

# **CITES Non-Detriment Findings (NDF) for Pod Mahogany, [*Khaya anthotheca* (Welw.) C. DC.] “Umbáua” in Mozambique**

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



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## 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

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## 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 19<sup>th</sup> 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<sup>o</sup>. 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 Pod Mahogany, [*Khaya anthotheca* (Welw.) C. DC.] “Umbaua” in Mozambique

## 1.2. EXECUTIVE SUMMARY

*Khaya anthotheca* is a rather a fast-growing plant species reaching up to 8 to 12 or even 16 mm a year. Occurs extensively throughout the country across a range of habitats, with exception of the southern region (excluding coastal areas of northern Inhambane). In Mozambique, the target species is barely connected to artificial propagation (exceptions to examples such as those from Manica province) and has no conservation status related.

Globally it is an IUCN Red List vulnerable species. Main threats to this species include: habitat conversion to cropland, exacerbated by itinerant agriculture, wildfires, habitat encroachment and firewood production. The biological risk faced by this species is high due to a low adaptation, low survival rate of its seedlings produced annually. Its habitats being humid zones and threatened by agriculture.

Umbáua may take just 25 years to maturity, 16 mm/year. Despite its wide distribution, according to the Mozambican national forestry inventory, the growing stock of the species seems not viable, since the volume within the diametric classes does not show an inverted J-curve.

The impact of timber industry in this species is high as it has been reported to have reached 88% decline between 2007 to 2018. Due to a small licenced volume, it is expected that illegal trade of this species is low. Can be considered unknown, also the species appears not target for exportation, having therefore little of no political influence. The impact severity of harvesting is medium to high, giving an estimated 80% 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 Law of 2023).

This NDF attempted to cover all concessions in the country and, the AAH (Allowed Annual Harvest) varied across the concessions. Maputo is the major consumer market, but *Khaya anthoteca* volume share is negligible, since it is a lesser used/known species. The NDF of the species needs to be discussed as many concessions does not exhibit a favourable distribution within the diametric class, particular the established regeneration of [20-29] cm at DBH.

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 *Khaya anthotecamay* 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**

*Khaya anthoteca*, commercially known as “Umbaua or M’baua” 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).



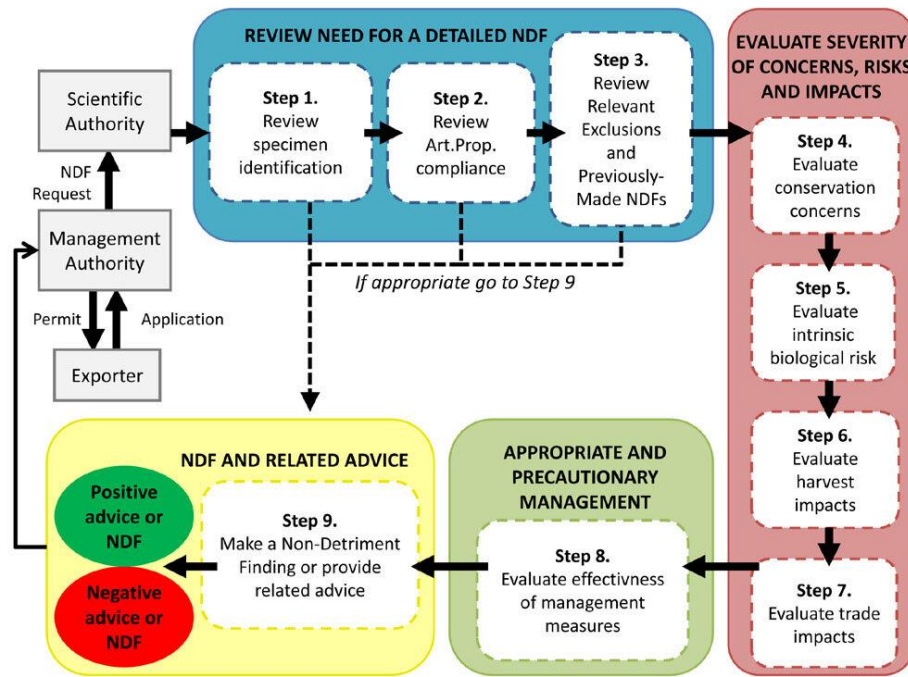


Figure 1: Nine-steps pathway for making non-detriment findings for timber/ tree species listed in CITES Appendix II (source: Wolf et al., 2018).

