

NOVEMBER 2019

A CRITICAL ASSESSMENT OF THE ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY OF THE

NAMIBIAN INDIGENOUS FOREST/TIMBER INDUSTRY

WITH REFERENCE TO ZAMBIA AND ANGOLA

Karen Nott,
Amber Nott,
David Newton



SPONSORED BY THE
Federal Ministry
of Education
and Research

TRAFFIC
the wildlife trade monitoring network

TRAFFIC REPORT

A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/ Timber Industry with Reference to Zambia and Angola

TRAFFIC is a leading non-governmental organisation working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.

Reproduction of material appearing in this report requires written permission from the publisher.

The views of the authors expressed in this publication do not necessarily reflect those of the organisations contributing to this report.

The designation of geographical entities in this publication and the presentation of the material do not imply the expression of any opinion whatsoever on the part of contributing organisations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Suggested citation:

Nott, K., Nott, A. and Newton, D. (2019). *A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/ Timber Industry with Reference to Zambia and Angola*. TRAFFIC, Southern Africa Programme Office, Pretoria.

Product of the first research portfolio of SASSCAL
SASSCAL 2012-2018

Published by:

TRAFFIC, Southern Africa Programme Office, Pretoria
ISBN: 978-1-911646-17-4

© TRAFFIC 2019. Copyright of material published in this report is vested in TRAFFIC.

UK Registered Charity No. 1076722

Author associations:

Karen Nott and Amber Nott: Integrated Rural Development and Nature Conservation (IRDNC)

David Newton: TRAFFIC Southern Africa Programme Office, Department of Animal, Plant and Environmental Sciences, University of the Witwatersrand

Cover photo: David Newton / TRAFFIC

Table of Contents

ACRONYMS	5
ACKNOWLEDGEMENTS.....	8
EXECUTIVE SUMMARY.....	9
1. BACKGROUND	13
2. KEY TIMBER SPECIES.....	15
2.1 KIAAT PTEROCARPUS ANGOLENSIS	16
2.2 AFRICAN ROSEWOOD GUIBOURTIA COLEOSPERMA.....	20
2.3 ZAMBEZI TEAK BAIKIAEA PLURIJUGA	22
2.4 OTHER NAMIBIAN TIMBER SPECIES	23
2.4.1 <i>Sickle Bush Dichrostachys cinerea</i>	23
2.4.2 <i>Wild Syringa Burkea africana</i>	23
2.4.3 <i>Silver Cluster-Leaf Terminalia sericea</i>	24
2.4.4 <i>Mopane Colophospermum mopane</i>	24
2.5 OTHER ZAMBIAN TIMBER SPECIES.....	24
2.5.1 <i>Mukula Pterocarpus tinctorius</i>	25
2.5.2 <i>Lucky Bean Tree Afzelia quanzensis</i>	27
2.5.3 <i>African Mahogany Khaya nyasica</i>	27
2.5.4 <i>African Linden Mitragyna stipulosa</i>	27
2.6 TIMBER SPECIES FROM ANGOLA	28
3. METHODS AND ACTIVITIES	29
3.1 LITERATURE REVIEW	29
3.2 STUDY AREA.....	29
3.3 PERMIT DATA FROM NAMIBIA.....	30
3.4 STAKEHOLDER ENGAGEMENT WITHIN NAMIBIA.....	32
3.5 CROSS-BORDER STAKEHOLDER ENGAGEMENT	32
3.6 PRODUCTION OF REPORTS, INFORMATION AND TRAINING MATERIALS.....	33
4. THE LEGISLATIVE AND POLICY FRAMEWORK	34
4.1 LEGISLATIVE AND POLICY FRAMEWORK FOR NAMIBIA.....	36
4.1.1 <i>Historical overview: Namibia</i>	36
4.1.2 <i>Current framework: Namibia</i>	37
4.2 LEGISLATIVE AND POLICY FRAMEWORK IN ANGOLA.....	39
4.2.1 <i>Historical overview: Angola</i>	39
4.2.2 <i>Current framework: Angola</i>	40
4.3 LEGISLATIVE AND POLICY FRAMEWORK FOR ZAMBIA	42
4.3.1 <i>Historical overview: Zambia</i>	42
4.3.2 <i>Current framework: Zambia</i>	43
5. USE OF TIMBER RESOURCES IN NAMIBIA.....	46
5.1 FOREST RESOURCE INVENTORIES	46
5.2 TIMBER RESOURCE USE	47
5.3 COMMUNITY FORESTS IN NAMIBIA.....	51
5.4 OVER-UTILIZATION AND EXPORT OF FIREWOOD.....	54
5.5 ANALYSIS OF TIMBER PERMIT DATA.....	55
6. CROSS-BORDER CHALLENGES	61
6.1 IDENTIFYING CROSS-BORDER CHALLENGES.....	61
6.2 RESPONSES TO SOME OF THESE CHALLENGES	65

6.2.1	<i>Meeting between Forestry Directorates of Angola, Namibia and Zambia</i>	66
6.2.2	<i>Drafting of MOU for collaboration</i>	67
6.2.3	<i>Timber trade directory and cross-border permits booklet</i>	68
6.2.4	<i>Cross-border workshops and information sharing</i>	68
6.2.5	<i>Non-gazetted border post information sharing</i>	71
6.3	OTHER OPPORTUNITIES FOR COLLABORATIVE CROSS-BORDER MANAGEMENT	72
7.	CONCLUSIONS	73
8.	REFERENCES	76
9.	APPENDICES	85

ACRONYMS

BMBF	Federal Ministry of Education and Research (Germany)
CBD	Convention on Biological Diversity
CBNRM	Community-based natural resource management
CF	Community Forest
CFMC	Community Forest Management Committee
CITES	Convention for International Trade in Endangered Species of Wild Fauna and Flora
DAPEES	Directorate of Agricultural Production, Extension and Engineering Services (Namibia)
DBH	Diameter at breast height
DC	Devil's Claw
DoF	Directorate of Forestry (Namibia)
DRC	Democratic Republic of the Congo
DVS	Directorate of Veterinary Services
FAO	Food and Agriculture Organization
FINNIDA	Finnish Ministry of Foreign Affairs, Department of International Development Cooperation
FOCAC	Forum on China-Africa Cooperation
GRA	Government of the Republic of Angola
GRN	Government of the Republic of Namibia
GRZ	Government of the Republic of Zambia
IDF	Institute for Forestry Development (Angola)
ILUA	Integrated Land Use Assessment (Zambia)
IRDNC	Integrated Rural Development and Nature Conservation
IUCN	International Union for Conservation of Nature
KAZA	Kavango-Zambezi
KfW	Kreditanstalt für Wiederaufbau
MAWF	Ministry of Agriculture, Water and Forestry (Namibia)
MET	Ministry of Environment and Tourism (Namibia)
MFMR	Ministry of Fisheries and Marine Resources (Namibia)
MoF	Ministry of Finance (Namibia)
MOU	Memorandum of Understanding
MURD	Ministry of Urban and Rural Development (Namibia)
NAD	Namibian Dollars
NAMPOL	Namibian Police
NGO	Non-governmental Organization
NP	National Park
NTFP	Non-timber forest product
RD	Regional Director (Angola)
SADC	Southern African Development Community
SASSCAL	Southern African Science Service Centre for Climate Change and Adapted Land-Management
SFF	Special Field Forces
SI	Statutory Instrument (Zambia)
SNDP	Sixth National Development Plan (Zambia)
TA	Traditional Authority
TBNRM	Transboundary natural resource management
TFCA	Transfrontier Conservation Area
TAO	Total allowable offtake
USAID	United States Agency for International Development
VAT	Value added tax

LIST OF TABLES

- Table 1: Timber species and their common names referred to in this report.
Table 2: List of traded timber species from Angola
Table 3: List of Directorate of Forestry offices
Table 4: Contribution of three species to % of basal area in Kavango East and Kavango West Regions
Table 5: Total Allowable Offtake as described in CF Management Plans
Table 6: Cost of Directorate of Forestry permits
Table 7: Contribution of Timber and Devil's Claw to total annual income of CFs for 2014–2015 financial year
Table 8: Summary of the Mukula *P. tinctorius* permit data 2015 and 2016

LIST OF FIGURES

- Figure 1: Distribution of Kiaat *P. angolensis*
Figure 2: Kiaat *P. angolensis* planks showing the pale sapwood and the darker heartwood
Figure 3: Distribution of African Rosewood *G. coleosperma*
Figure 4: Distribution of Zambezi Teak *B. plurijuga*
Figure 5: Distribution map for Mukula *P. tinctorius*
Figure 6: Container consignment of Mukula *P. tinctorius* at Kazangula border post, Zambia
Figure 7: Map showing KAZA TFCA (Source: <http://www.peaceparks.org>)
Figure 8: Timber wheel developed to assist with the identification of timber species when doing inspections of timber consignments
Figure 9: A schematic overview of the legislative and policy frameworks
Figure 10: Pit sawing of Kiaat *P. angolensis* logs
Figure 11: Map showing the registered CFs in Namibia
Figure 12: Mopane *C. mopane* firewood sales quantities from Katima Mulilo
Figure 13: Kiaat *P. angolensis* quantity (m³) totals per office per year
Figure 14: Kiaat *P. angolensis* timber quantities (m³) per office per year by origin and destination
Figure 15: Zambezi teak *B. plurijuga* timber quantities (m³) per office per year
Figure 16: Zambezi teak *B. plurijuga* timber quantities (m³) per office per year by origin and destination
Figure 17: African Rosewood *G. coleosperma* timber quantities (m³) per office per year
Figure 18: African Rosewood *G. coleosperma* timber quantities (m³) per office per year by origin and destination
Figure 19: Map showing countries with similar timber trade profiles
Figure 20: Map showing the designated entry points for timber consignments into Namibia as well as the gazetted and non-gazetted border crossings
Figure 21: Containers are opened, inspected and then resealed, or the contents scanned
Figure 22: Director Mukumba (Zambia), Director Hailwa (Namibia) and Director Veloso (Angola)
Figure 23: Key themes for collaborative action
Figure 24: The Wenela border post sign with stakeholder representatives
Figure 25: Timber wheel being used for inspections

