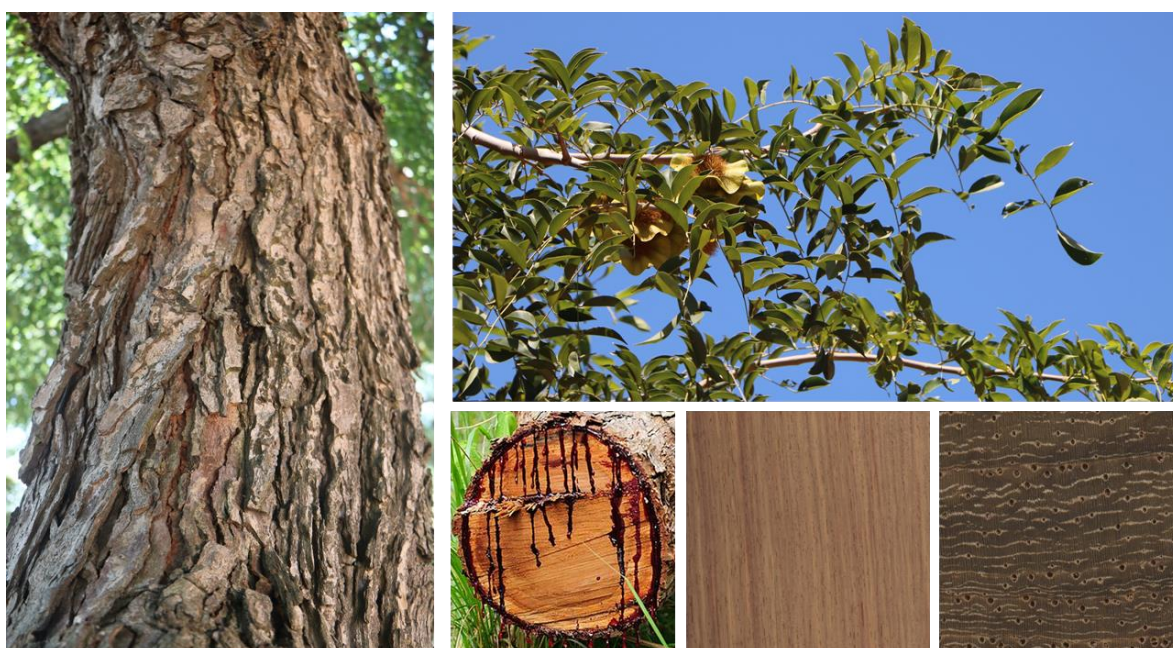# CITES Non-Detriment Findings (NDF) for Bloodwood [*Pterocarpus angolensis DC.*] "Umbila" in Mozambique

A nine-step process to support CITES Scientific Authorities making science-based NDF for timber/tree species listed in CITES Appendix II

Prepared by

Salomão Bandeira, Joaquim Domingos Campira

Natália Ngome and Ernesto Uetimane Júnior

Ministério de Terra e Ambiente
Direcção Nacional de Floresta

FNDS
Fundo Nacional de Desenvolvimento Sustentável

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Acknowledgments

ACRONYM

ANAC	Administração Nacional de Áreas de Conservação
CEAGRE	Centro de Estudos de Agricultura e Gestão de Recursos Naturais
CITES	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
DINAF	Direcção Nacional de Floresta
FEDEMOMA	Federação Moçambicana de Operadores de Madeira
FNDS	Fundo Nacional de Desenvolvimento Sustentável
IEIA	Initial Environmental Impact Assessment
IIAM	Instituto de Investigação Agrária de Moçambique
IUCN	The International Union for Conservation of Nature
MA	Management Authorities
MITADER	Ministério de Terra, Ambiente e Desenvolvimento Rural
NDF	Non-Detriment Findings
PAs	Protected Areas
SA	Scientific Authorities
UEM	Universidade Eduardo Mondlane
WWF	World Wide Fund for Nature

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. CONTEXT AND OBJECTIVES

The Government of Mozambique, through the National Fund for Sustainable Development (FNDS), is implementing the "Conservation Areas for Biodiversity and Development" Project - MozBio 2 (Mozambique Biodiversity), through financing from the World Bank, which aims to improve the management of the target landscapes of the Conservation Areas and improve the living conditions of communities within and around these areas.

The MozBio 2 project covers the Landscapes of the Clomplexo do Marromeu, Chimanimani and Costa dos Elefantes, and is divided into the following components: (i) support in the training of national conservation institutions, (ii) improvement of the management of the target Conservation Areas, and (iii) promotion of development rural area compatible with conservation.

Within the scope of the 19th the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Conference of the Parties (COP19) which took place in Panama between 14 and 25 November 2022, three proposals were presented with implications for Mozambique, namely: (i) inclusion of wood from all populations of *Afzelia* spp. (CoP19 Prop. 46 – covers Chanfuta) in Annex II with annotation N°. 17 (logs, sawn wood, veneers, panels and processed wood); (ii) inclusion of African populations of the genus *Khaya* spp. (CoP19 Prop. 51- covers Umbaua) in Annex II with annotation no. 17, and (iii) inclusion of African populations of *Pterocarpus* spp. (CoP19 Prop. 50-covers *Umbila* and *Nkula*) in Annex II with annotation no. 17.

Out of concern for the long-term survival of tree species of the three genera (*Afzelia* spp., *Pterocarpus* spp. and *Khaya* spp.) threatened by over-exploitation, COP19 agreed to the listing in Annex II of wood obtained from populations of tree species of the three proposed genera which will come into force in February 2023. The adoption process assumes that affected countries must prepare and validate Non-Detriment Finding Reports (NDF) in which the sustainable quota is estimated for each species, following the nine steps recommended by CITES.

It is in the context, and the implications of this decision on the country's natural resource economy, that NDF report of CITES Appendix II species was prepared for Ministry of Land and Environment in order to be submitted to the Secretariat from CITES.

1.1. OBJECTIVE

The objective of this reports is to give the decision and the necessaries advices of NDF of Umbila (*Pterocarpus angolensis*).

1.2. EXECUTIVE SUMMARY

Pterocarpus angolensis is a slow growing tree species with up to 4 mm growth per year. Occurs extensively throughout the country in nearly all range of habitats, ecoregions throughout Mozambique. This wood species is one of the most used throughout the country, especially for home furniture, window frames and doors.

Globally and conservation wise this species is a IUCN Least Concerned species. The main threats to this species include habitat conversion to cropland, exacerbated by itinerant agriculture, wildfires, habitat encroachment and cutting for firewood and charcoal production. The biological risk faced by this species is medium to high due to a low survival rate of its seedlings produced annually. The established regeneration (young trees with over 10 cm diameter at breast height), will have a higher probability to grow to a mature harvestable tree. This is a slow growing plant and usually takes over 120-165 years to attain a legal harvestable commercial size (40 cm of breast height diameter).

There is a considerable habitat decline due to wildfires, cropland increase, charcoal and firewood production as well as over logging. The 2018 Mozambican national forestry inventory reported a J-inverted curve, indication a potential for a substitution of harvested trees. This NDF basically covered all concessions in the country, with available data and examined the sustainability of the estimated AAC (Allowed Annual Harvest) across the forest concessions. Along with the other major cities, Maputo is a major domestic market and most of the supplied timber is harvested in the north of Save, in central and northern Mozambique.

The impact severity of harvesting is medium to high, giving an estimated 60% decline in trend, from 2007 to 2018. Legal logging impact severity is low to medium, given low volume sold in relation to the proposed exploration quota in general (reduction in 20 of national licensed volume between 2017 to 2022). This species has multiple uses within national market. Reports about illegal logging are rather common from 2016 after "*operação tronco*" however, recent reforms in the forestry sector about the seizure of illegal wood indicate improvements in inspection (increase in court cases, recovery of timber, etc.) but also existing weaknesses.

Single licenses were deleterious as around 53% of holders of this license indicated having a practice to trade illegal wood; thanks this is revoked (New revision of the Forestry and fauna Low of 2023).

Low enforcement is still needed to boost the effectiveness of management measures. Based on the assessments of individual forest management plans, the concessions with larger AAC of *Pterocarpus angolensis* may proceed and be granted a positive NDF (exportation) whereas those with almost with no timber require a tight surveillance. There is still a need to improve timber traceability from the logging concession sites (private entity) until final destination, including the timber marked for export (through accredited exported or even state entity).

2. METHODOLOGY

2.2. Data collection

Bloodwood [*Pterocarpus angolensis* DC], commercially known as "umbila" in Mozambique, is part of CITES Appendix II. According to this, non-detriment findings of timber species are assessed through the guide of Nine-steps process to support CITES Scientific Authorities making science-based non-detriment findings for timber/tree species listed in CITES Appendix II, version 3 (Wolf et al., 2018). Also called NDF, this guide provides a standardized mechanism to record process information required available to a CITES Scientific Authority (SA) in order to make an adequate NDF.

The nine-steps are divided into 4 groups, namely: Review need for a detailed NDF (steps 1, 2 and 3), Severity evaluation of concerns, risks and impacts (steps 4, 5, 6 and 7), appropriate and precautionary managements (step 8) and NDF and related advice (step 9). Each step has specific(s) key(s) question(s) and indicator(s). And, depending on answer of the key questions, negative answers of each step may address to early decision (short cut to Step 9).
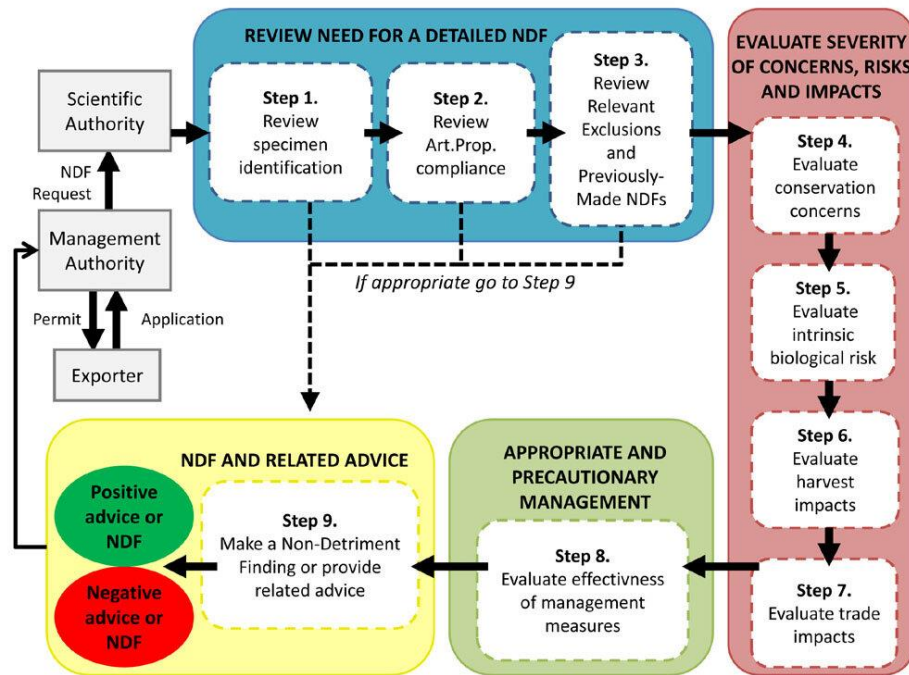
Figure 1: Nine-steps pathway for making non-detriment findings for timber/tree species listed in CITES Appendix II (source: Wolf et al., 2018).

