floral resources that occur within their community lands. Many CREMAs in the northern regions have significant populations of *P. erinaceus* within designated areas called ‘core zones’ where no harvesting of the species is permitted.

6.1.2. Enforcement of national ban on harvesting and export of *P. erinaceus*

The concerns over illegal harvesting of *P. erinaceus* have led to the imposition of four bans on felling and export of the species since 2012. The bans have been subject of several intermittent lifting to allow a few companies to salvage rosewood and to export confiscated and court backed auctioned logs (See Annex for Sample of Court Order). For instance, the first ban which was imposed in January 2012, was lifted in May 2012 and remained lifted till December 2013. Then, the second ban announced in January 2014. was lifted shortly for a few months, but reimpose in July 2014 leading to the third ban. The third ban remained until July 2015, when it was lifted again for a few companies to salvage lying and confiscated logs that had been felled by farmers in many locations, and in other cases, removal of logs obstructing the flow of the Bui river and hydroelectric power dam at Bui. A fourth ban was announced in February 2017. It is worth noting that, the various lifting of the bans were not wholesale and did not involve large scale logging but, rather it was predominantly directed towards salvaging of supposed ‘lying or abandoned logs’ by very few exporting companies. Thus, the liftings were only partial and temporal implying that, the felling/export bans have generally remained in force.

6.1.3. Research, monitoring and plantation development programmes

There are several joint programmes to improve on the management and Forestry Research Institute of Ghana (FORIG) is also leading a *P. erinaceus* research programme to better understand the biology and ecology of the species to improve silvicultural management. The Forestry Commission through the Resource Management Support Centre (RMSC) has identified and established permanent monitoring plots in selected regions across the species range to monitor natural population parameters as well as natural regeneration rates. As part of the Forest Services

Division's national plantation development programme, nurseries and plantations have been established within the distribution ranges. Currently, over 70 ha of *P. erinaceus* plantation have been planted. The Forestry Commission is also mobilizing resources to conduct population inventory of the species in all endemic areas including wildlife protected areas and forest reserves to estimate the total population.

6.1.4. Green Ghana program included species in the national tree planting programme

The Forestry Commission, through the Ministry of Lands and Natural Resources in June 2021 commenced nationwide tree planting campaign, to plant five million trees to restore depleted forest cover. In 2021, more than 6,000 seedlings of *P. erinaceus* have been supplied by the Forestry Commission and planted in different regions across the species ranges throughout Ghana.

6.1.5. Community sensitization and restriction on size-class harvesting

The Forestry Commission through the Forest Services Division has also embarked on a community sensitization programme to create awareness on the vulnerability of the species populations. Farmers who usually harvest the species, are encouraged to observe restrictions on the harvesting of small-sized species and commercial exploitation of the species for charcoal production.

6.1.6. Management of international trade in *P. erinaceus* in Ghana

All the key agencies of the Forestry Commission (Timber Rights Administration Unit -TRAU, Forest Services Division-FSD, Wildlife Division-WD, Timber Industry Development Division-TIDD, Resources Support Management Centre -RMSC) involved in the sourcing and timber rights allocation, inventory, harvesting, transporting, processing and trade (export or domestic sale) of *P. erinaceus* have instituted a joint programme of action to ensure the exploitation for trade of the species is not detrimental to populations of the species in the wild. More importantly, Ghana is implementing a system or systems to verify that timber products for shipment have been legally-produced and that only shipments verified as such are exported to the international market. The system for verification includes checks of compliance in order to provide assurance that the timber products destined for export to the international market have been legally produced and that legality licences are not issued in respect of shipments of timber that have not been legally-produced, or are of unknown sources. The system also includes procedures to ensure that timber of illegal or unknown origin does not enter the supply chain.

Some of the tasks in the joint programme of action includes;

- TRAU will continue to establish and prepare the necessary documentation for the administration of the appropriate rights to timber allocation to a prospective logger
- FSD will continue to regulate and manage the control interventions of the supply chain from the point of stock survey/enumeration and harvest to the point of commencement of log transport. FSD shall continue to protect the species population in designated forest reserves with the range states. FSD shall continue with its action of not issuing felling permits and log conveyance permits to transport the logs. It shall strengthen its road surveillance to reduce the illegal transport of the species. All logging and export data on *P. erinaceus* shall be included in the Ghana Wood Tracking System (GWTS).
- The TVD will perform the functions of verification. This will involve the reconciliation of data generated along the entire process chain of wood products destined for both export

and the domestic market. The TVD will also measure compliance of wood consignments to the legal standard as specified in Ghana's Legality Assurance System.

- TIDD is the designated licensing authority under the Ghana's Legality Assurance System. The TIDD will issue legality licences simultaneously with the export permits; this will be done after it has reconciled export permit applications submitted by exporters with verified FC datasets
- RMSC will conduct regular field monitoring of populations in *P. erinaceus* within the species distribution range and shall recommend Annual Felling Quota for the species based on her research for the Forestry Commission. The District Felling Quota will be set based on population monitoring studies within the specific region of species range. This Felling Quota will be administered by the District Offices of the Forest Services Division.
- WD is the management authority of CITES in Ghana and is responsible for the issuance of CITES permits for the international trade. Following a review of the process, the WD now scans issued permits and sends them directly to the destination country. This new approach has been adopted following abuse of the process by some exporters.

7.0. National or sub-national laws and regulations for *Pterocarpus erinaceus* relating to trade

Ghana and the European Union has since 2009 ratified the Voluntary Partnership Agreement on Forest Law Enforcement, Governance and Trade (FLEGT) in timber products into the European Community as well as timber products traded domestically. Under the agreement, Ghana is implementing a legality assurance system (GhLAS) which is based on adherence to the legal timber definition.