LIST OF APPENDICES

Appendix 1: Contribution (%) of Kiaat *P. angolensis* to species composition in forestry areas where resource inventories have been undertaken

Appendix 2: Summary of the stakeholder consultations done throughout the project period

Appendix 3: Action Plan drafted by Angolan, Namibian and Zambian representatives at the August 2015 workshop

Appendix 4: Publications and training materials produced

Appendix 5: Types of timber permits issued by DoF

Appendix 6: Summary of the permit data collected for three species of timber per office per year

ACKNOWLEDGEMENTS

Funding for this study was provided by the Southern African Science Service Centre for Climate Change and Adapted Land-Management (SASSCAL) to implement Task 35 entitled “*A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/Timber Industry*”. SASSCAL is a joint initiative of Angola, Botswana, Namibia, South Africa, Zambia, and Germany for the establishment of a Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL). SASSCAL is financially sponsored by the Federal Ministry of Education and Research (BMBF), Germany. The Namibian Director, Mr Peter Erb and his staff are thanked for their support and encouragement and special thanks are due to Mrs Sylvia Thompson for her assistance with data analysis.

During the course of this study, many individuals contributed their time, expertise, original research and professional advice. Thanks are due to the numerous people who provided access to data and valuable information through interviews, workshops and information sharing meetings. This report would not have been possible without the involvement of the staff of the Namibian Directorate of Forestry within the Ministry of Agriculture, Water and Forestry. Special thanks are due to the Director, Mr Joseph Hailwa as well as to Mr Johannes Niipale, Chief Forester for the north-eastern regions. Other colleagues from the Directorate of Forestry who assisted with many aspects of this study throughout the three-year period and deserve special mention are Ms Helmi Auala, Ms Carol Murphy and Mrs Christa Theart. The contributions of Ms Betty Mavuna and Ms Senia Poniso from Customs and Excise in Katima Mulilo are gratefully acknowledged.

As the study progressed and expanded beyond the borders of Namibia, inputs were obtained from colleagues in Zambian Forestry Department and especially the Director Mr Ignatius Makumba and Mr Victor Chiiba, the Provincial Forestry officer. They are thanked for their regular communications and updates on developments regarding timber trade in Zambia. Director Mr Domingos Nazare Veloso of the National Directorate of Forests within the Ministry of Agriculture in Angola is also thanked for his co-operation and contributions.

The authors would particularly like to thank Dr Simon Anstey, previously of Integrated Rural Development and Nature Conservation (IRDNC), for his guidance, insights into the timber trade and his enthusiasm and inspiration with many of the strategic milestones during this study. Thanks are also due to Sarah Oldfield, Chair of the IUCN SSC Global Tree Specialist Group and Chen Hin Keong, TRAFFIC’s Senior Forest Advisor, for their valuable input. Finally, thanks to Roland Melisch, Markus Bürgener and Richard Thomas of TRAFFIC for final review of this report.

EXECUTIVE SUMMARY

In a study conducted into the Mozambique-China timber trade dynamic, Zhang Ke and Shen Wei (2017) reported that Africa had become a vital source to meet China's growing demand for timber. In 2014, China's traded forest products with Africa, that were valued at about USD2.9 billion, represented a large increase from previous years. Although this trade represented only 13.6% of China's total tropical hardwood logs and lumber requirements, it not only comprised a large proportion of Africa's total timber production but also reflects an increasing demand for timber products from African countries, such as Mozambique and the Democratic Republic of the Congo, to supply China's expanding tertiary processing and export industries. Zhang Ke and Shen Wei (2017), also note that the trade is unsustainable and impacts negatively on local ecosystems. These impacts are in addition to those caused by the local use of timber resources as household energy sources, to support livelihoods and the provision of many other ecosystem services.

Whilst international agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) have set the stage for increasing commitments from Member States to the conservation of their forests, effective and sustainable forest management can only be achieved through improved, collaborative governance with an emphasis on local context.

This report contains the results and recommendations of the project "*A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/Timber Industry*" commissioned in 2014 and conducted by TRAFFIC through SASSCAL. The overarching objective of the project is to enhance the governance capacity of the Directorate of Forestry (DoF) in Namibia to manage better indigenous forests and deter unsustainable and illegal resource utilisation through comprehensive and independent assessment of the current status of the industry. The original focus of the project was on the timber trade within Namibia (Kiaat *Pterocarpus angolensis* in particular) but it became evident early in the study that the cross-border timber trade and in-transit timber formed a significant part of the Namibian profile. As a result, the project expanded from exclusive focus on Namibia to include areas of Angola and Zambia. The geographic scope of the study thus finally encompassed north-eastern Namibia covering West and East Kavango and Zambezi Region with the highest wood volumes in the country, Angola's Cuando-Cubango and Cunene Provinces including the newly gazetted Luengue-Liuana National Park (NP), and Zambia's Western and Southern Provinces including the Sioma Ngweze NP.

The report considers the nature and extent of the key timber species affected by trade in the study area. In Namibia's Kalahari Sands and Miombo Woodlands, the dominant tree species belong to the subfamily Caesalpinioideae (DoF, 2011a). The Kalahari Sands Woodlands vegetation type is also found in Angola, Northern Botswana, Zambia and Zimbabwe. The Caesalpinoid species typical of these ecosystems are Zambezi Teak *Baikiaea plurijuga*, Wild Syringa *Burkea africana*, African Rosewood *Guibourtia coleosperma* and Mopane *Colophospermum mopane*. Species such as Kiaat *Pterocarpus angolensis*, Marula *Sclerocarya birrea*, Silver Cluster-Leaf (Geelhout) *Terminalia sericea* and Mangetti *Schinziophyton rautanenii* are also important (DoF, 2011a).

In the past, the main timber species exploited commercially from these areas were limited to Kiaat and Zambezi Teak with unsustainable harvesting and export of Mukula *Pterocarpus tinctorius* from Zambia and the Democratic Republic of the Congo (DRC) reported more recently. Whilst the study focuses on these three key species, other important species from Namibia, Zambia and Angola are discussed.

The report provides an overview of the policy and legislative frameworks in Zambia, Angola and Namibia, covering the study area for the Kiaat, African Rosewood and Zambezi Teak timber resources. Whilst all three countries are making sound provision for permitting and other controls, lack of capacity and resources are seriously hampering the implementation of procedures and controls over harvest, movement and export of timber.

In 2015 Namibia gazetted new forest regulations and in 2016 the new permit books were printed and issued to the regional offices. An aspect of the new permits susceptible to misuse is the lack of a system for report-back on use of the permits issued. There is also a need for all permit data to be collated and summarised (as done during this study) in a format that can be easily shared and used to inform management decisions.

The new Zambian National Forestry Policy was adopted in 2014, and Parliament passed the Forest Act in 2015. Since the implementation of the Forest Act of 2015, three Statutory Instruments (SIs) have been implemented:

- SI no. 94 of 2015 – The Forest (Export of Timber) Regulations
- SI no. 50 of 2016 – The Forest (Concessions Licence) Regulations
- SI no. 31 of 2017 – The Control of Goods (Import and Export) (Forest Produce) (prohibition of Importation) Order.

Revision of the permit documentation from Zambia has improved the quality of the permitting process and thereby data collection. Collation and analysis of those data at a national level would provide a valuable contribution to management decisions impacting on sustainable forest resource management.

A key knock-on effect of the poorly managed permitting system is that limited revenues are materialising for communities, despite systems having been set up to provide benefits in exchange for sustainable resource management.

Building on an initial literature review in 2014, this study found that whilst timber trading permit data exist, they are often not collated, consolidated or analysed. The project systematically collected, structured and analysed permit data available for the period 2010 to 2014, as well transit permit data for two offices (Rundu and Katima Mulilo) for 2015 and 2016. In addition, the project consulted multiple stakeholders both within Namibia and across borders at key points within Angola and Zambia. Key interventions included the production and sharing of reports, information and training materials. Using data collected, information posters on the “Timber Trade in Namibia – Key Species” and “Forestry Permits – How to Fill in this Form” were produced to assist the DoF Namibia staff. A key event of the project was the August 2015 workshop with key participants from Angola, Namibia and Zambia held in Windhoek, Namibia. The purpose was to facilitate collaboration on forest management

and timber trade between these countries. A major outcome of the workshop was a joint plan of action calling for a Memorandum of Understanding (MOU) for co-operation and mutual support in the transboundary management of forest resources between the Ministry of Agriculture and rural Development (Angola), Ministry of Agriculture, Water and Forestry (Namibia) and Ministry of Lands and Natural Resources (Zambia) (TRAFFIC, 2015a and 2015b).