2.2.1. Review need for a detailed NDF (steps 1, 2 and 3)

Steps 1-3 involve the evaluation of whether a detailed, science-based NDF is needed for the species concerned. The species being made the NDF should be known in order to make an adequate non-detriment finding.

2.2.1.1. Step 1: Revision of species identification

- **Key question:** Is the SA confident, the timber or timber product concerned has been correctly identified, and that the correct scientific name has been used for the timber?

2.2.1.2. Step 2: Revision of compliance with requirements for artificial propagation

- **Key question 1:** Is the permit application for artificially propagated specimens?
- **Key question 2:** Is export of the artificially propagated specimens of this species permitted by national or relevant sub-national legislation?
- **Key question 3:** If specified as artificially propagated, do timber specimens meet all requirements for artificial propagation?

2.2.1.3. Step 3: Revision of relevant exclusions and previously made NDFs

- **Key question 1:** Are the timber specimens applied for covered by CITES Appendix II?

- **Key question 2:** Is the harvest or the export of wild-harvested specimens of this species permitted by national or relevant sub-national legislation or regulation?

- **Key question 3:** Has the Scientific Authority previously made a science-based NDF for this species that is still valid and is sufficient to evaluate the specimens for the current export permit application?

2.2.2. Severity evaluation of concerns, risks and impacts (steps 4, 5, 6 and 7)

The steps 4, 5, 6 and 7 supports evaluation of conservation concerns, potential biological risks, harvest and trade impacts and their severity. These evaluations are obtained using appropriate indicators. The texts bellow presents the summary of the all key questions as well as the summary of the main indicators found relevant in order to make the steps suitable with the national NDF for the species.

2.2.2.1. Step 4: Evaluate conservation concern

This steps evaluate the conservation concerns of the target species. At all, 3 key questions were used in order to evaluate the conservation concerns, namely, global conservation status, regional conservation status and national conservation status according to IUCN and local conservation status. See the key questions bellow.

- **Key question 1:** Considering assessments of the conservation status of the species, what is the indicated severity of conservation concerns at global, regional and national levels (low, medium, high and unknown)?

- **Indicators:** Conservation status of the timber species according to IUCN Red List (e.g. Deficient Data, Least Concern, Critically Endangered, Endangered) and current population trend and threats.

2.2.2.2. Step 5: Evaluation of potential biological risks

This steps evaluate the biological risks of the target species. At all, 5 key questions were used in order to determinate the risk severity of the potential biological risks, namely: geographic distribution, national /sub-national population size and distribution, size structure of

national/sub-national populations, habitat specificity and vulnerability and resilience of the tree species. The summary of indicators for each key question are presented below.

- **Key question 1:** What is the risk severity of the species according to its geographic distribution (low, medium, high and unknown)?
- **Indicator:** distribution type of species (widespread, restriction and unknown).

- **Key question 2:** What is the risk severity of the species according to national /sub-national population size and distribution (low, medium, high and unknown)?
- **Indicators:** population size (widespread, restriction to medium size or small region and unknown) and distribution (homogeneously, unevenly, scattered or unknown) type of species.

- **Key question 3:** What is the risk severity of the size structure of national/sub-national populations (low, medium, high and unknown)?
- **Indicator:** size classes distribution (reverse J-shaped curve) type of species.

- **Key question 4:** What is the risk severity of the habitat specificity and vulnerability (low, medium, high and unknown)?
- **Indicators:** adaptation of the species in relation of habitat or ecological zones and habitat quality (suitable or deteriorating) and size (increase, stable or increase).

- **Key question 5:** What is the risk severity according to resilience of the tree species (low, medium, high and unknown)?
- **Indicators:** growth rate, reproduction pattern and mortality rate of the specie.

2.2.2.3. Step 6: Evaluation of impacts of harvest

This steps evaluate the impact of harvest risks of the target species. Due to the magnitude of the NDF, 2 key questions where used (keys 2 and 3, hereafter named keys 1 and 2) as the key 1 is regarded to the harvest impact at forest concession level. Both questions were used in order to evaluate the harvest impact severity on the national and subnational population of the target species and on the ecosystems. The summary of indicators for each key question are presented below.

Key question 1: What is the harvest impact severity on national and subnational populations of the target species (low, medium, high and unknown)?

- **Indicators:** national and subnational population trend (increase, stability or decrease); effects of harvest operations on population (population interconectio), species distribution and the management principles (change or remain the same).

Key question 2: What is the harvest impact severity on the nation ecosystem (low, medium, high and unknown)?

- **Indicators:** degree of difficulty in identifying species; effect of harvest practices on non-target species, species diversity and environment and the role of management measures on the ecosystem.

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2.2.2.4. Step 7: Evaluation of impacts of trade

This steps evaluate the trade impact severity of the target species. Due to the magnitude of the NDF, 2 key questions where used (keys 2 and 3, hereafter named keys 1 and 2) as the key 1 is regarded to the trade impact severity at forest concession level. Both questions were used in order to evaluate the trade impact severity on national legal trade and the magnitude of illegal trade. The summary of indicators for each key question are presented below.

Key question 1: What is the harvest impact severity on the trade level in relation to harvest area production (low, medium, high and unknown)?

- **Indicator:** annual and historic amount of permit quantity roundwood (high, stable or low) at the harvest area.

Key question 2: What is the magnitude and trend of national legal trade (low, medium, high and unknown)?

- **Indicators:** type of uses (less or multiple); trade volume demand in relation to abundance of the species; and market demand trend (increase, stability or decrease).

Key question 3: What is the magnitude of illegal trade (low, medium, high and unknown)?

- **Indicators:** documentation status of domestic and international trade (poor, limited or good); transparency and robustness of trade chain () concerns regarded to volume in legal trade and harvested volume.

2.2.3. Appropriate and precautionary managements (step 8)

2.2.3.1. Step 8: Evaluation of appropriate rigors of existing management measures

This steps asks if whether existing management measures in place are relevant to the identified concerns, risks, and impacts, and evaluation and adequately mitigate or reduce the severity of harvest and trade impacts identified in Steps 6 – 7. It comprises 2 main questions, with appropriate indicators as shown below.

Key question 1: What management measures are in place for the target species? The indicators of this question are presented below.

    a. What is the ownership/tenure right of the harvest area (state; communal; private; logging concessions, etc.)?

    b. Who manages the harvest area (e.g. international corporation; industrial concession, small-scale holder, national or local logging company; communal forest management; state agency, private person, etc.)?

    c. What management measures are in place and are they documented (e.g. in a management plan), are they comprehensive and adequate to the requirements of the forestry operation?

    d. Are there State checks and controls of forest operations, transport, sawmills, exports, etc.?

    e. Is a credible certification system in place?

    f. Is monitoring conducted to systematically assess the impact of harvesting procedures and also assess whether management objectives have been met?

Key question 2: Do existing management systems adequately mitigate harvest and trade impacts identified for the populations and sub-populations of the species concerned? The indicators of this question are presented below.

    a) Management measures, to address the type and geographic scope of the identified concerns, risks, or impacts, do not exist or are unknown to exist.

    b) Management measures in place address the type and geographic scope of identified concerns, risks, and impacts (but don't have the appropriate level of rigour).

    c) Management measures in place have, at a minimum, the appropriate level of rigour required to reduce the severity of identified concerns, risks, and impacts (but are not implemented effectively or implementation is unknown).

d) There is evidence that the existing management measures have the appropriate level of rigour and are effectively implemented to mitigate the identified concerns, risks and impacts.

1.2.4. NDF and related advice (step 9)

Step 9 involves the making of an NDF or other advice to the Management Authority based on the outcomes of Steps 1-8. It comprises 7 decisions to support address the NDF. The list of the decisions is presented below.

a) Decision 9.1: Is the Scientific Authority not confident that the specimen concerned has been correctly identified, and that the scientific name used is compliant with the appropriate CITES Standard Reference?

b) Decision 9.2: Is the export of artificially propagated specimens of this species not permitted by national or relevant sub-national legislation?

c) Decision 9.3 Does the species covered by the export permit application clearly meet all requirements for artificial propagation?

d) Decision 9.4: Are the specimens not covered by CITES Appendix II?

e) Decision 9.5: Is the export of harvested specimens of this species is not permitted by national or relevant sub-national legislation or regulation?

f) Decision 9.6: Is the previous NDF still valid and sufficient to evaluate the current export permit application?

g) Decision 9.7: Do existing management measures (step 8) adequately mitigate harvest (step 6) and trade impacts (step 7) identified for the populations and sub-populations of the target species affected by the proposed trade?

2.3. Data collection and analysis

Data collection consisted in the consultation of bibliographic references such as books, scientific articles, digital and physical reports of relevant institutions, journal and internet sites. Confidence level of each information sources was classified as (low, medium and high). And, all data were treated in order to fit the indicators proposed on the guideline. Descriptive statistical and visual interpretation through graphic and/or table, were used to describe and/or quantify the trends or variation of numeric variables, whenever possible.