For the purposes of this Agreement, a definition of "legally produced timber" which includes *Pterocarpus erinaceus* is clearly established. The definition sets out Ghana's national and sub-national legislation that must be complied with in order for timber products to be covered by legality licences. It also sets out the documentation including criteria and indicators that shall serve as proof of compliance with such legislation relating to the source of timber, allocation of timber rights (e.g. timber utilization contract, salvage permit, plantation permit, confiscate timber) harvest, transport, processing, trade and fiscal obligations.

The laws and regulations in force in Ghana, from which this definition was extracted, include:

7.1. Constitutional Provisions

- Article 267(6) provides for the disbursement formula for stool land revenue (e.g. timber royalties)
- Article 268 - Requirement of Parliamentary ratification of agreements in relation to the grant of a right or concession for the exploitation of any natural resources.
- Article 269 Establish natural resources commissions [Forestry Commission] which "shall be responsible for the regulation and management of the utilisation of the natural resources concerned and the co-ordination of policies in relation to them".

7.2. Primary Legislation

- Forest Protection Decree, 1974 (N.R.C.D. 234) – This Act defined forest offences and prescribed sanctions and or penalties for such offences
- Trees and Timber Decree 1974 (N.R.C.D. 273) – This law prescribed guidelines for participation in the logging/ timber industry and provided for the payment of fees as

well as sanctions for non-compliance with the guidelines for participation and also export of unprocessed timber.

- Timber Resources Management Act 1997 (Act 547) – This repealed the Concessions Act, 1962 (Act 124) and provided for the grant of timber rights in a manner that secures the sustainable management and utilisation of timber resources
- The Forest Plantation Development Fund (Amendment) Act 2002 (Act 623) – This Act amended ACT 583 to enable plantation growers, both in the public and private sectors to participate in forest plantation development.

7.3. Subsidiary Legislation

- Timber Resources Management and Legality Licensing Regulation LI 2254 of 2017

The legal definition outlines conditions under which a product containing wood sourced and/or processed in Ghana can be licenced for sale within Ghana or for export from Ghana. For the purposes of the Agreement, the licences will cover all products exported to the EU.

Products from Restricted Timber Species as defined in Regulations 74(1) and 78 and listed in the Eighth Schedule to the Timber Resources and Legality Licensing Legislative Instrument (LI) 2254 include *Pterocarpus erinaceus*. The species shall therefore not be exported unless a restricted species permit is issued by the Forestry Commission with the approval of the Minister.

The Ghana-EU Voluntary Partnership Agreement takes into consideration the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and, in particular, the requirement that export permits issued by parties to CITES for specimens of species listed in Appendices I, II and III thereof be granted only under certain conditions, including that such specimens were not obtained in contravention of the laws of that State for the protection of fauna and flora. FLEGT licence system will nonetheless provide assurance of legal harvest of these products.

It is important to state that Ghana is implementing a computerized national wood tracking system (WTS) that enables the establishment of a chain of custody system as well as the monitoring and reporting of compliance against the legal definition from sourcing timber to the point of export or traded domestically. The WTS will gather information (e.g. inventory data, timber species harvested volumes, processed timber volumes, sales volume, etc.) at all the supply chain control points, process the data gathered and automatically reconcile it with data gathered at previous control points, identifying any errors or anomalies that are found in the data. This allows for legal harvest controls, landowner/traditional authority/community validation of timber permits, audit controls as well as export controls.

Furthermore, the entire GhLAS is open to external monitoring by an independent monitor (IM). The purpose of the intervention of the IM is to identify weaknesses and recommend systemic reforms in the GhLAS.

Timber in transit will be kept physically segregated from domestic and imported timber; it will not be integrated into the GhLAS and will not be subject to issuance of a Ghanaian FLEGT Licence at the point of export.

7.4 Challenges with Implementation CITES Article IV in Ghana

The few challenges militating against the effective implementation of CITES activities in Ghana. First, the WD, the Management Authority is unable to man all the entry and exit borders of the country. This presents the opportunity for some traders to illegal bring *Pterocarpus erinaceus* consignment into the country from neighbouring countries without being detected. Second, the

Management Authority operates a centralised system of issuing CITES permits. This makes it difficult for traders to acquire permits for export. The difficulty in accessing permits leads some traders to export the species illegally. Third, Ghana is yet to provide full legal backing for the implementation of CITES in Ghana. Finally, as a result of funding constraint, the species population inventories have been conducted only on off-reserve mainly fallow and farmlands, where species are usually harvested for the international trade. There is therefore the need to undertake population inventory of the species in all endemic areas including wildlife protected areas and forest reserves to estimate the total population.

8.0 Conclusion

Ghana has established a comprehensive system to manage and monitor the populations of *P. erinaceus* including plantation development to promote conservation of the species. The adoption of a quota system to regulate the harvest and trade of the species will ensure sustainable trade and conservation of the species in the wild.

The implementation of Ghana's Legality Assurance Systems also considers the legal framework that governs the management, law enforcement and trade of the species. The passing of the subsidiary legislation -Timber Resources Management and Legality Licensing Regulation LI 2254 of 2017, outlines conditions under which a product containing wood sourced and/or processed in Ghana can be licenced for sale within Ghana or for export from Ghana. Finally, the commitment and willingness of the different Divisions of the FC to implement the management and legal systems will ensure that the trade is done sustainably and not detrimental to populations in the wild.

9.0 Annex

Annex 1. High Court Ghana order grant the dispose of abandoned impounded and confiscated Rosewood