The study shows that Namibia has been, and still is, used as a conduit for timber being harvested in Angola, DRC and Zambia. Almost all the timber being exported through Walvis Bay harbour in Namibia comes from neighbouring countries. From Zambia 6,081 m³ of Kiaat, 7,336 m³ of Zambezi Teak and 19,247 m³ of African Rosewood was exported via Namibia between 2010 and 2016. From Angola 20,047 m³ of Kiaat, 1,131 m³ of Zambezi Teak and 282 m³ of African Rosewood was exported via Namibia between 2010 and 2016. In total, 32,664 m³ of Zambian timber and 21,460 m³ of Angolan timber was exported via Namibia during this period. During 2015 and 2016, a total of 29,190 m³ of Mukula mostly from the DRC, was transported through Namibia for export to China. These quantities are thought to be underestimates considering the extent of illegal consignments apprehended at roadblocks within the country (V. Chiiba, pers. comm.). Since the Zambian borders are now closed to the container trucks transporting round logs for export to China, the quantities of in-transit timber through Namibia should decrease drastically.

The timber trade out of southern Angola is concentrated on Kiaat trees being harvested just north of the border with Namibia and the transport of these consignments through Namibia to South Africa is being facilitated by the special permission given by Namibian Customs and Excise for traders to access the better road networks by entering Namibia through non-gazetted border posts.

The study also considered the policy, capacity building, regulatory and monitoring changes required to support a sustainable timber industry. Probably the most significant outcome of this study was the demonstration of the need for and the value of transboundary collaboration in the management of forest resources and the timber trade.

It is imperative that the process of finalising and signing the MOU between Angola, Namibia and Zambia is completed so collaborative actions can be implemented.

Once the MOU is signed, it will be possible to support the implementation of the Joint Action Plan developed between Angola, Namibia and Zambia during the 2015 workshop, including solutions identified in this project:

- Harmonise policy and standardise implementation mechanisms (including permit systems, customs requirements, consistency and quality of documentation)
- Improve data capture and analysis at local, provincial and national levels,
- Share key analysed data within countries and where strategic between neighbouring countries to inform management decisions
- Continue to strengthen management and monitoring systems for timber harvesting and trade, including undertaking and updating Forest Resources Inventories and the implementation of Forest Management Plans

- Seek mechanisms to make forest management economically viable such as integrating it with conservancies (Namibia) and increasing awareness of the domestic value of timber and Non-timber forest products (NTFPs)
- Support solutions identified during the project:
 - ✓ Maintain the Timber Trade Directory of Contacts – Angola, Namibia and Zambia
 - ✓ Support cross-border management for a range of issues including understanding different countries' systems and regulations, establishing jointly-agreed upon standard operating procedures
 - ✓ Support cross-border patrols
 - ✓ Build capacity on timber species identification using tools such as timber wheels or species booklets
 - ✓ Raise key stakeholder awareness including police and officials at borders (including non-gazetted border posts) used for timber import/export or transit.

1. BACKGROUND

The main threat to tropical dry forests in Africa is from increasing human populations inducing changes in land use practices, land cover and fire regimes (De Cauwer *et al.*, 2016; Pröpper *et al.*, 2010). Local and commercial trade in timber is also acknowledged to be a threat to the sustainability of dry forests and woodlands (de Cauwer, 2016; Geldenhuys, 1997; Schwartz *et al.*, 2002). The sustainability of the global timber trade continues to raise questions as forests worldwide are increasingly under pressure to meet the demands of the growing international market (Treasor, 2015).

Several Southeast Asian and South Pacific Island States remain the largest exporters of timber to China, the world's major timber importer. Zhang Ke and Shen Wei (2017) reported that in 2014, China's traded forest products with Africa, that were valued at about USD2.9 billion, represented a large increase from previous years. Although this trade represented only 13.6% of China's total tropical hardwood logs and lumber requirements, it not only comprised a large proportion of Africa's total timber production but also reflected an increased demand for timber products from African countries, such as Mozambique and the Democratic Republic of the Congo, to supply China's expanding tertiary processing and export industries.

International agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the African Union's Strategy on Combating Illegal Exploitation and Illegal Trade in Wild Fauna and Flora in Africa (2015) have set the stage for increasing commitments from Member States to the conservation of plant species in their forests. However, forest management can only be implemented effectively through improved and collaborative governance at the regional and national level, taking into consideration local context.

Within this context of increasing demand for timber from Africa and seeking to understand the role played by Namibia and its neighbours in this industry, TRAFFIC was contracted in 2014 through SASSCAL to implement a project titled "*A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/Timber Industry*".

SASSCAL's mission is to conduct problem-oriented research on adaptation to climate change and sustainable land management, provide evidence-based advice for decision-makers and stakeholders to improve the livelihoods of people in the region, and contribute to the creation of an African knowledge-based society.

The overall Project Objective was to enhance the governance capacity of the Directorate of Forestry (DoF) in Namibia to manage better indigenous forests and deter unsustainable and illegal resource utilisation through comprehensive and independent assessment of the status of the industry, specifically based on the trade in Kiaat produced in Namibia, Zambia and Angola.

The Project Outputs were to:

- Increase available knowledge on trade dynamics of timber, represented by Kiaat extracted from Kalahari Sands Woodlands and associated socio-economic factors by collecting baseline data amongst primary industry stakeholders and through targeted field work

- Increase available knowledge on trade dynamics of Kiaat derived from Kalahari Sands or Miombo Woodlands in Angola and Zambia and traded through Namibia.

The key project research questions were:

- Are current forest and timber trade management strategies adequate for ensuring legal and sustainable timber trade?
- Is Namibia being used as a conduit for timber being harvested in neighbouring countries (Angola and Zambia) and if so, to what extent?
- What policy, capacity building, regulatory and monitoring changes are required to place the Namibian and regional (neighbouring countries) timber industry on a sustainable footing?

Integrated Rural Development and Nature Conservation (IRDNC), a Namibian non-governmental organisation (NGO), was contracted by TRAFFIC to conduct detailed field research, including stakeholder consultations, compilation and analysis of official statistics in Namibia, and corroboration of statistical information through independent field research. The field research initially centred on the primary timber production areas and trade in Namibia's Kavango East, Kavango West and Zambezi Regions, and expanded to include relevant borders with Angola and Zambia. The research was focused on Kiaat but information on other timber species, such as African Rosewood and Zambezi Teak, was also collected where pertinent to the overall Project Objective.

Implementation of the project field activities started in July 2014 and was completed by June 2017. All activities were implemented jointly with the regional staff of the DoF, the government agency responsible for forest management in Namibia.

2. KEY TIMBER SPECIES

When considering the management of forest resources in Namibia, it is essential to consider the type and extent of these resources. The forests of Namibia occur mainly in the deep Kalahari Sands, in the north-central and north-eastern parts of the country and cover less than ten percent of the country (Mendelsohn, 2005). Namibia's forests can be described as dry, semi-open to open woodlands. The most important factors affecting the development of woodlands in Namibia are the soils, the availability of moisture and the occurrence of fire (Mendelsohn, 2005). The region with the highest wood volume is Kavango (now split into two regions—Kavango West and Kavango East), which has 34% of Namibia's standing stock of wood (Pröpper, 2009).

The dominant tree species in the Kalahari Sands Woodlands, as is the case with the dry Miombo Woodlands elsewhere in Southern Africa, belong to the subfamily Caesalpinioideae (DoF, 2011a). The Kalahari Sands Woodlands vegetation type (also referred to as North Eastern Kalahari Woodlands by Mendelsohn *et al.*, 2005) is also found in Angola, northern Botswana, Zambia, and Zimbabwe. The Caesalpinoid species typical of these ecosystems are Zambezi Teak, Wild Syringa, African Rosewood and Mopane *Colophospermum mopane*. Species such as Kiaat, Marula, Silver Cluster-Leaf *Terminalia sericea* and Mangetti *Schinziophyton rautanenii* are also important (DoF, 2011a). The species and their common names referred to in this report are provided in Table 1.

Species Name	Common Name
<i>Azelia quanzensis</i>	Pod Mahogany / Lucky Bean Tree
<i>Baikiaea plurijuga</i>	Zambezi Teak
<i>Burkea africana</i>	Wild Syringa
<i>Bobgunnia fistuloides</i>	Pau Rosa
<i>Colophospermum mopane</i>	Mopane
<i>Dialium englerianum</i>	Kalahari Podberry
<i>Dichrostachys cinerea</i>	Sickle Bush
<i>Diospyros mespiliformis</i>	African Ebony, Jackal-berry
<i>Entandrophragma angolense</i>	Tiama Mahogany
<i>Entandrophragma candollei</i>	Cedar Kokoti / West African Cedar
<i>Entandrophragma cylindricum</i>	Sapele
<i>Entandrophragma spicatum</i>	Owambo Wooden-banana
<i>Entandrophragma utile</i>	Utile, Sipo Mahogany, African Cedar
<i>Gossweilerodendron balsamiferum</i>	Tola, Agba
<i>Guibourtia arnoldiana</i>	Mutenye/Benge
<i>Guibourtia coleosperma</i>	African Rosewood/Ushiyi/False Mopane/
<i>Khaya anthotheca</i> (formerly <i>Khaya nyasica</i>)	African Mahogany/East African Mahogany
<i>Khaya ivorensis</i>	African Mahogany/Lagos Mahogany
<i>Milicia excelsa</i>	Iroko
<i>Mitragyna stipulosa</i>	African linden
<i>Pterocarpus angolensis</i>	Kiaat/Bloodwood/Mukwa/Mukula

<i>Sclerocarya birrea</i>	Marula
<i>Terminalia sericea</i>	Silver Cluster-leaf/Geelhout
<i>Terminalia superba</i>	Limba
<i>Schinziophyton rautanenii</i>	Mangetti
<i>Oxystigma oxyphyllum</i>	Tchitola
<i>Pterocarpus tinctorius</i>	Mukula
<i>Pterocarpus soyauxii</i>	African Padauk/African Coralwood/Mukula/Tacula (Angola)
<i>Pterocarpus tessmanii</i> (synonym <i>P. casteelsii</i>)	-

Table 1: Timber species and their common names referred to in this report.