### 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?

Depending on answer of the key questions, negative answers of each step may address to early decision (short cut to Step 9).

### **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 interconnectio), 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.

-

#### **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 are 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 *Khaya anthotheca* has been correctly identified, and that the correct scientific name has been used for the timber. The taxonomy of the target species is found bellow (Victor and Geldenhuys, 2005; Burrows et al., 2018; Kew, 2023).

Using botanic taxonomy, the target species has the following scientific classification:

Scientific name: *Khaya anthotheca*

Class: Magnoliopsida

Order: Sapinales

Family: Meliaceae

Subfamily: Khaya

Genus: Anthotheca:

Etiology *Khaya nyasica* Welw.; *Garretia anthoteca* Welw.; *Khaya wildemanii* Ghesq.

Synonyms (*anthotheca*: from Anthos-, flower, and -theka, case – the reference is uncertain; perhaps alluding to woody pods that split open).

Common names: Mozambican names: Umbaua; Mbaua (Manica, Niassa, Sofala).

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

The source of *Khaya anthotheca* in Mozambique is wild, occurring from the low lands along the sandy soils of the coastal line from Inhambane to Cabo Delgado provinces to highlands (inselbergs) such as Mount Mabu, Namuli and Chimanimani mountains. It is absent in Maputo, Gaza province and along the Rovuma river. In southern region of the country, its absence may be due to the short rains, mainly in Gaza as the climate (Timberlake et al., 2012; Wursten et al., 2017; Burrows et al., 2018). It is covered by CITES Appendix II with annotation 17. According to this annotation, *Umbaua* 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 7<sup>th</sup> July; (b) regulation of the forestry and wildlife law: decree 12/2002, of 6<sup>th</sup> June; (c) processed wood export tax regulation: decree 42/2017, of 10<sup>th</sup> August; (d) processed wood export tax law, law 14/2017, of 30<sup>th</sup> December; (e) annual plan for the export of processed wood: ministerial diploma 55/2018, of 12<sup>nd</sup> June; (f) forest policy and its implementation strategy: resolution 23/2020, of 27<sup>th</sup> 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 *Khaya anthoteca* was conducted considering the 3 levels of distribution, namely: worldwide, regional and national levels. Globally, the conservation status of the target species is Vulnerable (VU) 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 (Hills, 2019).

At regional level, the conservation status of the species was assessed within the countries (Hills, 2019), what suggests the lack of regional legal instrument. *Khaya anthoteca* is Vulnerable (VU) in Malawi (Msekandiana, G. and E. Mlangeni, unknown year) and Angola (Costa et al., 2019); is Least Concern in South Africa (Victor and Geldenhuys, 2005) and Zimbabwe (Hyde et al.,



2023); and is not known in Zambia and Tanzania. Meanwhile, according to the endangered species list of plants of Tanzania, the target species is not included (<http://www.earthsendangered.com/search-regions3.asp>), what possibly suggests low risk of threats.

In Mozambique, *Khaya anthoteca* is near threatened – NT, under IUCN red list (Golding, 2002) and 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 (DINAF, 2018).

Considering 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, monitoring 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. (Hills, 2019).

### **3.1.3. Step 5: Evaluate potential biological risks**

#### **3.1.3.1. Geographic distribution**

*Khaya anthoteca* is widespread, from Angola; Cameroon; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Ghana; Liberia; Malawi; Mozambique; Nigeria; Sierra Leone; Tanzania, United Republic of; Uganda; Zambia; Zimbabwe. It is fairly widely grown in plantations within its natural area of distribution, but also in South Africa, tropical Asia and tropical America.

According to the risk severity assessment associated with geographic distribution, *Khaya anthoteca* has a low risk severity for geographic distribution is widespread, commonly occurring throughout a large region - African one continent (see Figure 1).



Figure 2: Geographic distribution of *Khaya antboteca* (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 Burrows et al. (2018; GBIF, 2023; Hyde et al., 2023). Following Burrows et al (2018), the target species is distributed all over the country, with exception of Gaza and Maputo provinces. although the fragmentation or isolation pattern exhibited by the species at national level, with high visibility at the central region of the country (Sofala, Manica, Tete and Zambézia). This population is connected with the population found in Nampula province. Only the population found in Niassa is isolated from the remaining population.