3. RESULTS

3.1. Nine-steps of non-detriment findings for Pterocarpus angolensis

3.1.1. Steps 1, 2 and 3: Reviews of specimen identification, compliance with requirements for artificial propagation and relevant exclusions and previously made NDFs

The Scientific Authority are confident that *Pterocarpus* has been correctly identified, and that the correct scientific name has been used for the timber. Using botanic taxonomy, the target species has the following scientific classification:

Scientific name:	*Pterocarpus angolensis*
Class:	Magnoliopsida
Order:	Fabales
Family:	Fabaceae (Leguminosae)
Subfamily:	Papilonoideae
Genus:	*Pterocarpus*
Etiology	*angolensis:* from Angola.
Synonyms	*Pterocarpus bussei* Harms; *Pterocarpus dekindtianus* Harms; *Pterocarpus dekindtianus* var. *latifoliolatus* De Wild.; and *Pterocarpus dekindtianus* var. *latifoliolatus* De Wild..
Common names:	Mozambican: Mukwa, Mubvamaropa (Manica); Mukurambira (Ndau), Mbila (Niassa and Macua); Ambila (Rhonga); and Umbila (Sena). International names: Bloodwood, Kiaat (English); Mbira (Shona);

Source: Burrows et al. (2018) and GIBF, 2023.

The source of *Pterocarpus angolensis* in Mozambique is wild, occurring from the low lands along the sandy soils of the coastal line to highlands (inselbergs) such as Mount Mabu and the Chimanimani mountains (Timberlake et al., 2012; Wursten at al., 2017; Burrows et al., 2018) It is covered by CITES Appendix II with annotation 17. According to this annotation, *P. angolensis* specimens can be exported as log, sawn wood, veneer sheets, plywood and transformed wood with a conditional permit provided that the exportation will not be detrimental to the survival of species (CITES, 1983).

The harvest or the export of wild-harvested specimens is permitted by national or relevant sub-national under (a) forestry and wildlife law: law n° 10/99, of 7th July; (b) regulation of the forestry and wildlife law: decree 12/2002, of 6th June; (c) processed wood export tax regulation:

decree 42/2017, of 10th August; (d) processed wood export tax law, law 14/2017, of 30th December; (e) annual plan for the export of processed wood: ministerial diploma 55/2018, of 12nd June; (f) forest policy and its implementation strategy: resolution 23/2020, of 27th March; and (g) enforcement of cites listed species (CM – 2002; 2017; MTADER, 2018a). The specimens can be exported as planks, sleepers, beams, parquet rules, Slats and Others (MTADER, 2018a).

3.1.2. Step 4: Evaluate conservation concern

The conservation status of *Pterocarpus angolensis* was conducted considering the 3 levels of distribution, namely: worldwide, regional and national levels. Globally, the conservation status of the target species is of Least Concern (LC) with decrease trend of the population and without known population size. The main threats are related to biological resource use in form of logging and wood harvesting, and are motivated by intentional use for subsistence, practiced in small scale, and trade, practiced in large scale. Although the scope and severity of the subsistence use are unknown these threats are still ongoing causing stress at both ecosystem and species levels and (Barstow and Timberlake, 2018).

At regional level, the conservation status of the species was assessed within the countries, what suggests the lack of regional legal instrument. *Pterocarpus angolensis* is Vulnerable (VU) in Malawi, Namibia and Zimbabwe and Least Concern in South Africa (Barstow and Timberlake, 2018). In Mozambique the target species is classified as first-class timber species (Conselho de Ministros, 2022). The main threats in Mozambique are described at the next steps. On the other hand, the disparity on distribution of the species within the provinces of the country, combined with the impacts of the uses (subsistence and trade), may suggest the necessity of subnational classification, moving the species to precious class timber (DINAF, 2018).

Considering the assessments of the conservation status of the species, the *severity of conservation concern is "Low"* since the species, population, or sub-population has been assessed and is not considered to be threatened as defined by the criteria of IUCN Red List category. However, monitory and management of the harvesting and trade processes of this species is recommended as the population size, although unknown, was reported to have a decreasing trend. (Barstow and Timberlake, 2018).

3.1.3. Step 5: Evaluate potential biological risks

3.1.3.1. Geographic distribution

The species is native of Angola; Botswana; Congo, The Democratic Republic of the; Malawi; Mozambique; Namibia; South Africa (KwaZulu-Natal, Limpopo Province, Mpumalanga); Swaziland; Tanzania, United Republic of; Zambia and Zimbabwe (Barstow and Timberlake, 2018). This distribution is accord with the distribution presented by GIBF (2023) and Kew (2023) (see figure 1). Meanwhile, the distribution of the species, although it has been identified as occurring in Latin America, its nullity is due to the aquatic location of the place of occurrence, as *P. angolensis* is a terrestrial plant (https://www.gbif.org/species/5349240).

The risk severity assessment associated with geographic distribution of *Pterocarpus angolensis* is low due to its widespread occurrence in Africa.
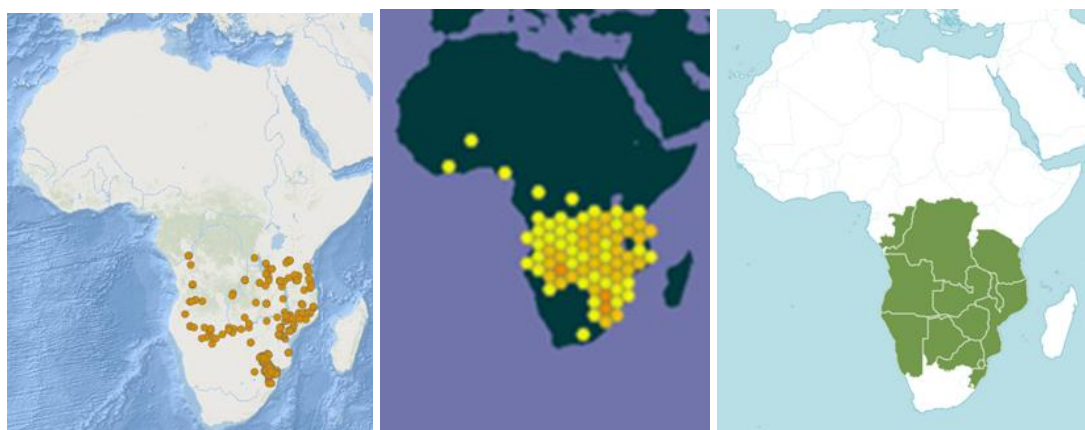
Figure 2: Geographic distribution of *Pterocarpus angolensis (Source: Barstow and Timberlake, 2018; GIBF, 2023; Kew, 2023).*

3.1.3.2. National or sub-national population size and distribution

Information regarded to the distribution of plants species within Mozambique has been documented by many plant specialist groups (Busten, 2017; Burrows et al, 2018). Information related to mapping of the plant species, particularly tree, has been carried by Burrow et al. (2018) and is presented at GBIF database (https://www.gbif.org/species/5349240). *Pterocarpus angolensis* is distributed all over the country [see figure 1 (provinces of Mozambique)], although the fragmentation or isolation pattern exhibited by the species at national level. The population of Maputo province is separated from the population extending

from Inhambane and east of Gaza provinces to Rovuma river where the distribution is continuous (see figure 1).

The risk severity of the species according to national /sub-national population size and distribution (low, medium, high and unknown)?

3.1.3.3. Size structure of national or sub-national populations

3.1.3.3.1. Size structure of national populations

At national level, the size structure of *Pterocarpus angolensis* follow a reverse J-shaped curve (Figure 2). The natural regeneration was estimated in 1.45 trees per hectares and a recruitment estimated in 1.2 trees per ha (sampling area: area em hectars) (DNAF, 2018). The numbers of trees at natural regeneration ([05 – 10 cm[) and established regeneration ([10 – 15 cm[) were estimated in 5.76 and 3.68 trees per hectare (Productive Forest Area: 17 216 677 ha; National Forest Area: 31 693 872 ha). These numbers are highest when compared with other important timber species at the same classes such as *Millettia stuhlmannii* ([05 – 10 cm[: 9.33 trees*ha^{-1} and [10 – 15 cm[: 3.75 trees*ha^{-1}), *Swartzia madagascariensis* ([05 – 10cm[: 2.25 trees*ha^{-1} and [10 – 15 cm[: 1.8 trees*ha^{-1}), *Afzelia quanzensis* (([05 – 10cm[: 1.45 trees*ha^{-1} and [10 – 15 cm [: 1.2 trees*ha^{-1}), *Guibortia conjugata* at first class ([05 – 10 cm[: 0.01 trees*ha^{-1} and [10 – 15 cm[: 2.5 trees*ha^{-1}) and *Khaya anthotheca* ([05 – 10cm[: 0.20 trees*ha^{-1} and [10 – 15 cm[: 0.01 trees*ha^{-1}), (DNAF, 2018).
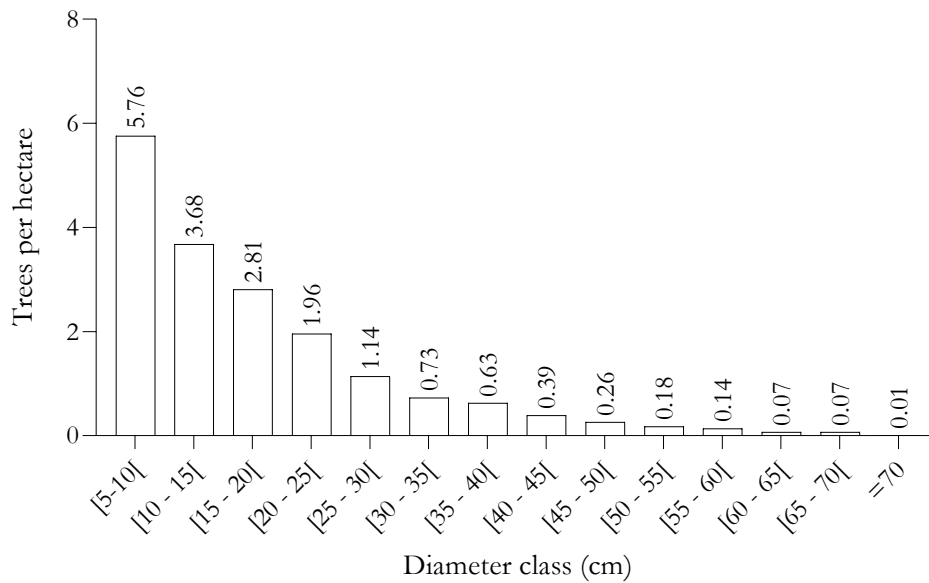
Figure 3: Size structure of national populations of Pterocarpus angolensis (source: DINAF, 2018).