The southern and central Southern African Development Community (SADC) countries have many hardwood species heavily exploited for commercial use within these countries and also for export (Mendelsohn *et al.*, 2005; Newton *et al.*, 2002). One of the principal hardwoods removed in large quantities is Kiaat, and the sustainability of the logging practices have been questioned (Caro *et al.*, 2005; Moses, 2013; Pröpper, 2009). Kiaat and Zambezi Teak were historically the only timber species commercially exploited from the Kalahari Sands Woodlands. While Kiaat also occurs in the Miombo Woodlands, Zambezi Teak is confined to the Kalahari Sands Woodlands (DoF, 2011a). Recently, the unsustainable harvesting and export of Mukula from Zambia and the Democratic Republic of the Congo (DRC) has become evident (GRZ, 2015).

2.1 Kiaat *Pterocarpus angolensis*

Kiaat is a medium to large sized deciduous tree that grows up to 30 m tall (Orwa *et al.*, 2009) although in Namibia it generally only reaches a height of 15 m. The distinctive fruit is a spherical pod, 70–120 mm in diameter. The central portion is raised with stiff bristly hairs encircled by a papery wing which is up to 50 mm broad (Mannheimer *et al.*, 2009). The tree has a long period of leaflessness, generally from May to October (De Cauwer *et al.*, 2014). The brilliant, dramatically red sap gives it one of its common names: “Bloodwood”. Within the study area it is commonly referred to as “Mukwa.”

The distribution of Kiaat within Namibia is in the north-eastern sandy plains and dunes (Mendelsohn *et al.*, 2003) east of the 400 to 450 mm rainfall isohyet (Figure 1). This includes the following regions: Zambezi, East Kavango, West Kavango, Ohangwena and parts of Oshikoto and Otjozondjupa where most of the rainfall occurs in January and February (Mendelsohn *et al.*, 2002). Within this range, it is locally abundant and one of the dominant species in the area (Curtis *et al.*, 2005). This species is light-demanding and remains as a suffrutex (low growing woody shrub) for many years if growing in shade (Curtis *et al.*, 2005).

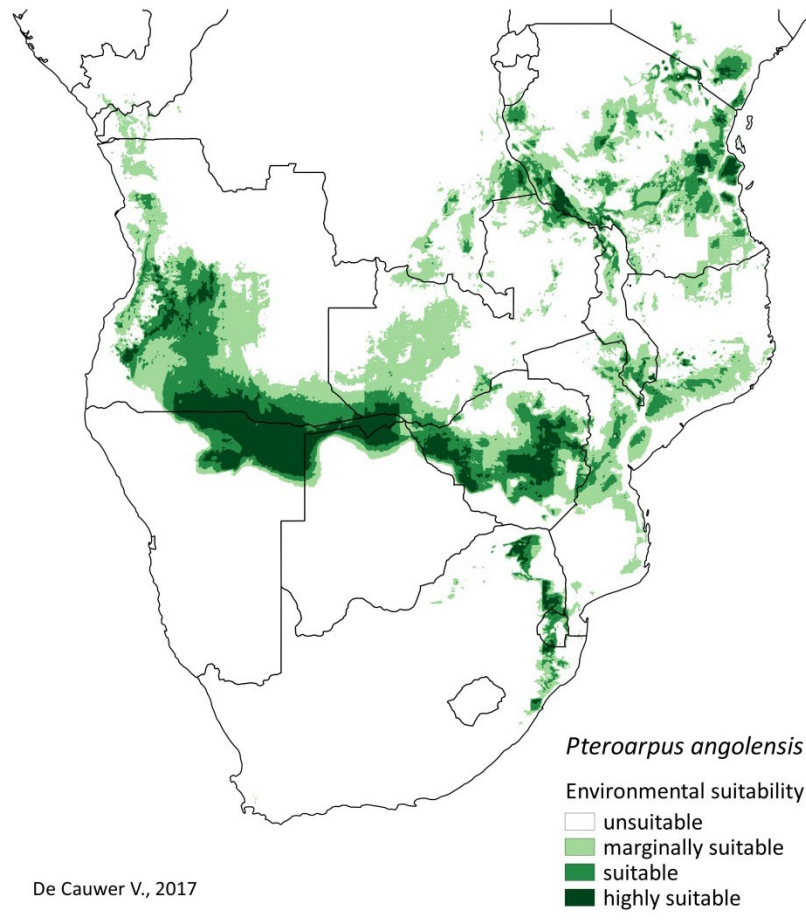


Figure 1: Distribution of Kiaat *P. angolensis*

Populations of Kiaat are characterised as having mainly old trees (Mendelsohn, 2005). Although many seeds are produced, only 2% germinate under natural conditions (Moses, 2013). Typically, Kiaat trees remain within the suffrutex stage for about 10 years—the seedlings grow but die back each dry season—and only after ten years do they develop into trees in the zero to five cm diameter class (Pröpper *et al.*, 2015).

The woodlands where Kiaat trees are found are characterised by disturbances, especially fire (Mendelsohn *et al.*, 2003) and shifting cultivation (De Cauwer *et al.*, 2014). The species is generally thought to be able to withstand fire (Burke, 2006; Moses, 2013) since it dies back to the woody rootstock and then coppices during the next season. Seeds need fire to germinate and total protection from fire results in a decrease in recruitment (Curtis *et al.*, 2005). Repeated heavy burning produces a “staghead appearance” which also occurs if the tree is stressed from unfavourable conditions such as poor soils or too much water (Orwa *et al.*, 2009). This species is sensitive to frost (Burke, 2006) and the young trees are especially susceptible. Bjorkman (1999) conducted a study in two areas in the Zambezi (then Caprivi) and Otjozondjupa Regions and found that the loss of Kiaat due to fire during the two-year study period was eight percent. Pröpper *et al.*, (2015) found at their study sites in Kavango East and West Regions, the main cause for tree damage was fire. Extreme cold events can affect the flowering of Kiaat which takes place between September and December (Curtis *et al.*, 2005).

Beyond Namibia, the distribution of Kiaat extends to South Africa, northern Botswana, Zimbabwe, Zambia, Mozambique, Swaziland, Malawi, DRC, and Tanzania (Anon., 2013). Kiaat trees tolerate a wide range of environmental conditions but generally they are limited to deep sandy soils (Mendelsohn *et al.*, 2003) in areas where rainfall exceeds 400 mm/year and where there is a dry season contrasting with a wet season (Mendelsohn *et al.*, 2005). The average trunk (bole) volume of Kiaat in the Namibian Kalahari Sands Woodlands is 19% and its contribution to the total wood volume is 14% (Pröpper *et al.*, 2015).

De Cauwer *et al.* (2014) developed models to predict the potential distribution of this species based on current distribution and environmental requirements. Their results showed more environmental requirements for Kiaat than those described in the literature, with distribution mainly influenced by amount of summer rainfall, minimum temperature in winter and temperature seasonality. They further determined that Kiaat is mainly found in areas with a fire frequency below 45%. Their study concluded that climate change could decrease the species's range considerably, threatening its existence in Namibia and Botswana (predicted decrease in species distribution area of up to 50%) while potentially increasing it in Zambia.

Information about growth rates is required to determine the sustainability of harvests (Pröpper *et al.*, 2015). However, data in the literature about maximum tree age and associated growth rates appear to be contradictory, although this may partly be due to differences in environmental conditions in different countries. De Cauwer *et al.* (2014) give the life expectancy of Kiaat as 60 to 90 years but under favourable conditions it can reach an age of 100 to 140 years. The growth rate (height) given by Orwa *et al.* (2009) is 50 to 70 cm/year. De Cauwer *et al.* (2014) state that the diameter at breast height (DBH) of mature trees of this species is 40 to 70 cm while Mendelsohn *et al.* (2005) state that Kiaat (as well as Zambezi Teak) need to grow for 130 years before reaching DBHs of 45 cm and give the average growth rate (in diameter) for Kiaat as 0.33 cm/year. Moses (2013) explains these differences as being due to varying environmental conditions in different countries and the 40 trees that he harvested in Namibia had a mean height of 8 m and a mean DBH of 47 cm. Further studies (Pröpper *et al.*, 2015) have determined that Kiaat trees in the Kavango region of Namibia need more than 90 years to reach the minimum harvest size of 45 cm diameter. The same study indicated that the annual DBH increment of a Namibian tree varies between 4.2 and 6.6 mm/year. This compares well with data from other countries, which is remarkable since Namibia is at the edge of the distribution range. The findings can be attributed to the low canopy coverage in Namibia's woodlands since Kiaat is a light demanding species (Pröpper *et al.*, 2015). De Cauwer (2016) estimated the wood volume for Kiaat in the Kavango region to vary between 11 and 19 m³/ha.