Although the isolation pattern exhibited by the species, it's absence at many areas within the country is related by the lack of assessment infrastructures, what restricts the carrying out of studies. However, forest concessions are sources of the distribution of the species within the country. The amount of the individual of the target species varies according to factors such as, proximity of human settlement and cropland which are the drives of loss and exploitation as it plays important roles for the local communities (construction, medicine, handcraft and jewelry).

According to the risk severity assessment associated with national /sub-national population size and distribution *Khaya anthotheca* has high risk severity for national population and sub-populations although presenting a large they are confined to riverine, areas with high vulnerability due to the practice of agriculture (MITADER, 2018; Malatesta et al., 2019).

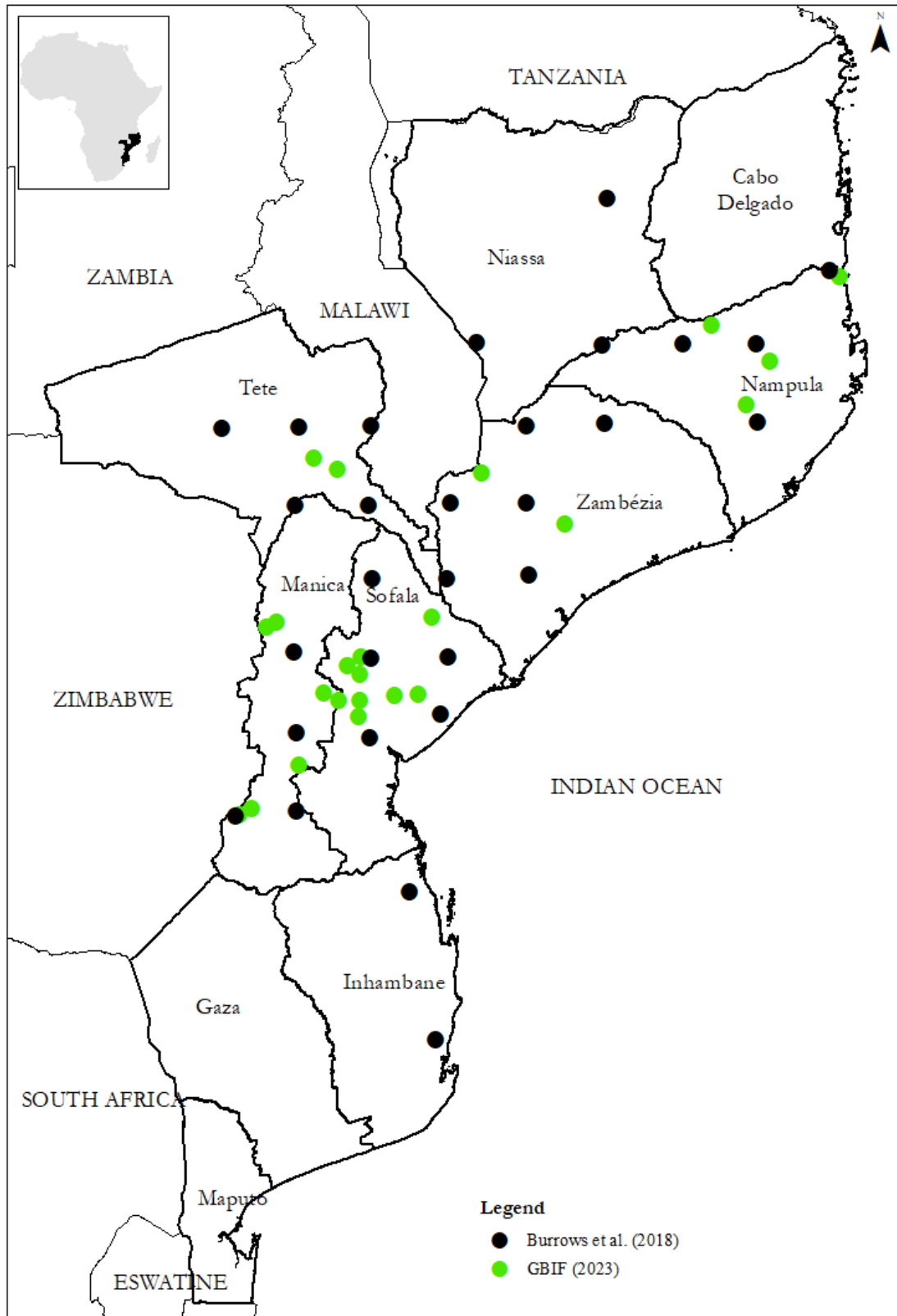


Figure 3: : National distribution of *Khaya anthotheca* (Source: Burrows et al., 2018; GIBF, 2023).