This size structure only includes productive forest area (PFA- logging forest areas), and does not include the population found within the protected areas (national parks and reserves) of the country. National PFA, in which *Pterocarpus angolensis* occurs is estimated in 14 317 347 ha (Semi-deciduous Forest including Miombo: 12 978 866 ha and Semi-evergreen Forest including Gallery Forest: 1 338 581 ha), about 45% of national forest areas (31 693 872 ha) and 1.1%% lower than non-productive areas (14 477 195 ha) (DINAF, 2018). Assuming the PFA, the population size of the target species in Mozambique is estimated in 135 155 756 trees for the regeneration classes ([5-15 cm[) (DINAF, 2018).

Analyzing the data presented by consulted forest concession areas, it is difficult to have a complete population size structure of the target species as the number of trees of regeneration (natural and established) classes are generalized (Miombo Consultores, 2015; Comunicações Timbila, 2018; Marrureia, 2020; Consul, 2021). Meanwhile, the absence of trees in many well-established plants plays important role as indicator of the low individual within many diameter classes.

3.1.3.3.1.2. Size structure of national or sub-national populations

Analyzing the data presented by consulted forest concession areas, it is difficult to have a complete population size structure of the target species as the number of trees of regeneration (natural and established) classes are generalized (Miombo Consultores, 2015; Comunicações Timbila, 2018; Marrureia, 2020; Consul, 2021). Most of the consulted forest concessions (62.2%, n = 173) reported to more than 4 diameter classes although presented in timber volume not in number of trees per hectare (Figure 3).
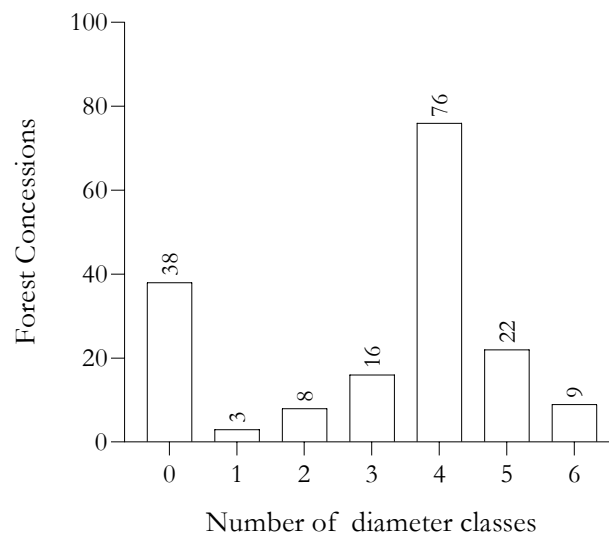
Figure 4: Relation number of diameter classes [20 - 70 cm[and number of forest concessions.

3.1.3.4. Habitat specificity and vulnerability

Overlapping the distribution map of *Pterocarpus angolensis* within the country (Burrows et al., 2021) and the ecoregion maps (IUCN, 2021), the species occupies a range of habitat and ecoregions, apart from the Mopane woodland in Gaza province and Zambezi flooded grassland. Also, the species occurs in the dense forest of southern Africa, an ecoregion characterized by the presence of Afromontane habitats; within the mosaic of mountainous forest pastures at east of Zimbabwe; and forest mosaic and pastures mountains of southern of Rift valley (Figure 4).

Related to habitat vulnerability of the species at ecoregion level, the main threats have been described by plant and land use and land use specialists. Within the dense forest of southern Africa ecoregion, the treats are cropland, uncontrolled burns, logging, plant cropping, invasive plants and climate change (Timberlake et al., 2007, 2009, 2012, 2016; Bayliss et al., 2010;

2012; Müller et al., 2012; Campira and Andicene, 2022). Within the ecoregion of Inhambane coastal forest mosaic, the threats are settlement, as the number of human population increases. Furthermore, with the installation of Gas and oil company at north of Cabo Delgado province where the population of
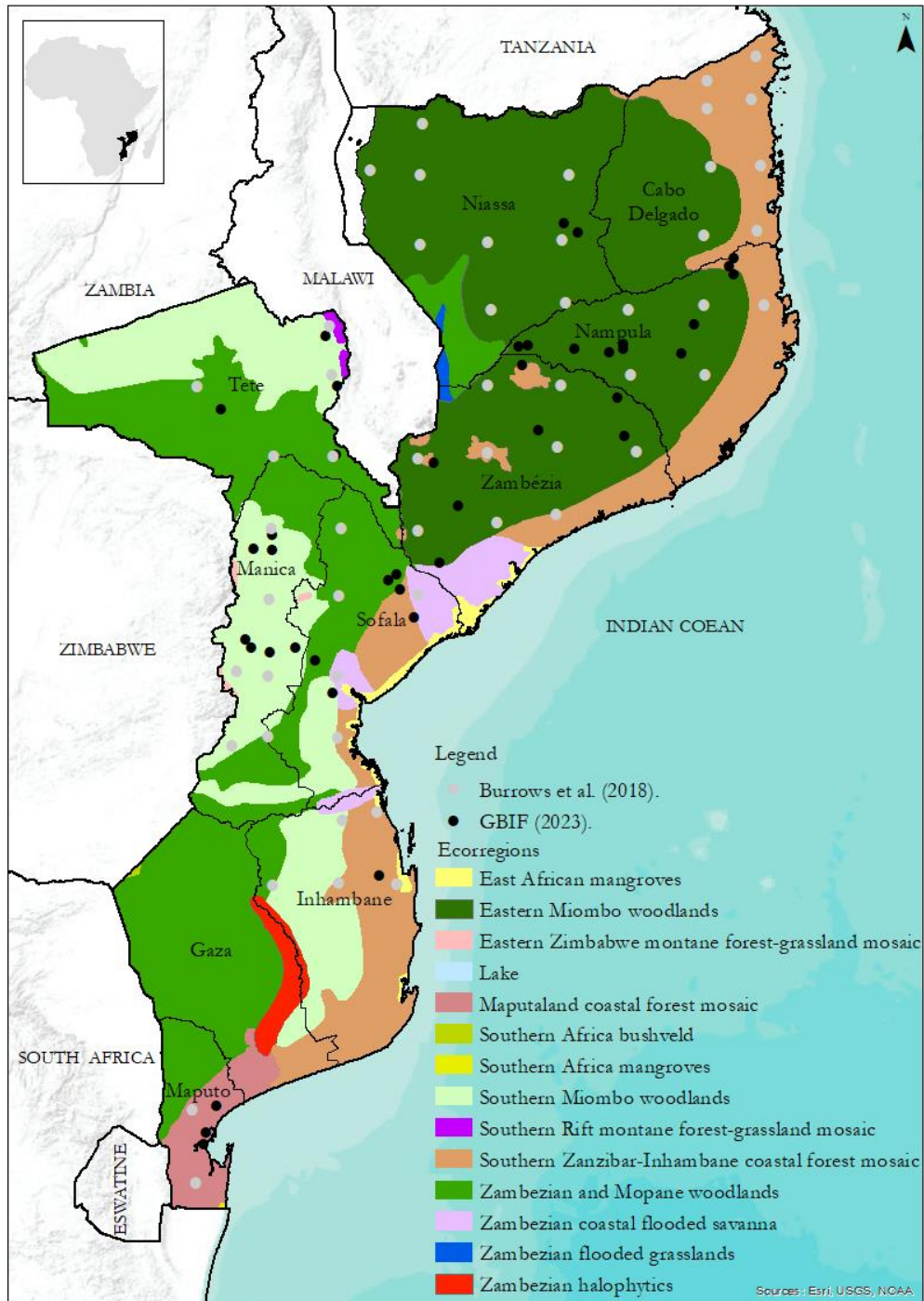
Figure 5: *Distribution of Pterocarpus angolensis Bloodwood (Umbila) in ecoregions of Mozambique.*

Umbila is isolated, the habitats will be threatened as the number of human population will increase due to the human attraction offered by the company (Malatesta et al., 2019; IUCN, 2021; Campira et al., 2022).

Related to other ecoregions, the threats are conversion of forest and grassland/savannah due to cropland, fires and settlements. According to Malatesta et al. (2019), whose land use categories was defined according to IPCC (Intergovernmental Panel on Climate Change) criteria (forest use: 0.5 ha with $\geq$ 20% of tree canopy cover with < 20% of other uses (crops, settlement, wetland and other lands)), Mozambique has gone to a change on its land use between 2001 and 2016. More than 3 million hectares of the original forests, mainly miombo and mopane forests and Inhambane coastal forest mosaic, was lost due to cropland (84.7%) and settlement (1.9%), respectively. However, more than 1 million of forest was gain from other uses, with the exception of settlement use.