Caro *et al.* (2005) conducted a study in western Tanzania to determine the natural recruitment rate of Kiaat. Recruitment was found to be low with only a third of parent trees generating any seedlings despite considerable seed production. Heavily protected wildlife conservation areas supported large parent trees but very few seedlings were recorded. They suggested that this mortality was caused by the high density of browsing wildlife. Outside the well-protected areas, cutting had removed most large trees and the remaining adults were small and produced relatively few seeds. They listed factors that affect recruitment as:

- location and elevation indicative of higher precipitation
- competition for light since short grass and reduced parent canopy cover was associated with more seedlings
- whether the area has been burnt – burnt areas recorded fewer seedlings.

This study concluded that Kiaat is rapidly being driven to local extinction in western Tanzania since low recruitment was resulting in populations declining despite protection from harvesting.

Kiaat can be propagated from stem sprouts in the nursery, but the success rate for this method in the wild is low (Caro *et al.*, 2005). Moses (2013) reports that little success has been achieved with the establishment of Kiaat plantations in Kenya, Mozambique and Tanzania.

Kiaat is one of the most important timber species in southern Africa because of its attractive and stable hardwood (Pröpper *et al.*, 2015). The wood from this species varies greatly in colour and weight. The sapwood is yellow while the heartwood ranges from light brown to dark reddish-brown (Figure 2). The sapwood is subject to borer damage (Mannheimer *et al.*, 2009). The brown heartwood is resistant to borer and termites, is durable and polishes well, making it suitable for furniture production. The wood saws and planes easily, glues and screws well and shrinks very little when drying. When cut, it exudes a red, sticky sap which contains 77% tannin and is an effective dye (Orwa *et al.*, 2009).

This species is heavily utilised for a variety of purposes but mostly for timber on a commercial basis (Mendelsohn *et al.*, 2005; Mendelsohn *et al.*, 2006). Intensive harvesting and the lack of natural regeneration have been cause for concern in many SADC countries including Namibia (Caro *et al.*, 2005; DoF, 2011a; Pröpper *et al.*, 2015). Kiaat has the status “Near Threatened” on the IUCN Red List (IUCN, 2017).

Kiaat was declared a protected species in Namibia in 1952. The threats to this species are listed by Loots (2005) as fire, excessive logging, low recruitment, slow growth, clearing of land for agricultural and residential purposes, expanding human population and heavy browsing of small trees. Within Namibia the DoF permit data indicate that Kiaat is used to produce planks, blocks, sawn timber (Figure 2) and wood carvings. De Cauwer *et al.* (2016) considered the environmental drivers of change in the transition zones of woodlands in Namibia. This study concluded that while Kiaat communities were better able to withstand high fire frequency than other communities, they show a higher vulnerability to climate change. Its status as a protected species was listed in the regulations to the Forest Act 2001 (Government of the Republic of Namibia (GRN), 2015). This species is also protected in Botswana, Malawi, Zimbabwe, Swaziland, Zambia, and South Africa.



Figure 2: Kiaat *P. angolensis* planks showing the pale sapwood and the darker heartwood

Source: A. Nott

2.2 African Rosewood *Guibourtia coleosperma*

Throughout this report the common name African Rosewood is used to describe the species *Guibourtia coleosperma*. African Rosewood is an evergreen tree that grows up to 20 m high and has a spreading crown with drooping branches. The main trunk usually forks fairly low down, above which there is a large, rounded crown. These trees can be spotted by their patchy bark and characteristic shape (Mendelsohn *et al.*, 2009). The reddish to yellow-brown bark is distinctive with rough, black patches on old trunks. The leaves are dark green and resemble those of Mopane hence one of the other common names for the species is False Mopane (Mannheimer *et al.*, 2009).

The fruit is a broad, dark brown woody pod, two to three cm long. The pod, splits down one side only, partially releasing a single brown seed with a bright red aril attached to the pod by a narrow stalk (Mannheimer *et al.*, 2009). The seeds and arils are collected, cooked and eaten. Within the study area (Kavango East and West Regions, Zambezi Region and its borders with Angola and Zambia) it is commonly referred to as “*Ushivi*”.

African Rosewood grows in deep Kalahari Sand Woodlands (Figure 3) and its abundance varies locally (Mannheimer *et al.*, 2009). It is only found in areas with a mean annual rainfall above 300 mm (Burke, 2006) in north-eastern Namibia, southern Angola and Zambia and western Zimbabwe (Mendelsohn *et*

al., 2005). It is also said to occur in southern DRC and Botswana. This species is reported to have a low tolerance for fire (Burke, 2006).

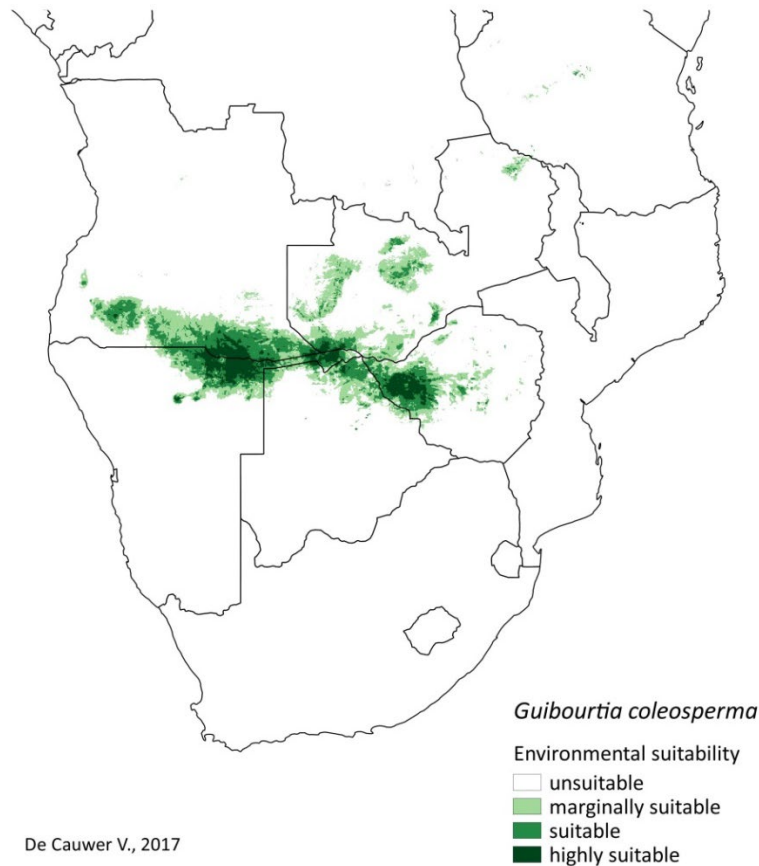


Figure 3: Distribution of African Rosewood *G. coleosperma*

These conspicuous trees can be seen along roadsides and in villages since they are often saved when areas are cleared because of their utility, particularly for shade and food. However, De Cauwer and Younan (2015) report that Namibian populations of this slow growing tree have limited natural regeneration. The forest inventories in the Namibian Northern Kalahari Woodlands show that regeneration of this species is under-represented compared to mature tree composition.

The sapwood is yellow-white, and the heartwood is pink-red to red with deep red markings. The wood has a fine, straight grain but since the trunk usually forks fairly low down and the thicker stems and branches curve and twist, it is seldom possible to cut long, straight planks (Mendelsohn *et al.*, 2005). It is often used for railway sleepers, canoes, construction and sometimes furniture (Mannheimer *et al.*, 2009). Within Namibia, the DoF permit data indicate that African Rosewood is mostly harvested to produce planks, blocks, sawn timber, firewood and wood carvings.

Recently, and especially in Zambia, this species is being harvested increasingly as logs for export to China where the Chinese market demand consistently displays a clear preference for unprocessed timber products and sawn wood can fetch a lower price than logs (Weng *et al.*, 2014).

2.3 Zambezi Teak *Baikiaea plurijuga*

Zambezi Teak trees are deciduous with a dense spreading crown. They grow up to 20 m high and have a stem diameter of up to 75 cm (Mendelsohn *et al.*, 2005). Zambezi Teak trees can easily be identified including by its conspicuous flowers with their crinkly petals and bright pink-purple colour (Mannheimer *et al.*, 2009). The flowers are held above the canopy and the velvety woody pods burst open loudly and scatter the seeds (Mannheimer *et al.*, 2009; Mendelsohn *et al.*, 2005). These explosively-dehiscent pods are characteristic of Caesalpinoid trees and as a result, seeds are not distributed far from the mother tree (Timberlake and Chidumayo, 2011).

Zambezi Teak has a similar distribution to that of African Rosewood within Namibia, growing in deep Kalahari soils (Figure 4) in areas with an annual average rainfall of above 300 mm (Burke, 2005). However, its abundance varies substantially from area to area. Patches where it is common include the Caprivi State Forest, north-western Kavango and eastern Ohangwena Region (Mannheimer *et al.*, 2009; Mendelsohn *et al.*, 2005). Outside of Namibia, this species is found in south-eastern Angola, south-western Zambia, western Zimbabwe and northern Botswana. It is also reported to have a low tolerance for fire (Burke, 2006).