### 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 *Khaya anthotheca* do not follow a reverse J-shaped curve (see graphic below). The numbers of trees at natural regeneration ([05 – 10 cm]) and established regeneration ([10 – 15 cm]) were estimated in 0.20 and 0.01 trees per hectare (Productive Forest Area: 17 216 677 ha; National Forest Area: 31 693 872 ha). These numbers are small when compared with other 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) *Pterocarpus angolensis* ([05 – 10cm]: 5.76 trees\*ha-1 and [10 – 15 cm]: 3.68 trees\*ha-1), *Swartzia madagascariensis* ([05 – 10cm]: 2.25 trees\*ha-1 and [10 – 15 cm]: 1.8 trees\*ha-1) and *Azelia quanzensis* ([05 – 10cm]: 1.45 trees\*ha-1 and [10 – 15 cm]: 1.2 trees\*ha-1). It is high only at first class, not biological significant, when compared to *Guibortia conjugata* at first class ([05 – 10 cm]: 0.01 trees\*ha-1 and [10 – 15 cm]: 2.5 trees\*ha-1) (DNAF, 2018). As indicated, this is the timber species with the lowest number of tree per hectare in Mozambique.

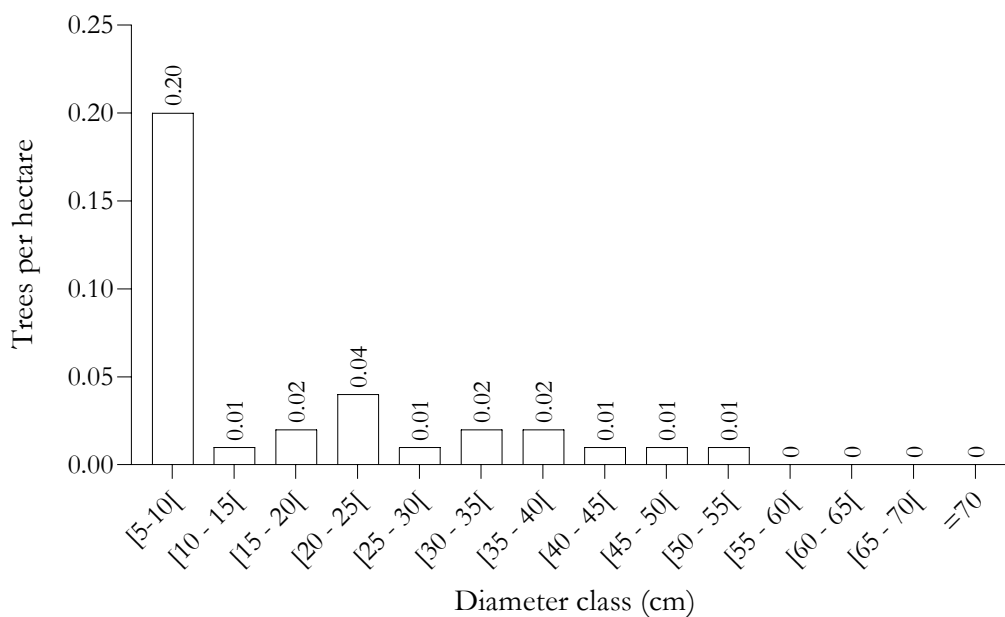


Figure 4: Size structure of national populations of *Khaya anthotheca* (source: DNAF, 2018).

Comparing the first two classes of the target species with the remaining diametric classes of the same species, they are relatively equal, suggesting insecurity of sustentation natural capacity of the species for the future harvest. Meanwhile, suspicion of overexploitation of individuals with commercial diameter ( $\geq 40$  cm), or the effect fires, agriculture and tree harvest

due to charcoal production, is likely as the number of trees at such diameter class is less than 1 unity (DINAF, 2018; MITADER, 2018; 2021; Malatesta et al., 2019).

This size structure of the national population only includes productive forest area (PFA), and does not include the population found within the conservation areas of the country as part of the methodology applied during the fourth national forest inventory. National PFA, in which *Khaya anthotheca* occurs is estimated in 17 216 677 ha, about 54% of national forest areas (31 693 872 ha) and 18.9% higher 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 3 615 502 trees for the regeneration classes, 516 500 trees attained commercial diameter ( $\geq 50$  cm) and almost 344 334 trees are close to the commercial diameter class [35 – 40 cm]. Considering the values may increase slightly when considering the limitation of the national forest inventory (DINAF, 2018).