Currently, about 4 million hectares of natural forest were estimated to be subjected to different types of disturbances. Fire (49.2%) and shifting cultivation (32.1%) are the main disturbance factors observed, covering altogether about 81.3% of the disturbed forest area, followed by logging (9.2%). Conversely, constructions (4.3%), charcoal production (2.5%), grazing (2.4%), pols for construction (0.2%) and mining (0.1%) are the less incident disturbance factors, affecting altogether about 9.5% of the disturbed forest area. Since the fires are characteristics to the miombo forest, the crops are restricted to the presence of settlements, and the forest low tends to protect forest areas toward sustainability, the rate of which these causes impact on forest dynamic seems to be low in long term.
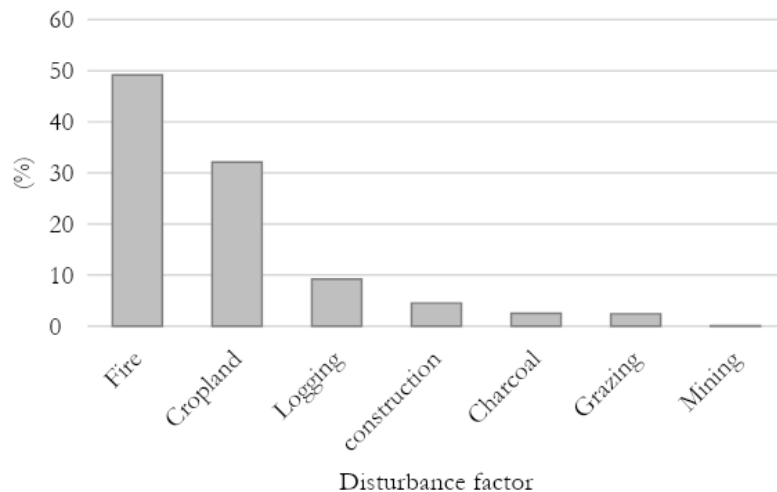
Figure 6: Disturbing factors for the survival of *Pterocarpus angolensis.*

The risk severity in relation to habitat specificity and vulnerability for *Pterocarpus angolensis* is medium due to its widespread occurrence on various habitat types across its range and ecological zones, although some habitats are declining in size. Annually, the country loses more than 267 000 ha (MITADER, 2018).

3.1.3.5. Resilience of tree species

The risk severity of resilience of Bloodwood resilience is analyzed considering growth and mortality rates and reproduction pattern. It was described by Takawira-Nyenya (2005). Although Pterocarpus angolensis can produce ample seed (up to 10,000 fruits/ha are recorded), germination is poor. Under natural conditions only 2% of the seed germinates and half of the seedlings produced die in the first year. After germination the seedling rapidly develops several shoots and a strong taproot, which may reach to a depth of 1 m in the first year.

The shoots reach about 15 cm length in the first year and often die back in the dry season. The plants enter a suffrutex stage, in which the root expands in size and lateral roots develop in the top 50 cm of the soil, while shoots usually die back to below ground level in the dry season. New shoots develop in the rainy season. This stage may last for 10 years (sometimes up to 25 years) until the root has sufficiently developed to allow the above-ground part of the sapling to survive the dry season.

Many seedlings do not survive the suffrutex stage because of drought, burning, nutrient deficiencies (particularly boron) and damage by browsing animals. Initial shoot growth of saplings forms a zigzag pattern because of the yearly dieback of the top 10 cm. After the suffrutex stage, the growth is fast, up to over 2 m in one year, and the tree rapidly reaches a height where it cannot be reached by most browsing animals. Compared to other trees the saplings with a thick corky bark are extremely fire resistant, sometimes surviving temperatures of up to 450°C, and fires contribute to pruning side branches and multiple stems. During the first decade following the suffrutex stage, height rather than diameter increases, while in the 2nd decade the diameter increases more rapidly.

Trees start flowering when they have a permanent stem of 15–20 years old, but full development of fruits usually only starts when trees are about 35 years old. The ripe fruit weighs 5–10 g, but because of the large wing wind transport is possible, usually up to 30 m from the mother tree. The spiny centre of the fruit also favours dispersal by animals. The phenology is tightly synchronized with the seasonality of the rainfall and flowering starts at the beginning of the rainy season.

In general flowering and leaf flush occur from (August–) September to November (–December), fruits ripen from January to April and may remain on the tree until far into the next flowering season, leaves are shed in May–June. Flowering is short, usually only 2–3 weeks, and pollination is by insects (e.g. honey bees). Fruit development takes about 4–5 months. Trees growing on good sites in full light live for up to 100 years, by which age they are about 20 m tall, with a crown diameter of 10–12 m and a bole diameter of 50–60 cm; bark thickness is 1.5–2 cm and sapwood 5 cm thick. Bole length will depend largely on the life history of the tree, but is favoured if the stand has been burned since the tree was about 5 years old and if pruning is carried out. The annual diameter increment of the bole was estimated 5.5–8.5 mm in Tanzania. In Mozambique it was estimated that a tree of 50 cm in bole diameter has a mean timber volume of 1.9 m³ and 5.3 m³ for 80 cm diameter.

3.1.4. Step 6: Evaluate impacts of harvest

3.1.4.1. Impact of harvest on national and sub-national populations of target species

The current and latest monitoring data show that the national populations of the target species decreased 60% of its AAC between 2007 and 2018. This decline was also followed by the decrease of productive forest areas in all provinces, possible with exception of Inhambane

province as the local data showed increase of experienced decline during the period in analyse. And, observing the AAC proposed in 2018 (See Table 1), timber harvesting was not allowed (AAC = 0 m^3) in Tete, Inhambane and Gaza provinces (DINAF, 2018). In Maputo, although the population was reported as existing (Burrows et al., 2018), its volume is not enough to feed even the local market.

The proposed quota within 2021 and 2022 was high than the mean and the extreme values of 95% Confidence Interval in Niassa, Nampula and Manica provinces, with exception of Cabo Delgado and Zambézia provinces where the proposed CAA was low than the proposed one. This is associated with the limitation on the data collection during the national forest inventory. According to the national report (DINAF, 2018), the estimation of AAC was addressed to forest types (Mopane, Mecrusse, Semi-deciduous forest including Miombo and Semi-evergreen forest including gallery forest) rather than provincial estimation, for which localized and well detailed inventories are recommended. Also, financial and logistic limitations contributed to low assessment of coastal forest, where *Pterocarpus angolenbsis* also occurs more frequently (see Figure 3). This suggests the importance of local forest inventories by local authorities.

Table 1: Allowable Annual Cut (mm3) of Pterocarpus angolensis in Mozambique (DINAF, 2018; 2023)

Province	AAC in 2018			AAC 2021 - 2023		
	-95% IC	Mean	+95% IC	2021	2022	2023
Cabo Delgado	7 914	*10 274*	12 634	1 695	1 695	2 000
Niassa	876	*1 114*	1 352	10 274	10 274	15 000
Nampula	833	*1 435*	2 036	6 293	6 293	6 293
Zambézia	26 890	*32 777*	38 664	32 777	32 777	32 777
Tete	0	*0*	0	2 000	2 000	6 000
Manica	374	*1 114*	1 854	4 638	4 638	4 638
Sofala	*5 649*	*7 218*	8 788	3 194	3 194	3 194
Inhambane	0	*0*	0	490	490	1 000
Gaza	0	*0*	0	50	50	500
Maputo	0	*0*	0	0	0	0
Total	**42 536**	**53 932**	**63 474**	**61 411**	**61 411**	**71 402**

However, the subpopulations of the species is widely distributed over the country. Also, some provinces where the AAC had been interdicted (Tete, Inhambane and Gaza). The harvest impact severity on national and sub-national populations is high as the up-to date monitoring

data show that the populations of the target species have been decreasing over the years (2007 to 2028).

3.1.4.2. Harvest impact on the ecosystem

Harvest impact severity on the ecosystem is hard to grasp and remain unknown as many of the indicators are not available. Information is needed on number and density of seed-trees; enrichment planting; damaged volume of the target species compared to its growth volume; logging selectivity; quantity or spatial coverage is not known if they have influence on seed production of remnant stand. Spatial coverage of regeneration, mainly natural. basically none of the management plans have such information.

However, indirect evidence, such as the reduction of simple license logging and the revocation of some areas, due to the lack of transparency or sustainability, points to the commitment of national authority to reduce the impact of harvest on the target species.

3.1.5. Step 7: Evaluate impacts of trade

3.1.5.1. Trade level and magnitude and trend of national trade

According to reports from the National Directorate of Forests (DINAF), *Pterocarpus angolensis* trees make up the top 5 of most licensed and harvested wood species. In fact, officially there is a slight downtrend of licensed volumes over the recent past years (2017-2022). Annual reports of the Forestry Authorities (DINAF 2017; 2018; 2019; 2020; 2021 and 2022) state that Umbila licensed logs represented 34 % of the national licensed volume in the year 2017) down to 20 % of the national licensed volume in the year 2022). Before 2002, most of Mozambique wood species were exported as logs including Umbila, but later in 2017, the Decree 42/2017 banned the export of any logs for all listed native wood species.

In Mozambique, as mentioned earlier, in terms of products, the logs of Umbila are locally milled for making boats, doors, parquet flooring, furniture and window frames. Umbila main export product is sawn wood and the main destinations are South Africa, Zimbabwe, China, Thailand and Vietnam (ITTO)

Table 2: Official records of legally exported Umbila wood products and approved quota (DNAF, 200, 2021 and 2021).

Year	Approved quota (m^3)	Exported volume * (m^3)
2020	60 411,00	2 817,193
2021	61 411,00	15 022,26
2022	71 402,00	23 372,37
Total	**193 224**	**41 211.823**

* includes stockpiled timber

However, owing to its wood properties and local preference the export volumes never matched domestic consumption driven by the fast growing population. This is backed by the present and future per capita consumption reported by Falcão (2019). There is projected an increase on consumption of wood, coal and firewood and consumption of wood for school desks whereas legal (exported wood) and illegal trade are expected to reduce (see table below).

Table 3: Projection trends of timber and forestry resources between 2018 and 2030 (Falcão, 2019).

Year	Volume (m^3)				
	CWCF	**VCWD**	**EW**	**IW**	**Total**
2018	26 807 596	21 764	494 615	247 307	*27 571 282*
2019	27 495 082	26 607	494 615	4 946	*28 021 250*
2020	28 214 627	26 607	350 000	3 500	*28 594 735*
2021	28 938 142	26 607	350 000	3 500	*29 318 250*
2022	29 672 214	26 607	350 000	3 500	*30 052 321*
2023	30 335 560	26 607	350 000	3 500	*30 691 733*
2024	31 171 142	26 607	350 000	3 500	*31 546 405*
2025	31 935 898	26 607	350 000	3 500	*32 316 005*
2026	29 903 188	27 607	350 000	3 500	*30 284 295*
2027	33 493 955	28 607	350 000	3 500	*33 876 063*
2028	34 286 206	29 607	350 000	3 500	*34 669 313*
2029	35 087 114	30 607	350 000	3 500	*35 471 222*
2030	35 895 995	31 607	350 000	3 500	*36 281 103*
Total	*403 236 720*	*327 273*	*4 839 229*	*290 753*	**408 693 976**

Where: CWCF - Consumption of wood, coal and firewood; CWD – Consumption of wood for school desks; EW - Exported wood; and IW - Volume of illegal wood

3.1.5.2. Magnitude of illegal trade

Given projection of population increase in Mozambique it is forecasted an increase in consumption in this timber for various purposes, namely furniture focus to school desks and chairs and export (Falcão 2019). At national level there is poor documentation of national and international illegal trade however the government has recognized having an annual loss of $US 200 000 000 due to illegal trade of timber (MTA, 2023). There are also reported discrepancies in the volume reported in the place of departure and countries of arrival. As an example, volume reported by China can be traced before and after "Operação Tronco that occurred in 2016. For the period 2007-2012 (EIA 2013) and period 2014-2016 were timber reported form Mozambique was 530 000 m3 opposite to 680 000 thousand by China (REF:)

Reports on illegal trade within national media are not uncommon; an indication of possible increase of low enforcement. This increase of reports might also indicate existing fragilities. There has been a practice of legalizing confiscated timber (Stakeholders horkshop of 11 March 2024). But confiscated, then legalized CITES Appendix II timber species cannot be exported given absence of traceability.