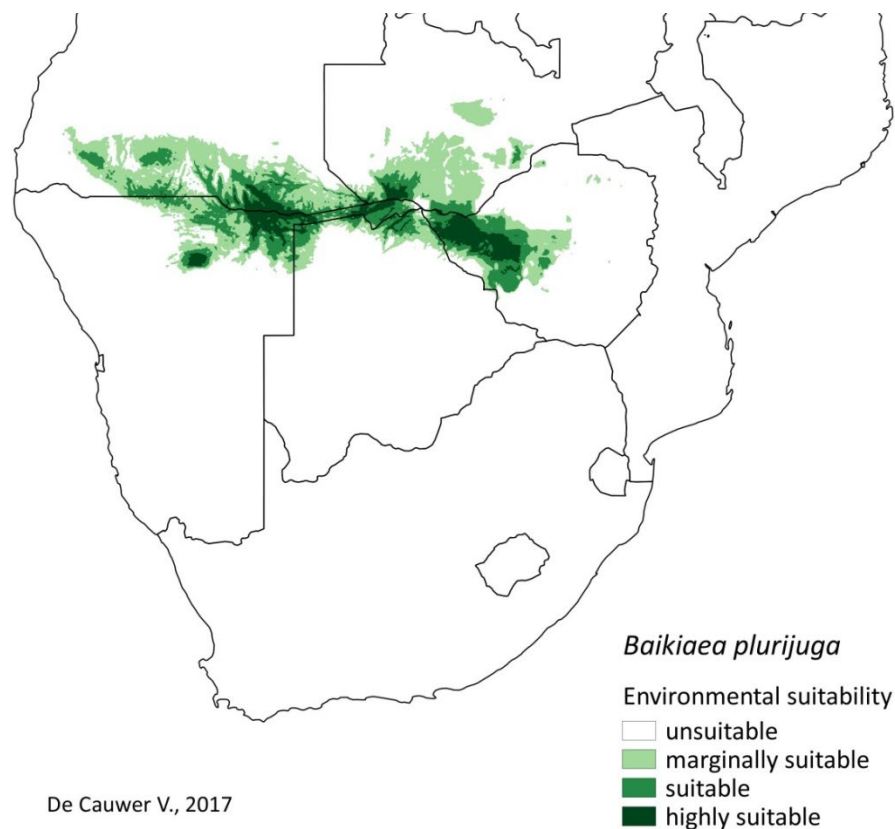


Figure 4: Distribution of Zambezi Teak *B. plurijuga*

This species produces excellent wood, which is dark red in colour, durable, hard and resistant to both rotting and insect attack, especially termites (Mannheimer *et al.*, 2009). It is used in construction, for

railway sleepers, furniture and mine props (Mannheimer *et al.*, 2009). Zambezi Teak has been protected in Namibia since 1952 (Loots, 2005), and is classified as Near Threatened on the IUCN Red List. The biggest threats to these populations throughout their distribution range come from fire, clearing lands for farming and from timber logging, apart from Namibia where logging has been stopped (Mendelsohn *et al.*, 2005). Within Namibia, the DoF permit data indicate that Zambezi Teak is most commonly harvested to produce planks, blocks and sawn timber.

2.4 Other Namibian timber species

The woodlands of Namibia are dominated by six tree species which represent 84% of the basal area (De Cauwer *et al.*, 2016). In addition to the three timber species discussed in the sections above, other species are important but not necessarily for the production of sawn timber, including: Mangetti, Kalahari Podberry *Dialium englerianum*, Sickie Bush *Dichrostachys cinerea*, Wild Syringa, Silver Cluster-Leaf *Terminalia sericea* and Mopane. The latter four species regularly harvested for a variety of local uses are described below.

2.4.1 Sickie Bush *Dichrostachys cinerea*

Sickie Bush is a deciduous shrub or small tree that grows up to six metres high and can be thicket forming. Thickets of these trees tend to indicate a serious substrate disturbance (Mannheimer *et al.*, 2009). This can be caused by either overgrazing or poor agricultural practices. The species is widespread in a variety of habitats throughout the central and northern regions of Namibia. These trees have yellowish to dark grey-brown to black bark, and the bark is usually very rough. The leaves are pale green in colour and are hairless above and densely downy brown below (Mannheimer *et al.*, 2009).

The leaves and pods of Sickie Bush are often browsed by livestock. The seeds, root bark and leaves are also used to treat various ailments in humans. The underbark of this tree has well-developed fibres from which rope can be made. Most commonly, the wood is used to make pick handles and fence poles because it is very durable and resistant to termites (Mannheimer *et al.*, 2009). Within Namibia, the permit data indicate that Sickie Bush is mostly harvested for firewood, poles and charcoal production.

2.4.2 Wild Syringa *Burkea africana*

Wild Syringa *Burkea africana* is a deciduous tree with a rounded to flattened crown, that can grow up to 20 m high and is confined to the Kalahari Sands of the central-north and north-eastern areas of Namibia. The trees have a grey to dark grey rough bark (Mannheimer *et al.*, 2009). Their distinguishing characteristic is velvety reddish-brown growth points on the branches.

When damaged, the tree exudes a yellowish red resin which is edible and used locally. The wood is very hard and dries slowly. It can be easily sawn or processed, but 85% of these trees are hollow (De Cauwer, 2016). Despite this, this species is commonly harvested for use as poles, firewood and to produce charcoal.

Currently, Wild Syringa provides the largest contribution to basal area in the north-eastern Namibian Dry Savannah Woodlands (De Cauwer, 2016). The Namibian permit data indicate that Wild Syringa is most commonly harvested for use as firewood, poles for construction and fencing, but little evidence was found of it being made into planks and exported as timber.

2.4.3 Silver Cluster-Leaf *Terminalia sericea*

Silver Cluster-Leaf, also known as “*Geelhout*”, is a deciduous tree or sometimes a shrub, up to eight metres in height. It is restricted to sandy soils, but does occur in many savanna type environments as well as the dry woodlands. The bark is very rough, pale grey and tends to peel off in papery strips. The leaves are often browsed by game and livestock, making it a highly valuable food source. The under-bark is fibrous, making it valuable for craft and basket making. An edible gum is exuded in September which is collected and eaten (Mannheimer *et al.*, 2009).

The wood of this species is yellow and very hard. It is strong, attractive and easy to come by and is often used for poles or droppers, for homestead construction, tool handles and firewood. Unfortunately, it is not suitable to produce planks because of its lack of durability (Mannheimer *et al.*, 2009). It is a common species in the north-eastern regions of Namibia, and coppices easily thus partial harvesting can be done without killing the tree. Nevertheless, numbers are dwindling due to overharvesting for poles (Mannheimer *et al.*, 2009). Within Namibia, the DoF permit data corroborate that the Silver Cluster-Leaf is most commonly harvested for droppers and poles.

2.4.4 Mopane *Colophospermum mopane*

Mopane is a deciduous to semi-deciduous shrub or tree that can grow up to 15 m in height. It is dominant in localized areas in the far north-eastern and north-western parts of Namibia, and in fact is often the only tree or shrub in areas where it occurs. The bark is very rough with deep grooves and is grey to brown in colour. The leaves are like those of African Rosewood, but are much duller and generally larger (Mannheimer *et al.*, 2009).

The bark fibres of young Mopane trees contain tannins used locally to tan leather. The leaves are often browsed by game and livestock, making it a highly valuable food source (Silow, 1976). This tree is also home to ‘mopane worms’ (from *Imbrasia belina* moths) which are considered a delicacy in some parts of the country. Mopane worms have a high nutritional value but can kill livestock (Silow, 1976).

The heartwood is very hard and heavy, making it resistant to beetle and fungus infestations. This does not allow the wood to be used in traditional timber (planks and blocks), but the wood does have a good texture and can be smoothly finished (Mannheimer *et al.*, 2009). This wood is mainly used for firewood (as it burns very well with a pleasant fragrance), but due to its durability is often used for poles or fencing droppers. Although there are dwindling numbers of mopane trees, it coppices easily and parts of the tree can be harvested without killing the main tree. The Namibian permit data indicate that Mopane is most commonly used for firewood, poles and charcoal production.

2.5 Other Zambian timber species

The Fifth National Report to the Convention on Biodiversity (CBD) by Zambia (Ministry of Lands, Natural Resources and Environmental Protection, 2015) lists several timber tree species that are locally threatened due to exploitation and as a result, mature trees of these species are rare. These include: lucky bean tree or pod mahogany *Azelia quanzensis*, East African mahogany *Khaya nyasica*, African Linden *Mitragyna stipulosa* and Mukula. These will be described briefly in the sections that follow. None of these species were being traded through Namibia until recently. In 2016, most of the in-transit timber permits issued by DoF in Namibia were for Mukula and all the consignments were *en route* to China.

2.5.1 Mukula *Pterocarpus tinctorius*

Mukula is an evergreen tree that can grow to a height of 20 m. It is a rare and slow-growing hardwood, which takes more than 80 years to reach full maturity. The young twigs are densely brown and hairy (Phiri *et al.*, 2015). The leaflets are shiny on the upper surface. The flowers are in axillary or terminal panicles and congested. Their seed pods are one seeded and six to ten cm in diameter. They are circular or sub-circular, borne on a short stipe. The centre of the seed is thickened with interspersed coarse yellow viscid hairs over the seed.

The distribution of this species includes the DRC, Tanzania, Mozambique, Malawi and Zambia (Bingham *et al.*, 2017) but it does not occur in Namibia (Figure 5). The tree grows in hilly locations in northern, eastern, central, north-western, Luapula, Muchinga and Lusaka Provinces in Zambia (Lemmens, 2008).

During the past few years, this tree has been exploited for its ornamental, furniture and medicinal properties (Lemmens, 2008). The sawn timber is dark red in colour (Figure 6) and commonly confused with *Pterocarpus angolensis*, *P. soyauxii* or *P. castelsii*. All these species are referred to locally as Mukula as reflected in the Namibian DoF in-transit permit data. Many consignments of this timber are being transported through Namibia from Zambia and the DRC for export to China.