The risk severity of the target species associated with its size structure of sub-national populations is high as it is not ideally presented in a reverse J-shaped curve.

#### **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%,  $n = 173$ ) did not report the presence of the species. And, within an universe of 10 diameter classes, only 8% presented 4 to 5 classes (see figure 3).

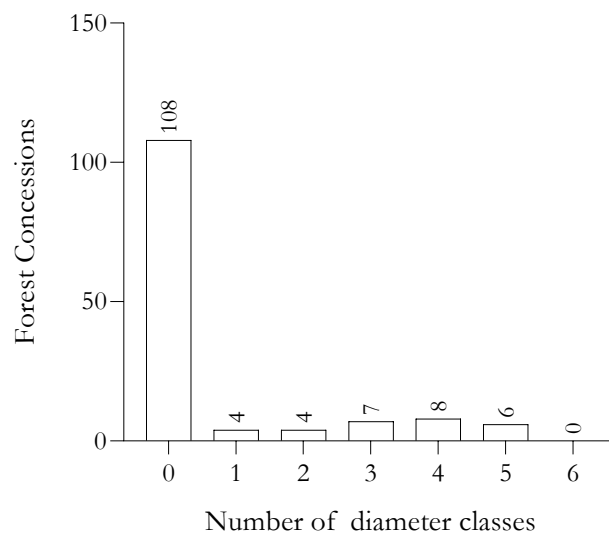


Figure 5: Relation number of diameter classes [20 - 70 cm] and number of forest concessions.

#### 3.1.3.4. Habitat specificity and vulnerability

Overlapping the distribution map of *Khaya anthoteca* within the country (Burrows et al., 2021) and the ecoregion maps (IUCN, 2021), the species occupies a low range of habitat and ecoregions. Its occurrence is associated with well-drained soils and riverine where the presence of water is granted. Therefore, with the fluctuation of rainfall and increase of human population with high dependence of agriculture (Timberlake et al., 2007, 2009, 2012, 2016; Bayliss et al., 2010; 2012; Müller et al., 2012; MITADER, 2016; Malatesta et al., 2019; Campira and Andicene, 2022), the habitats of the species seem to reduce in its extension and quality. According to the last forest inventory, although there was registered an increase of forest areas between 2013 and 2016, the reduction of AAC for the species was estimated in 80%.

Within the ecoregion of Inhambane coastal forest mosaic, the threats are settlement, as the number of human population increases.