Timber stakeholder workshop has denounced the practice of emitting the government collecting guide for abandoned wood as a form of legalizing illegal cutting of wood. The timber reinforcement agency (AQUA, Agency of Environmental Control) is also reported having limitations in term of personnel and means including financial to tackle quite are recurrent episodes of illegal practices. And, field visits to provincial authorities and operators have reported the inability of the concessionaries to fix timber prices, a practice reported had motivating the illegal timber cutting to curb dwindling revenues.

Single Licence is banned under new 2023 updated Forestry and Fauna Law but due to absence of it regulation it appears that such practice of single licence has not yet completed ceased. Single licence was widely criticised as problematic as source of mal-practices in the timber sector in Mozambique. Single licences were deleterious as around 53% of holders of this licence indicated having a practive to trade illegal wood; thanks this is revoked (New revision of the Forestry and fauna Low of 2023).

Pterocarpus angolensis harvesting was reported a decline estimated to be 60% between 2007 to 2018 (MITADER 2018). Given the above we believe that ilLegal trade might have some

stake on this; together with other impacts already mentioned, SUCH AS agriculture expansion wildfires, firewood/charcoal production. Furthermore, respondents indicated risk of cutting of unauthorized size, i.e. smaller size classes, that ended up laundered within national trade

Given the above we can conclude there is some prove of illegal trade (MTA 2018). Legal trade occurs however international trade has limited documentation. Trade chain is less robust, having efforts to make it more transparent given ongoing reforms. There is no concern about substitution for lookalike species. There is tendency of slightly reduction of the reported volumes in importing countries of all timber species.

In another comment (by Sheila de Menezes Advogados (2017) publication stated that "As long as the legal framework is not fully and properly implemented, and weaknesses occur in the intervention of local communities in the management of forest resources and the actions of inspectors, as well as non-observance or inadequacy of management plans, whatever measure is taken will not have any effect, as revealed by data collected in the province from Cabo Delgado". Therefore, timber traceability, concession tightening to support sustainability, inspector increase power and reducing of quota as well as restoration initiatives are very important tools.

The severity of this illegal trade should be medium for Umbila. It could also be unknown There is a low volume sold in relation to the proposed exploration quota; species with multiple uses; consumption projection with a decreasing trend.

3.1.6. Step 8: Evaluation of appropriate rigor of existing management measures
3.1.6.1. Management measures of harvest and trade impacts
In Mozambique the management measures are regulated by the National Forest Directorate (DINAF), and are included in the management plans during the submission of application for which they are generalized for all species, including the *Pterocarpus angolensis* harvested by the logging companies. The harvest areas are owned by different entities, such as local communities and private and singular logging concessions. In a sum of 34 management plans randomly chosen, 5% are owned by local communities, 38% are owned by singular and the 57% are owned by private. These areas managed as Simple License modality has been banned as part of sustainability management (DINAF, 2023).

Generalized, the management measures in Mozambique are uniform and their implementation is strongly recommended to all sorts of concessions widespread within the country. As mentioned at step 6.3, the main management measures in place are: zonation of the concession in forest formations, forestry operations, forest production, protection activities, promotion of secondary species, involvement of the local communities and research.

3.1.6.1.1. Zonation of the concession in forest formations

The *zonation of the concession in forest formations*, although referring to the division of forest into forest types, also refers to the division of the entire concession into three main categories: productive area (logging area), non-productive area and conservation area. The productive area comprises the areas where the harvest of the timber is allowed, and this is divided according to the forest types available at the area, such as dense forest, gallery forest and savannah. This area is divided into blocks or forestry management units whose number is, generally, the same as the harvest cycle (Sitoe and Bila, 2006). They are established to facilitate annual planning and harvesting for a period corresponding to 1 year (Langa, 2021), whereas the non-productive area is reserved to (i) community area, for the settlement, social and economic infrastructures, cropland and livestock areas, and (ii) forestry industry, for installation of the equipment, buildings, agriculture, roads and other human land uses subcategories, including wooden and non-wooded grassland (Sitoe and Bila, 2006).

The conservation area is intended to protect the area, not allowing either harvesting or hunting of the local fauna. It represents, at least, 10% of the total area of the concession, and consists of riverine areas, wetlands, slopes of mountains, historical and cultural value areas, degraded and fragile areas, areas with near threatened or endangered species and threatened micro ecosystems. The extension area for conservation activities varies according to the natural conditions of the areas, with some areas protecting less than 10% of the areas (Langa, 2021).

3.1.6.1.2. Forestry operations

Forestry operations consist of pre-harvesting operations, operations during the harvest and post-harvesting operations (Serrote, 2017; SC, 2020; Langa, 2021). Operations before harvesting are short-term exploration plans. They establish procedures and delimiting the operation plans in order to guarantee efficiency during the exploration processes. It gathers

25

information related to the identification and marking of the trees with recommended DBH, collecting of topographic, hydrologic and access ways, division of the productive areas into management units (blocks), identification of camping and storage areas, drag mapping and operation planning. This activity is mainly carried during the dry season, when the access conditions are assured.

Before starting the harvesting operations, all management plans include carrying out pre-inventory. Trees of *Pterocarpus angolensis* with 40 cm of DBH are expected to be marked and registered together with other non-potential plants. It also includes registration of commercial height, falling direction, the shape of log, shape and illumination of the tree cover. The harvesting of trees whose log value is less than 50% due to natural formation (rot and curvature log) or an over opened or broken tree cover, which may indicate unsuitability of the log parts, are expected to be avoided.

Operations during the harvest consists in selection and marking, at least 75%, of trees with >50 cm of DBH, with the remaining 25% acting as seed bank and natural plant propagation, according to the established AAC of the areas. During this process, harvesting preparation activity is expected to occur observing the falling direction and the security of the operators. Harvest process considers the prevention of damaging of the surrounding trees as well as the dragging direction, seeking to guarantee the minimum damages. In addition to harvesting logs, branches with a diameter estimated in 20 cm belonging to the same tree are addressed in order to maximize the use. Log dragging carried by tractor machines is planned to cause minimum damage to the ecosystem, mainly erosion, through the opening of short trails linked to the secondary roads before reaching the storage for the last loading for transformation. Logs are locally measured in a prepared database to address the diameter and marked with a unique identification number for harvesting control and carrying of internal and external audits.

Post-harvest operations are related to the management of the blocks after the harvesting process. Sprouting is expected to take in count leaving 5 to 20 cm of the main stem from the base before logging and is monitored according to stems growth. The competitor sprouts are expected to be removed during growth monitoring in order to leave the healthy one, and protection is given to the sprout against fires and other competitors' plants. Enrichment planting is expected to be carried using seeds of marked trees or even part of the plants (e.g. stems or branches) during the harvesting process in productive, cleared or disturbed areas after previous analysis of seed germination success.

3.1.6.1.3. Protection activities and research

Protection as part of management measures and consists mainly in entrance access, fires, plagues and diseases and illegal harvesting. Entrance access isis done basically by secondary roads opened by the concessionaires and charged to rangers, mainly composed of members of the local communities, and is related to the monitoring of unsustainable activities within the concession such as illegal logging, uncontrolled fires, plant harvesting, hunting and cropland (Sitoe and Bila, 2006; Serrote, 2017; Chauque, 2020; Langa, 2021).

Uncontrolled fires are the main threat to the entire ecosystem and affect the dynamic of forest. It also affects the distribution and structure of the target species (CEAGRE, 2015; Malatesta et al., 2019). Part of illegal activities and are motivated by illegal hunting or land clearing for development of agriculture. Protection measures due to this threat are awareness raising of local communities, opening of firebreaks surrounding the edges of the blocks, clearance of fuel biomass

Research in Forest Concessions or area exploited in system of Simple Licenses. Research thematics are (a) inventory programs, (b) growth and forest dynamic, (c) artificial enrichment and (d) effects of harvest mandatory (Sitoe and Bila, 2006; Serrote, 2017; Chaúque, 2020). Concessions forest studies are scarce. Many areas are limited to present management plans as requests for licensing, one of the most important information to present to the national authority (Sitoe and Bila, 2006).

3.1.6.2. Management measures effectivity on mitigation of harvest and trade impacts
3.1.6.2.1. Inspection of forestry activities: from forestry concessions to trade

The effectivity of management measures on mitigation of harvest and trade impacts have been investigated. DINAF (2022) assessed the forest concessions in 2021 using different criteria. Assessing forest exploitation using (a) the proper delimitation of the area and forestry exploration blocks are (b) the appropriation of forestry exploration license (c) the equability of equipment to carry out forestry exploration, (d) the observation of minimum cutting diameter, codding the stumps and logs at the exploration site, and extraction of all the felled wood, and (e) the recording of all wood harvested and transported in log books for this purpose. These informations are grouped into (i) Zonation of the concession in forest formations and (ii)

Forestry operations. The results indicated that there is a persistence of operators with non-compliance of management measures.