The heartwood of Mukula is used for making gun stocks and curios. The outer layer is being used in the timber industry, either for planks or veneer for furniture. Locally, this wood is also sometimes used for charcoal production for local consumption (Lemmens, 2008). The recent increase in harvesting, trade and transport of consignments of Mukula logs from Zambia and the DRC has caused concern in both government and civil society.

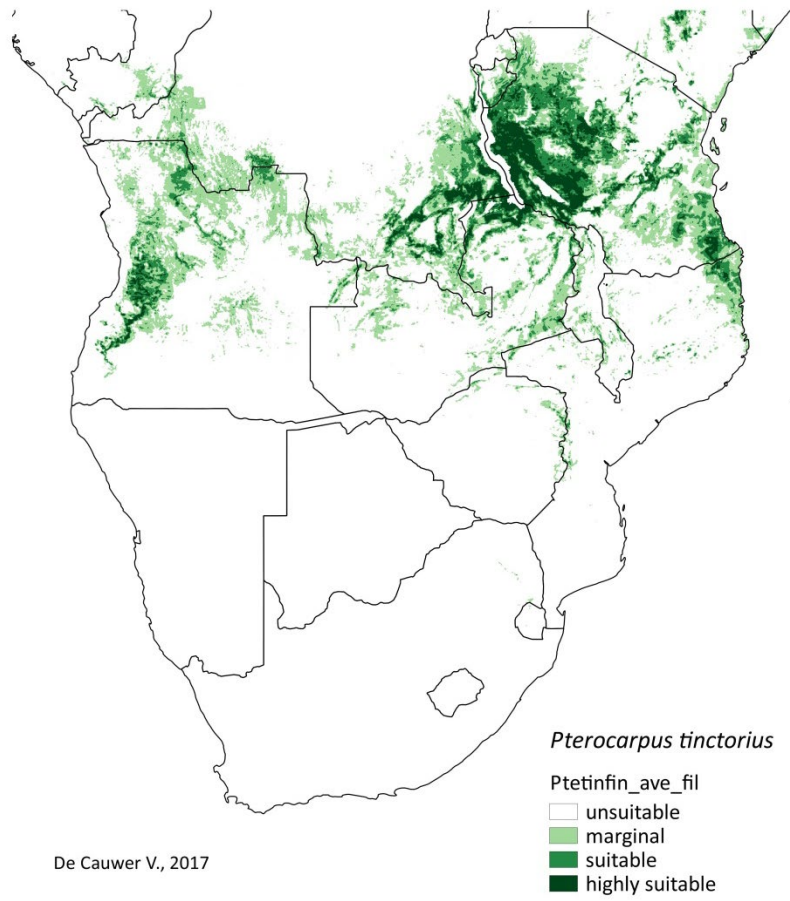


Figure 5: Distribution map for Mukula *P. tinctorius*



Figure 6: Container consignment of Mukula *P. tinctorius* at Kazangula border post, Zambia

Source: F. Mubunga

2.5.2 Lucky Bean Tree/*Pod Mahogany Afzelia quanzensis*

Afzelia quanzensis is a deciduous tree with bright green leaves that turn to an attractive yellow in autumn. Its upright large spreading crown also complements its beauty, and the somewhat drooping branches resemble a eucalypt from a distance (Palgrave, 2002). It is a deep-rooted tree that may grow up to 35 m high. It has a grey-green or creamy grey, smooth bark that is patterned with raised rings that flake off irregularly, leaving circular patches. The large flat pods are brown and woody, approximately 170 mm in length and are produced in late summer. In autumn, they split open to release distinctively black seeds with scarlet arils. There may be up to 10 seeds per pod (Palgrave, 2002).

This tree is widespread throughout Angola, Botswana, Kenya, Mozambique, Somalia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (Palgrave, 2002) growing in low altitude woodland and dry forests, usually in deep sand. The light red-brown wood of the Lucky Bean Tree is hard and has a good grain. It has been used for building, making plywood, furniture, panelling and for flooring. Wood is termite and borer resistant and can therefore be used for corner poles for fencing.

2.5.3 African Mahogany *Khaya nyasica*

African Mahogany *Khaya nyasica* is a large evergreen tree up to 40 m tall. Its trunk is very straight and reaches a considerable height before branching. The bark is mottled grey and brown with a smooth surface that exfoliates in large scales. It mainly grows at low to medium altitudes, in riverine forest and always near water (Orwa *et al.*, 2009).

The timber is reddish in colour with an attractive grain, hard but fairly easily worked. The wood takes a fine finish and polishes well. It weathers well above ground and is untouched by termites and borers. It is considered an excellent wood for furniture and general cabinet making, but supplies have been depleted by exploitation (Orwa *et al.*, 2009).

2.5.4 African Linden *Mitragyna stipulosa*

African Linden *Mitragyna stipulosa* is an evergreen tree that grows to heights of 35m. The bark surface is smooth, greyish brown to dark brown while the inner bark is finely fibrous. The crown is rounded, with few, heavy branches (Bolza and Keating, 1972). The wood is used for light construction, flooring, interior joinery, interior trim, furniture, vehicle bodies, sporting goods and a variety of household items. It is also suitable for the production of veneer and plywood as well as for paper making. The tree is also harvested for use as firewood and for charcoal production. African Linden *M. stipulosa* wood is considered a superior wood of general utility. In trade, it is not distinguished from *M. ledermannii* (Bolza and Keating, 1972).

The heartwood is pale- to pinkish brown, slightly darkening upon exposure, and indistinctly demarcated from the wide sapwood. The grain is straight to interlocked with fine and even texture.

The wood is slightly glossy on quarter-sawn surfaces, and has an unpleasant odour when freshly cut (Bolza and Keating, 1972).

2.6 Timber species from Angola

There is currently no evidence of cross-border timber trade from Angola to Namibia other than the three timber species forming the focus of this study (Kiaat, African Rosewood and Zambezi Teak). Other species are being harvested within Angola for local use and some for export directly from Angolan ports. The main timber species harvested and traded in Angola are listed in Table 2 below.

Species Name
<i>Terminalia superba</i>
<i>Diospyros mespiliformis</i>
<i>Azelia quanzensis</i>
<i>Gossweilerodendron balsamiferum</i>
<i>Guibourtia arnoldiana</i>
<i>Oxystigma oxyphyllum</i>
<i>Pterocarpus tinctorius</i>
<i>Bobgunnia fistuloides</i>
<i>Entandrophragma angolense</i>
<i>Entandrophragma candollei</i>
<i>Entandrophragma cylindricum</i>
<i>Entandrophragma spicatum</i>
<i>Entandrophragma utile</i>
<i>Khaya anthotheca</i>
<i>Khaya ivorensis</i>
<i>Milicia excelsa</i>

Table 2: List of timber species used domestically and/or exported directly from Angolan ports.

Source: Romeiras *et al.* (2014)

3. METHODS AND ACTIVITIES

3.1 Literature review

A literature review undertaken at the start of the study was updated to reflect information gathered from a wide variety of additional reports and documents during the study. Initially the review focused on the timber trade in Namibia but was later expanded to include information on Zambia and Angola. Literature relating to the following topics was sourced:

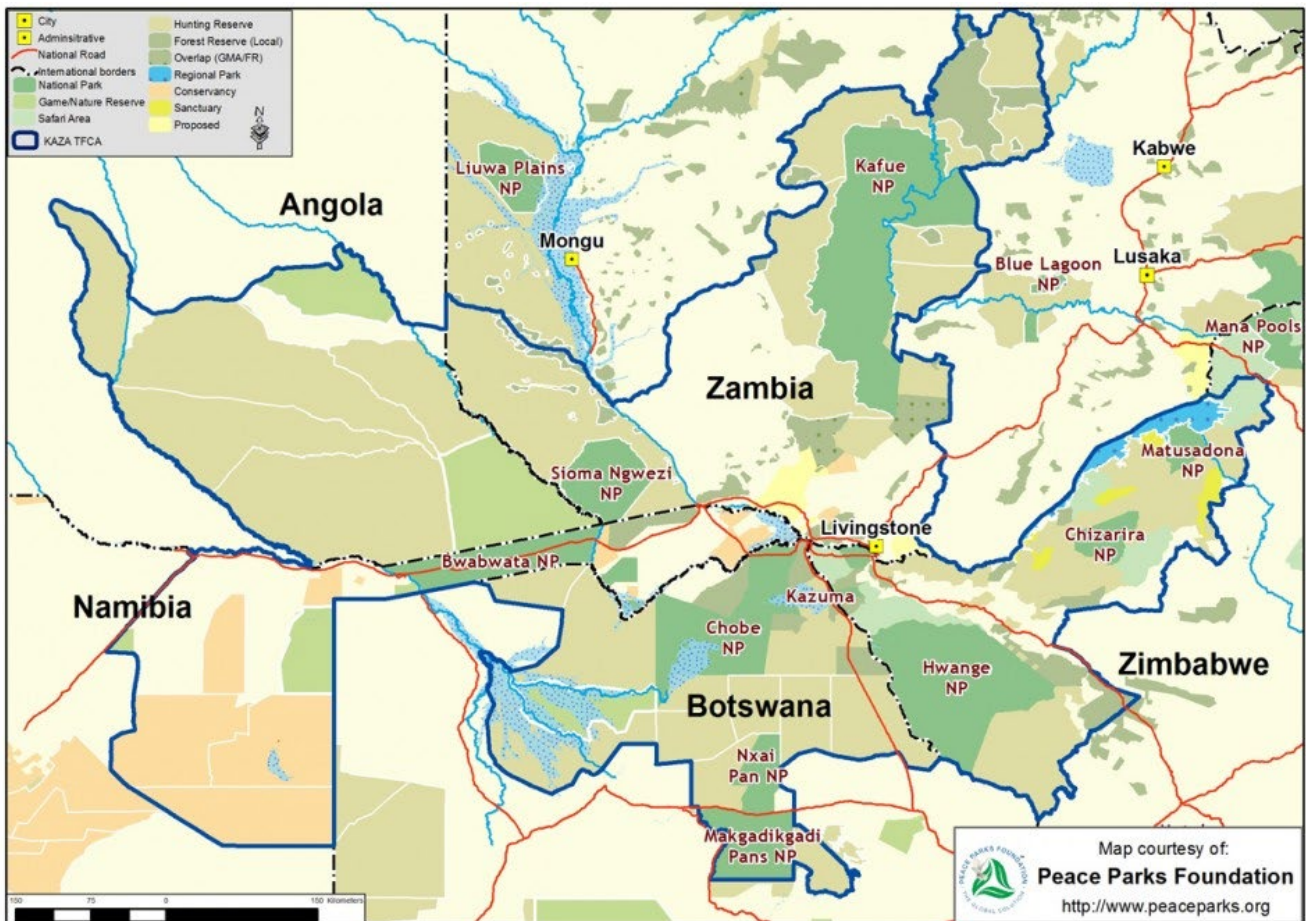
- Information about the ecology of the key timber species
- Resource inventories and management plans relating to forest resources and timber species (Appendix 1)
- Historic and current information regarding the trade of the key timber species
- Legislation, policy and regulations relating to timber use and trade.