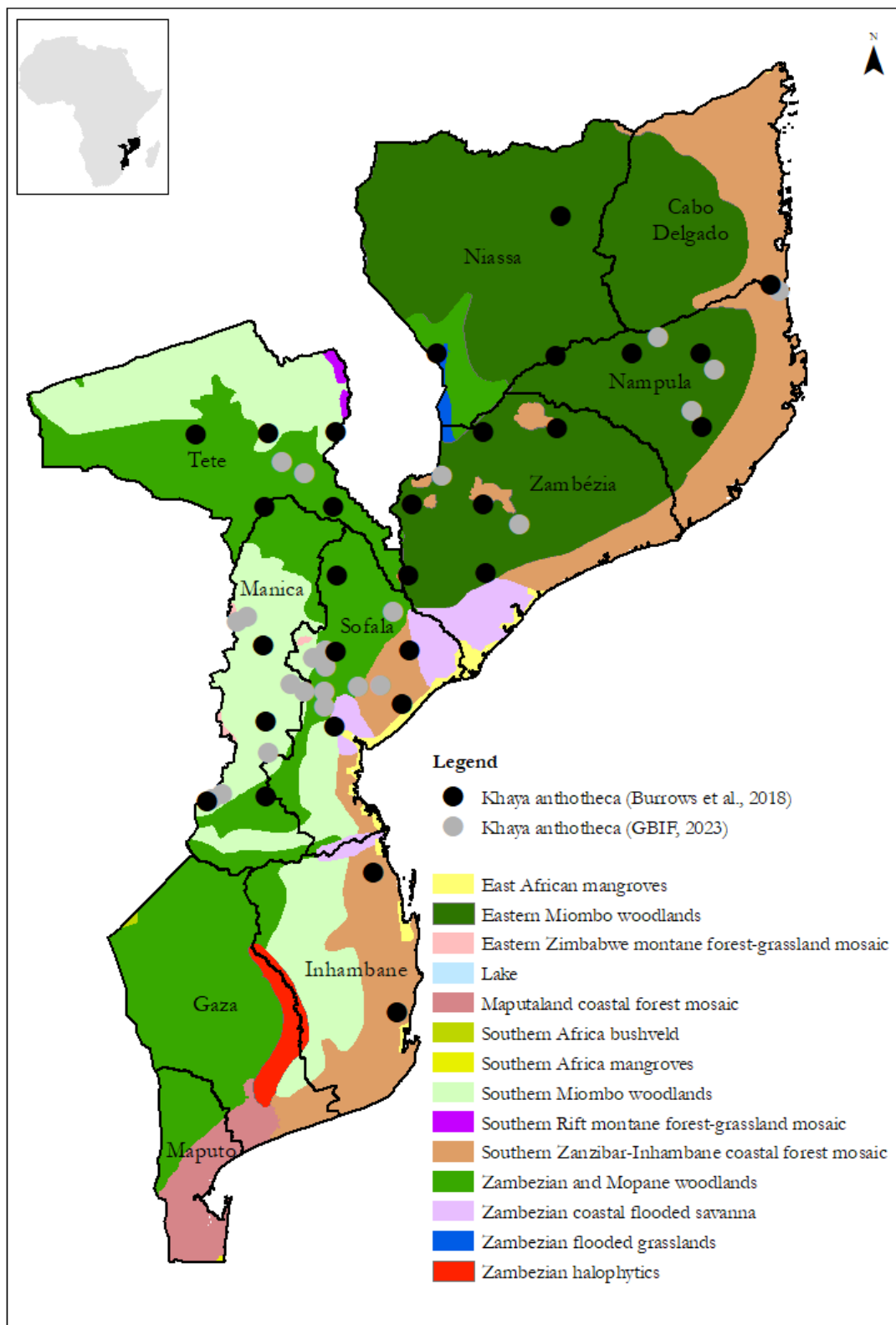


Figure 6: Distribution of *Khaya anthotheca* in ecoregions of Mozambique

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.

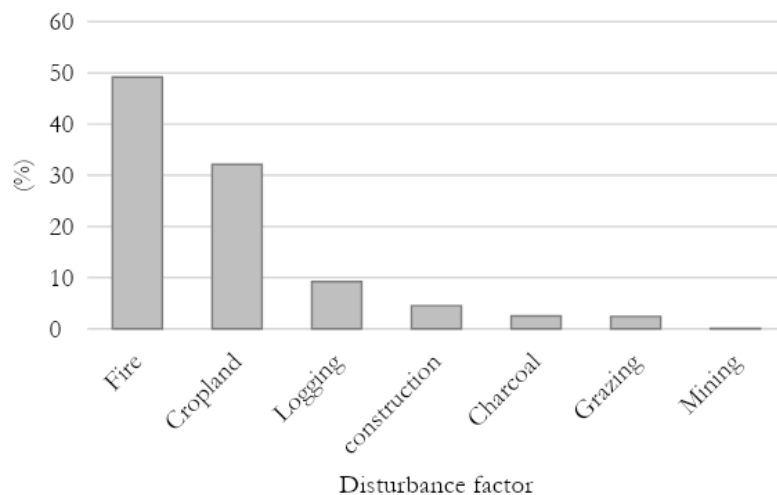


Figure 7: Disturbing factors for the survival of *Khaya anthotheca*.

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.

The risk severity in relation to habitat specificity and vulnerability for *Khaya anthotectis* 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 analysed considering growth and mortality rates and reproduction pattern. It was described by Takawira-Nyenya (2005). Young trees have a slender stem and a small crown. Extensive lateral growth starts when the upper canopy of the forest has been reached. In Ghana the average height of seedlings was 2.5 m and average stem diameter 4–4.5 cm after 2.5 years. In Côte d'Ivoire *Khaya anthotectis* trees planted in the open in the semi-deciduous forest zone reached an average height of 12 m and an average bole diameter of 18 cm after 10 years.

However, trees planted in the evergreen forest zone were only 6 m tall and 9 cm in diameter after 8 years. In Malawi planted *Khaya anthotectis* trees reached a height of 8 m and a diameter of 9 cm after 7 years. Trees may already develop fruits when they have a bole diameter of 18 cm, but abundant fruiting usually starts at diameters above 70 cm. This means that the removal of trees of diameter classes below 70 cm from the forest may result in lack of natural regeneration. Fruits are usually produced in the dry season, from January to March in Côte d'Ivoire and Guinea. Dispersal of the seeds is by wind. The maximum dispersal distance is over 50 m, but about 75% of all seeds are dispersed within 30 m of the parent tree.