Regarded to environmental sustainability of native wood production, Egas and Falcão (2018) reported that the exploitation of native forests both under Forestry Concessions and as a Simple License, in most cases, is not carried out in accordance with the management plans proposed by Sitoe and Bila (2006) due to the lack of formal annual exploitation plan, without complying with the exploration blocks. The situation is worsened by exploitation carried out by illegal loggers, including some members of local communities that cut down trees in other people's concessions, transgressing the most basic recommendations for environmentally sustainable exploration.

3.1.6.2.2. Protection activities and research

Protection activities are crucial to maintain the sustainability of timber exploitation. Non-well protected areas are vulnerable to fires and illegal harvest. Fires effects are the reduction of effort of forest enrichment, as small plants are less tolerant of fires what causes changes on population structure of the species (Sitoe and Bila, 2006; CEAGRE, 2015; DINAF, 2018, MITADER, 2018). Fires still one of the most threat for forest areas. As stated before, fires have 49.2% of weight over the sum of forest threats (Malatesta et al., 2019). Meanwhile, the trend of fire effects on forest loss is decreasing due to intensification of environmental education campaigns by national authority and its partners have been aimed to reduce uncontrolled fires, such campaigns have shown results encouraging in recent years. Therefore, the effectivity of this measure is medium

Related to reforms, national authorities and non-governmental organization carried a lot of researches in order to follow the dynamic and impact of the timber harvest, trade and consumption in Mozambique. several changes and recommendations have been addressed to the national authority and logging companies aimed at enforcing better forest management plans. Forest inventories (MITADER, 2018), forest dynamic and drives of forest loss (CEAGRE, 2015; DINAF, 2018; Malatesta et al., 2019); annual reports of timber products trade (DINAF, 2017, 2018, 2019, 2020, 2021), forest inspection strategy 2020 – 2024 (AQUA, 2019; DINAF, 2021b), forest and governance in Mozambique: Vision 2035 (Pereira and

Taquidir, 2019), Native forest wood value chain: Diagnosis of the Current Situation (Egas and Falcão, 2018).

These investigations contributed and still contributing positively for the changes of the forest sector toward sustainability and transparency in short, medium and long term (Egas and Falcão, 2018; Pereira and Taquidir, 2019; DINAF, 2022). To illustrate, the number of forest operator and timber exporter observed a reduction, with most of the operators loosing licenses due to the unprecedented practices, such as unclear management plans documentation and illegal harvest practices.

Meanwhile, problems with researches are related to limitation due to financial resources, research completion time, poor diversity of bibliography, lack of information data on quantifying the volumes illegally harvest and trade, the lack of data on forest growth and forest types. Other problems are related with the lack of scientific information on Non-Timber Forest Products (reeds, bamboo, tree bark and others), in addition to the lack of information on the levels of consumption of stakes, poles, and others, has led to these products not included in the study (Falcão, 2019).

3.1.7. Step 9: Non-detriment finding and related advice

3.1.7.1. Non-Detriment finding

a) Decision 9.1: The plant has been correctly identified, and, the scientific name used is compliant with the appropriate CITES Standards.

b) Decision 9.2: The permit application is not for artificial propagation plants.

c) Decision 9.4 and 9.5: There is no science-based NDF made for this species, meanwhile, (a) the timber species is covered by CITES Appendixes and (b) the harvest or export of wild-harvested specimens of the species is permitted by national or relevant-subnational legislation or regulation;

d) Decision 9.7: The existing management measures are adequately to mitigate the harvest impacts and trade impact, for which the NDF is positive in concessions with timber. However, some advises are important to make the harvest and trade of this species non-detriment.

3.1.7.2. Advices

In order to make the harvest and trade of Pterocarpus angolensis non-detriment the national forestry authority must consider the following advices:

3.1.7.2.1. Legal and institutional aspects

- Further operationalize AQUA by strengthen its inspection role. Additional financial, human and material resources are needed to make it more autonomous and capable to fulfil its role as biodiversity/timber controller.
- There have been suggestions for some level of moratoria on export. May be in forms of exclusion of territories or concessions that have proven not having timber.
- Improve methods for measuring volumes of wood products across timber value chain, including inspections.
- Quotas must be commented by SA.
- Eliminate authorization to remove uncollected or abandoned wood (cut apparently outside legal procedures)
- Seized illegal wood should never be exported should not be exported. Reason: its concessions or harvested areas cannot be traced.
- There is a need to guarantee that the Simple Licence (now forbidden by forest low, of 2023) is no longer active in any concessions and free areas in the country.
- Forest concessions with negative historic located near protected areas must be suspended.
- There is need to document concessions having bad reputations (re-incidence of report of malpractices). Exemplar punishment should be considered for those, especially if located in vicinity of protected areas (national parks and reserves).
- Primary surveillance is paramount in concessions with no legal wood or very low AAC.

3.1.7.2.1. Research

- There is a need to do advocacy and sensitization about CITES procedures for species included on Appendix II.
- Encourage forestry and ecological researches on the following topics across the country: growth and mortality rates across the country
- Improve management plans

- The documents must guarantee the screening timber specimens across the chain custody.
- The existing forestry information system must be detailed and near all information made available. Specifics: need to add crucial information such as operator database containing location, extent, wood species, cutting cycle, productive area, conservation area, CAA; threats, etc.).

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ANNEX

Consulted Forest Concessions and the Allowable Annual Cut (courtesy of DINAF, 2024)

Province	Concession Name	Year	District	AAC	Net productive área (ha)
Zambézia	Nis, Lda	2017	Lugela	3823	33000
Cabo Delgado	Socipalm, S.A.R.L.	2021	Mueda	3500	68720
Zambézia	East African Forest Products, Lda	2016	Lugela	2561	31180.35
Zambézia	Madeiras Alman, Lda.	2016	Lugela	2255	15040
Sofala	EDN, Limitada		Gorongosa-Maringue	1866	
Zambézia	Madeira De Mocuba Lda	2021	Mocuba, Ile e Maganja da Costa	1620	34828
Zambézia	Jm7- Jihas Madeiras Sete, Lda	2017	Mopeia	1550	30000
Zambézia	Bassam Jihad Madeiras Sete Lda	2022	Mopeia	1500	30000
Zambézia	Somon, Lda	2021	Derre	1420	49127.88
Zambézia	Baia Branca	2020	Alto-Molocue	1135	18.294
Tete	Soflora	2023	Zumbo	1032	18205.5
Cabo Delgado	Sawers Cap Lda	2021	Montepuez	948	21105
Zambézia	Raimundo Julio	2021	Maganja da costa	933.66	15424.5
Tete	Edn, Limitada	2016	Marávia	918.75	17299.54
Zambézia	Abdul Amid Alimamad	2017	Gilé	879	23500
Zambézia	Wooden World,Lda	2017	Milange	878	43054
Zambézia	Baia Branca	2020	Alto-Molocue	860.63	7.253
Zambézia	Sun Flower	2021	Morrumbala	850	16000
Zambézia	Francisco Duarte	2019	Gile	834	12250

Cabo Delgado	King's Way Lda	2017	Namuno	823.5	12000
Zambézia	Madeiras Alman, Lda.	2016	Mocubela	802	28,000
Zambézia	Madeiras Amos, Lda	2019	Lugela	801	17051
Zambézia	Madeira Amas Lda	2019	Lugela	801	17051
Zambézia	J.C.Trading,Lda	2021	Gilé	791	221948
Zambézia	Crest, Lda	2021	Pebane	775	24.8
Cabo Delgado	Suzana Valente	2022	Macomia	769	7436
Zambézia	Woodenworld	2017	Mulevala	741	14000
Zambézia	Somon, Lda	2021	Chire	731	36042
Zambézia	Shung Lin	2019	Pabane	720	17313
Cabo Delgado	King's Way Lda	2017	Montepuez	705	14400
Cabo Delgado	Success Investiment, Limitada	2018	Mueda	694	17.192
Cabo Delgado	Success Investiment, Limitada	2021	Mueda	693	16.392
Tete	Benedita Francisco A. J. Baptista.	2016	Zumbo	687.3	19860.37
Tete	Bendita Francisco A. J. Baptista	2015	Zumbu	687.3	19860.37
Cabo Delgado	Alexandre Loureiro-Madeiras Lda	2017	Montepuez	677	37000
Cabo Delgado	Mpingo Madeiras	2020	Montepuez	677	48869
Zambézia	Fernando Mario	2021	Mopeia	650	12.797
Tete	Feriado Damião Alferes	2016	Mancungue	641.37	18955.2
Cabo Delgado	African Timber, Limitada	2018	Chiúre	628	10000
Cabo Delgado	Sawers Cap Lda	2018	Montepuez	616	975
Cabo Delgado	Arlindo Afonso	2018	Meluco	607.5	9000
Zambézia	Bafina E Filhos	2022	Gilé	604	19154
Zambézia	Uape	2022	Gile	585	10151.2
Cabo Delgado	Isabel Manuel Nkavadeka	2019	Muindumbe	574	13.222

Cabo Delgado	Isabel Manuel Nkavadeka	2019	Muidumbe	573.964	13,222
Tete	Maurício Pinto Patrício	2016	Zumbo	562.3	19473.3
Zambézia	Cuacua Madeiras, Lda	2021	Mopeia	540	38000
Zambézia	Cobua	2017	Lago	530	18000
Cabo Delgado	Sawers Cap Lda	2021	Montepuez	520	15,662.68
Zambézia	Bassam Jihad Madeiras Sete Lda	2022	Mocuba	516	34071.44
Zambézia	Francisco Duarte	2022	Gilé	515	17000
Sofala	Lavasflor, Limitada	2020	Muanza e Cheringoma	512	41.098
Cabo Delgado	Pacific International Lda	2021	Chiure	510.5	12185
Cabo Delgado	Pacific International Lda	2017	Chiúre	504.45	12185
Zambézia	Ossapa	2016	Lugela	504	21750
Tete	Empresa UTA	2015	Zumbo	493	17052
Tete	Feriado Damiao Alferes	2020	Zumbu	482	16349.68
Tete	Francisca Diogo Jaqueta	2020	Mutarara	479.6	17,481.85
Zambézia	Carlos Alberto Simiao Inacio	2021	Mopeia	466	16.092
Tete	Feriado Damião Alferes	2015	Mancungue	458.12	18955.2
Cabo Delgado	Guo Mao, Limitada	2021	Namuno	457.95	1,348.65
Tete	Mauricio Pinto Patricio	2015	Zumbo	455.84	19473.76
Cabo Delgado	Guo Mao, Limitada	2017	Namuno	455.606	11.791
Zambézia	Wooden World,Lda	2017	Mocuba	455	16180
Tete	Cristiano Da Conceição Damião Nardela	2016	Zumbo	451.81	10063.45
Tete	Cristiano Da Conceição Damião Nardela	2015	Zumbo	451.81	10063.45
Cabo Delgado	Arlindo Afonso	2021		450	9000
Zambézia	Madeiras NLC	2017	Mocuba	439	14969
Manica	Madeiras E Transporte Ataide	2018	Sussundenga	436.75	16583.55

Zambézia	Madeiras Alman, Lda.	2016	Lugela	434	6520
Zambézia	Nelson Lopes Cardoso	2020	Mocuba	428.929	18378
Zambézia	Nelson Lopes Cardoso	2019	Mocuba	428	18.378
Cabo Delgado	Madeiras Alman, Lda	2020	Mueda	426	39,946.99
Cabo Delgado	Madeiras Alman, Limitad	2020	Mueda	426	39946.99
Cabo Delgado	Madeiras Alman, Limitad	2017	Mueda	425	26000
Tete	Jonas Dumana Apulai	2023	Zumbo	422.72	17516.6
Cabo Delgado	Paemacc Lda	2021	Montepuez	411.21	32776
Zambézia	Madeiras Alman, Lda.	2016	Lugela	395	12440
Cabo Delgado	Miti International, Lda	2018	Mueda	394	204138
Zambézia	Cimunitaria De Mundzo	2022	Maganja da costa e Mocuba	392.46	37895.12
Zambézia	Unflower.Lda	2022		380	
Zambézia	Crest, Lda	2021	Pebane	369	17.285
Zambézia	Crest, Lda	2021	Pebane	358	16.382
Niassa	Madeiras David	2021	Nipepe	348.11	14720
Zambézia	Carlos Alberto Simiao Inacio	2020	Gilé	343	16298
Tete	Cristiano Da Coiceicao Daniel Nardela	2020	Zumbu	339	15.804
Zambézia	Momed Icbal Issuf Daud, Lda	2021	Guile	326.32	17000
Zambézia	Carvalho Representações	2017	Morrumbala	320	32650
Zambézia	Sociedade Moveis Licungo, Lda.	2021	MOcuba, Mulevala e Mucubela	320	35233.39
Cabo Delgado	Faustino Rafique	2021	Chiure	303.15	14,010.22
Tete	Salafo Investimentos, Limitada	2016	Marávia	299.5	19568.22
Tete	Mc, Limitada.	2016	Marávia	297.67	19610.4
Sofala	Lofe Construcoes, Lda	2021	Cheringoma	293.51	9300
Zambézia	Crest, Lda	2021	Maganja da costa	280	33.87

Cabo Delgado	Suzana Valente	2018	Macomia	278.85	7436
Zambézia	Amade Ali Saide	2019	Mopeia, Mulevale	273.4	2500
Zambézia	Amade Saude	2019	Mopeia	273.4	17500
Cabo Delgado	Nkutema Namoto Alberto Chipande	2021	Mueda	271.6	15242
Zambézia	Amade Ali Saide	2021	Mulevala	270	12000
Sofala	Madeiras Preciosas De Mocambique, Lda	2023	Chiringoma	268	43955
Manica	Oliveira Arao Oliveira	2021	Sussundenga	266	12077
Zambézia	Ligonha Timber Products, Lda	2021	Alto-Molocue	260.09	14756.41
Zambézia	African Timber, Limitada	2016	Lugela	258.94	18630.7
Cabo Delgado	Aniceto Maria Antonio Tiago	2023	Namuno	248	15086
Cabo Delgado	Suzana Valente	2021	Macomia	244	6,440.17
Cabo Delgado	Amina Ibraimo	2018	Balama	242.68	17183.73
Cabo Delgado	Amina Ibraimo	2021	Balama	242	17.184
Sofala	Levasflor	2017		235.54	46239
Zambézia	Inovation Import 7 Export, Lda	2019	Lugela	233.05	17229
Cabo Delgado	Yafei Comercio Internacional Limitada	2021	Montepuez	222.72	1308883
Manica	Simbire Madeiras	2017	Mchaze	221	13931.04
Tete	Isabel Goncalves Barcos Dias	2020	Zumbu	209	19,086.56
Zambézia	Tom Yin	2019	Milange	200	17763
Zambézia	Concessao De Coromana	2019	Mulange	200	17763
Tete	Mamani Bunga Vale	2021	Doa	191.63	16345
Zambézia	Chumpimg Wu.	2020	Morrumbala e Milange	190	35329.13
Tete	Vuca's Moz Sociedade Unipessoal, Lda	2020	Zumbu	186.04	15518.43
Zambézia	Madeiras Jorge Bing, Lda	2020	Lugela	160.55	38475.01
Sofala	Gloria Virginia Ricardo	2021	Buzi	160	15000

Cabo Delgado	Axu Internacional Investimentos Corporation Mozambique, LDA	2018	Montepuez	152.72	14.4
Cabo Delgado	Axu Internacional Investimentos Corporation Mozambique, LDA	2018	Montepuez	144	14.4
Zambézia	Madeiras Wamusse	2018	Morrumbala	131.92	270000
Zambézia	Madeiras De Zambézia.	2017	Morrumbala	130	26000
Sofala	M & B, Lda	2021	Muaza	107	12448
Tete	Abdul Sacoor Mussa Valy Ossman	2015	Moatize	100	13.488
Tete	Abdul Sacoor Mussa Valy Ossman	2015	Moatize	100	13488
Tete	Natercia Pedro Charmar Droblene	2016	Chifunde	92	15939
Sofala	Madeira Cheringoma	2021	Cheringoma	73	8963
Tete	Isabel Gonsaves Barco Dias	2015	Zumbo	70.119	12600
Zambézia	Today Wood In Products, Lda	2023	Mucubela	70	28000
Tete	Solistino Alfalinho Marques	2015	Zumbu	65.8975	18000.1
Nampula	Florestal, LDA	2015	Angoche	65.79	49398
Zambézia	Florestal Comunitaria De Nipiode	2019	Mocuba, Mulecala e Macubela	53	28370
Zambézia	Florestal Comunitaria De Uapé	2019	Gilé	53	17698
Tete	Hélder Manuel Agostinho P. Macaringue	2015	Zumbo	45.7	18000
Tete	Pereira Alissone Cheiro	2015	Zumbo	45.3	18000
Sofala	Marino Denjo	2021	Chemba	31.9	
Tete	Hélder Manuel Agostinho P. Macaringue	2016	Zumbo	31.9	18000
Zambézia	Industrias Sotomane	2021	MOcuba, Mulevala e Mucubela	30	8000
Zambézia	Floresta Comunitaria De Nipiode	2019	MOcuba, Mulevala e Mucubela	20	17059
Cabo Delgado	Associação Esperança De Ancuabe	2020	Ancuabe	6.813	1.776
Cabo Delgado	Associação Esperança De Ancuabe	2020	Ancuabe	6.813	
Cabo Delgado	Wood Export, Limitada	2015	Mueda	5.448	417.988

Cabo Delgado	Wood Export Limitada	2021	Mueda	4.734	93.713
Cabo Delgado	Mozambique First International Development, Limitada.	2018	Mueda	3.3	42.2
Cabo Delgado	Kam Wang Moçambique, Limitada.	2019	Balama	2.038	62,501
Cabo Delgado	Panga, Lda	2021	Montepuez	1.637	
Cabo Delgado	Associação Makhala Honthudji	2019	Balama	1.143	62.501
Sofala	Mafer	2021	Cheringoma	0	25500
Zambézia	Ligonha Timber Products, Lda	2020	Alto-Molocue	0	6.618
Tete	Vitoria Paulo Maia	2015	Zumbo	0	18000
Sofala	Empresa Edn, Limitad	2021	Gorongosa	0	20
Sofala	Euromoz, Lda	2020	Maringue	0	
Sofala	Ceno, Lda	2021	Caia	0	8800
Sofala	Sonia Joaquim Raposa	2021	Chemba	0	14034.51
Sofala	Chiramba, Lda	2021	Chemba	0	12643.6
Tete	Isabel Gonsaves Barco Dias	2016	Zumbo	0	12600
Tete	Interbeira, Lda	2016	Cahora Bassa	0	15650
Tete	Inchope Madeira	2015	Macanga	0	10663
Tete	Interbeira, Lda	2013	Chintholo	0	15650
Tete	Abdul Sacoor Mussa Valy Ossman	2015	Changara	0	13088
Gaza	Neves Fernando Nhanengue	2023	Massangena	0	
Zambézia	Floresta Comunitaria do UAP	2019	Gile	0	12772
Inhambane	Anastacio Pascoal Palege Macucule	2015	Inhassoro	0	17000
Inhambane	Amade Ismail Abdul Sultane	2018	Funhalouro	0	14000
Sofala	Sinohanson	2018	Dondo	0	8737.19

List of exporters for 2024

Exports are expected to have the capacity for process timber so that compliance for export of processed wood is attained.

Ord.	Nome do Exportador	Contacto (+258)	Província
1	Safi Timber Importação & Exportação E.I	848888809	Sofala
2	Forest Resources Mozambique, S.A	864030201	Maputo
3	Kussunga S.A	877847682	Sofala
4	Eco Village	823027804	Cabo delgado
5	Tct Indústrias Florestais, lda	823027804	Sofala
6	Mpingo Madeiras, Lda	840343870	Cabo delgado
7	Grupo Chantel Trading	878806039	Maputo
8	Asfa Sociedade Unipessoal, Lda	868220000	Inhambane
9	Filipe Filipe Chibale	847335862	Inhambane
10	Levasflor, Lda	868778287/849377941	Sofala
11	Juwa Timber	861087016/842719034	Nampula
12	Success Investment, Lda	867778888	Cabo delgado
13	Soflora, Lda	876242966	Sofala
14	Yafei Comércio Internacional, Lda	845550056/862882222	Cabo delgado
15	Projecto Chacate E.I	873594264/847659786	Maputo
16	Madeiras Bajone	864003266	Zambézia