*Khaya anthotectis* is propagated by seed. The 1000-seed weight is 180–280 g. The seeds are often already attacked by insects while they are still on the tree, and undamaged seeds should therefore be selected before sowing or storage. The seeds can be stored for up to 1 year in a cool and dry place; adding ash to reduce insect damage is recommended. Fungi can cause serious losses of stored seed, with seeds stored at –18°C and 5°C showing higher occurrence of fungi and lower germination rates than seeds stored at 15°C. The seeds are best sown in seed beds in the nursery, they should be covered with only a thin layer of soil, or left partially

uncovered. Germination takes 8–35 days. The germination rate of fresh healthy seed is up to 85%, but decreases rapidly under natural circumstances. When seedlings are grown in small containers, they can be planted out when they reach 30 cm and have fully developed compound leaves. Seedlings can also be left in the nursery until they are 1–2 m tall, after which the root system is slightly pruned and leaves stripped off before planting into the field as striplings. In experiments in Indonesia, vegetative propagation by means of cuttings was successful, with a rooting success rate of 75% when growth hormone was applied.

Natural regeneration of *Khaya anthotheca* after logging is seriously hindered by the low density of adult trees in most forests, the fruit production being largely limited to larger sized trees and the comparatively poor dispersal ability of the seeds. It has been suggested that additional sowing at favourable sites would enhance sufficient regeneration after logging. It has also been suggested that the inclusion of shifting cultivation such as a taungya-like system into management systems may offer possibilities for sustainable management of *Khaya anthotheca*.

However, more research is needed on appropriate management systems in natural forest to ensure sustainable exploitation of *Khaya anthotheca*. Its fair growth rate makes more extensive establishment of plantations an option, but *Hypsipyla* attack is a serious drawback. The combined effects of selection of provenances with genetic resistance and appropriate silvicultural practices could have a substantial positive impact on the damage caused by *Hypsipyla robusta* stem borers.

Plantations of *Khaya anthotheca* may suffer seriously from *Hypsipyla robusta* shoot borers that kill the main stem of young trees, causing excessive branching and contributing to mortality. Silvicultural techniques, such as overhead shading of saplings, mixed planting and removal of lateral shoots, can reduce damage by shoot borers. Seeds are commonly attacked by seed-boring beetles and eaten by small rodents.

### **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 80% of its AAC between 2007 and 2018. This decline was also followed by the decrease of productive forest areas in all provinces. And, observing the AAC proposed in 2018

(See Table 1), timber harvesting was only allowed in Manica province, with the remaining provinces presenting AAC of 0 m<sup>3</sup> (DINAF, 2018).

Between 2001 and 2023, the CAA was allowed in more 4 provinces (Cabo Delgado, Sofala, Tete and Zambézia). 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 *Umbaua* also occurs more frequently (see Figure 3). This suggests the importance of local forest inventories by local authorities.

Table 1: Allowable Annual Cut (mm<sup>3</sup>) of *Khaya anthotheca* in Mozambique (DINAF, 2018; 2023).

Province	AAC in 2018			AAC 2021 - 2023		
	-95% IC	Mean	+95% IC	2021	2022	2023
Cabo Delgado	*	*	*	0	1 000	1 000
Niassa	*	*	*	0	0	0
Nampula	*	*	*	0	0	0
Zambézia	*	*	*	1 775	1 775	1 775
Tete	*	*	*	650	650	650
Manica	194	577	960	265	265	265
Sofala	*	*	*	453	453	453
Inhambane	*	*	*	0	0	0
Gaza	*	*	*	0	0	0
Maputo	*	*	*	0	0	0
<b>Total</b>	<b>194</b>	<b>577</b>	<b>960</b>	<b>3 143</b>	<b>4 143</b>	<b>4 143</b>

The harvest impact severity on national and sub-national populations is medium to high as the up-to-date monitoring data show that the populations of the target species have been decreasing over the years (2007 to 2018). An update of this species is important there was a statement during the workshop that the difficulties related to the harvest as well as inventories is related to the areas where the species occurs, areas close to rivers.

### 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), *Khaya anthotheca* has low commercial impact as not part of the most licensed timber species in Mozambique between 2017 and 2022. Meanwhile, consulting the licensed volumes of the 173 management plans, the AAC was estimated in 11 988 m<sup>3</sup> between 2015 and 2022, with the amplitudes values ranging from 50 to 1 866 m<sup>3</sup>. Documents of harvested volume are not available.

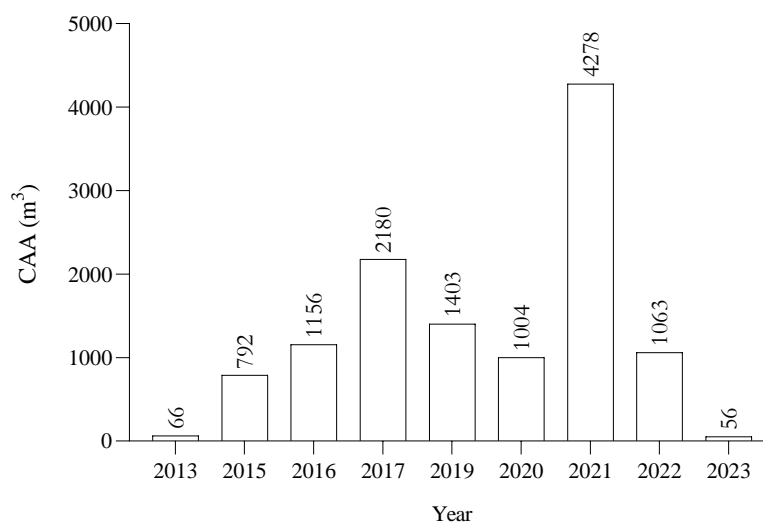


Figure 8: The variation of licensed volumes on 173 consulted forest concessions in Mozambique between 2013 and 2023.

### 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 from Mozambique was 530 000 m<sup>3</sup> 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.

Considering the illegal trade of timber exportation from Mozambique, and associated with the AAC of this species, it seems that the illegal trade only occurs internally. And, despite the projection of increase on consumption of wood, coal and firewood and consumption of wood for school desks whereas legal (exported wood) and reduction of illegal (see table below) the existence of this species depends on the plant enrichment activities within the concessions and the involvement of local communities, capacity them to observe the practice of ecological agriculture, the main pressure factor of the areas where the species occurs (MITADER, 2018).

Table 2: Projection trends of timber and forestry resources between 2018 and 2030 (Falcão, 2019).

Year	Volume (m <sup>3</sup> )				Total
	CWCF	VCWD	EW	IW	
2018	26 807 596	21 764	494 615	247 307	<b>27 571 282</b>
2019	27 495 082	26 607	494 615	4 946	<b>28 021 250</b>
2020	28 214 627	26 607	350 000	3 500	<b>28 594 735</b>
2021	28 938 142	26 607	350 000	3 500	<b>29 318 250</b>
2022	29 672 214	26 607	350 000	3 500	<b>30 052 321</b>
2023	30 335 560	26 607	350 000	3 500	<b>30 691 733</b>
2024	31 171 142	26 607	350 000	3 500	<b>31 546 405</b>

2025	31 935 898	26 607	350 000	3 500	<b>32 316 005</b>
2026	29 903 188	27 607	350 000	3 500	<b>30 284 295</b>
2027	33 493 955	28 607	350 000	3 500	<b>33 876 063</b>
2028	34 286 206	29 607	350 000	3 500	<b>34 669 313</b>
2029	35 087 114	30 607	350 000	3 500	<b>35 471 222</b>
2030	35 895 995	31 607	350 000	3 500	<b>36 281 103</b>
<b>Total</b>	<b>403 236 720</b>	<b>327 273</b>	<b>4 839 229</b>	<b>290 753</b>	<b>408 693 976</b>

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

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 *Khaya anthoteca* 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 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 *Khaya anthoteca* 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 is 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 (Siteo 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 (Siteo 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, coddling 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 Siteo 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-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 (Siteo 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 losing 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 not adequately to mitigate the harvest impacts and trade impact, for which the NDF is negative 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 *Khaya anthotecanon*-detriment the national forestry authority must consider the following advices:

##### **3.1.7.2.1. Legal and institutional aspects**

- The trade status of the species needs to be updated, advancing it the Precious timber species.
- 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 law, 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- Jihás 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	Chumping 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.

<b>Ord.</b>	<b>Nome do Exportador</b>	<b>Contacto (+258)</b>	<b>Província</b>
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