3.2 Study area

While the original focus of the study was on the timber trade within Namibia, it was realised based on observed Angola and Zambia trade volumes that the emphasis needed to be on cross-border timber trade and in-transit timber from these countries. Within Namibia, this study focused on the West Kavango, East Kavango and Zambezi Regions while in Angola, the focus was on Cuando-Cubango and Cunene Provinces, including the newly gazetted Luengue-Liuana NP. In Zambia, the focus was on the Western and Southern Provinces, including the Sioma Ngweze NP. As such, this study was situated within the Kavango-Zambezi (KAZA) Transfrontier Conservation Area (TFCA).

Funded by the German development bank (Kreditanstalt für Wiederaufbau (KfW)), the KAZA TFCA is the largest of its kind in the world covering nearly 520 000 km². The KAZA TFCA Treaty was signed on 18th August 2011 in Luanda by the Heads of State of Angola, Botswana, Namibia, Zambia and Zimbabwe (Figure 7). The preservation of protected areas, corridors and dispersal areas for wildlife migration as well as benefits for local communities and economic development are the key indicators for the success of the KAZA TFCA programme. While the focus of KAZA TFCA has historically been on such wildlife resources as rhino horn and their cross-border movements, the need to address management and trade of other natural resources including timber has become increasingly evident.

Figure 7: Map showing KAZA TFCA



Source: <http://www.peaceparks.org> (viewed on 15 September 2019)

3.3 Permit data from Namibia

This study was initiated in 2014 as a comprehensive and independent assessment of the status of the timber industry in Namibia and that transiting Namibia sourced from Zambia and Angola. For each of the three focal species, the quantities of timber recorded on permits was determined through collation and analysis of all permit book data in eight regional offices (Bagani, Eenhana, Katima Mulilo, Nkurenkuru, Okongo, Omafo, Rundu and Windhoek) for the period 2010 to 2014. This was then extended to 2015 and 2016 for Bagani, Rundu and Katima Mulilo offices. A summary of these data is presented in Appendix 6. The permit system in use up until 2016 did not differentiate between timber consignments being transported within Namibia and those in-transit through Namibia.

The aspects of the timber trade being reviewed in this study fall under the jurisdiction of the Division of Forest Management and the North-East and North-West Subdivisions of DoF. A number of DoF offices (Table 3) are found in the study area.

Region	Office	Issue permits?
Zambezi	Katima Mulilo	Yes
	Bukalo	Yes

	Kongola	No
	Sibbinda	No
Kavango East and West	Rundu	Yes
	Ndiyona	No
	Nkurenkuru	Yes
	Mukwe	No
	Divundu	Yes
	Mururani Gate	Not yet
	Siya	No
Ohangwena	Eenhana	Yes
	Okongo	Yes
	Omafo	Yes
Khomas	Windhoek	Yes

Table 3: List of DoF offices in study area

Each region operates independently with no current national system for permit data capture. An electronic permit system was in operation for several years until the end of 2009. Due to the challenges of keeping the computer network functional in remote areas, this electronic system was abandoned and as from 2010 the permit offices returned to a paper-based system. The permit system is discussed in detail in Section 5.2.2. The collection of permit data involved visiting the study area and regional DoF offices to determine which offices had issued permits for timber harvesting or transport. At each of the offices, all the permit books for the period 2010 to 2014 were located and the data from each permit issued entered into spreadsheets for synthesis and analysis. Data analysis revealed that the transit permits issued by the Katima Mulilo and Rundu offices were the most important indicators for cross-border timber trade. The transit permit data for these two offices were collected for 2015 and 2016. With the gazettelement of the Forestry Regulations (of the Forest Act 2001) in August 2015, the format of the permit books was revised but the categories of timber products remained unchanged.

During the August 2014 review of the permit files in the Rundu and Katima Mulilo offices, examples of the accompanying documentation from timber consignments from Angola and Zambia were reviewed and where possible were photocopied. The data contained in the transport permits were the most useful of the range of permit types (see Section 4.1.2 and Appendix 5 for further detail). In some cases, multiple permits (e.g. transport permit plus a marketing permit and then the renewal of the transport permit for the remainder of the consignment not sold in Namibia) were issued for the same consignment of timber. It was essential to track consignments through Namibia to ensure that double entries had not been made. The bulk of the timber consignments were found to be in-transit from Angola or Zambia to either Walvis Bay for export by sea, or South Africa via Windhoek by truck.

Various attempts were made to verify the data obtained from the permit books by comparing them with the customs data at point of export. Unfortunately, the customs codes for export of timber and timber products do not differentiate between harvested indigenous timber, plantation timber, reconstituted timber products and furniture. Applications were also sent to the Commissioner of

Customs in Windhoek to request these data from the accompanying documentation collected by customs officials, but this was not successful.

3.4 Stakeholder engagement within Namibia

Engagement with Namibian stakeholders was central to activities throughout the course of the project. Consistent and regular consultation with DoF in Namibia ensured their full support and active participation. This process also meant that DoF staff were fully informed of the outcomes of the activities undertaken.

To ensure project sustainability, the IRDNC team's implementation approach was based on the following values:

- **Ownership:** focus on creation of ownership of the process and outcomes within the DoF on all levels
- **Linkages and sharing:** creating linkages which will enhance sharing and lead to adaptive management thus sustainability
- **Transparency:** endeavouring to be transparent in all actions, stakeholder interactions and data collection and reporting processes
- **Relevance:** data collected should be relevant to adaptive management practices and made available and be useful to those tasked with the responsibility of forest management.

Other Namibian stakeholders consulted in the target regions included the Ministry of Agriculture, Water and Forestry (MAWF) incorporating the Directorate of Agricultural Production, Extension and Engineering Services (DAPEES), as well as Directorate of Veterinary Services (DVS). The Ministry of Finance (MoF), their Directorate of Customs and Excise and in particular their Risk Management Unit, the Ministry of Environment and Tourism (MET), the Namibian Police (NAMPOL), the Special Field Forces (SFF) as well as relevant NGOs such as IRDNC and the KAZA Secretariat were also consulted (See Appendix 2).

3.5 Cross-border stakeholder engagement

Cross-border stakeholder engagement became a clear priority during the project. Contact was made with the Zambian Forestry Department within the Ministry of Lands, Natural Resources and Environmental Protection. The community-based natural resource management (CBNRM) role players including the Cross-Border Forum Coordinators. The Zambian Bureau of Standards and the Customs Services Division of the Zambian Revenue Authority were also all engaged by the project team. In Angola, engagement was carried out with the Forestry Department incorporating the Institute for Forestry Development (IDF), and departments of Agriculture and Customs and Immigration departments were also consulted.

A summary of all the stakeholder consultations and interactions can be found in Appendix 2.

3.6 Production of reports, information and training materials

Several different training materials were produced during the project, starting in 2014 with a literature review report *“A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/Timber Industry”*. Data collection was then undertaken, and two different posters entitled *“Timber Trade in Namibia – Key Species”* and *“Forestry Permits – How to Fill in this Form”* were produced to assist the DoF Namibia staff with species identification and correct permit form completion.

In August 2015, a workshop was held in Windhoek with key participants from Angola, Namibia and Zambia focused on forest management and timber trade collaboration between these countries. The workshop report *“Collaboration on forest management and timber trade: Angola-Namibia-Zambia Joint Workshop”* was produced and distributed to all the relevant parties. The action plan (See Appendix 3) included the drafting of an MOU for co-operation and mutual support in the transboundary management of forest resources between Ministry of Agriculture (Angola), Ministry of Agriculture, Water and Forestry (Namibia) and Ministry of Lands, Natural Resources and Environmental Protection (Zambia). The draft MOU was submitted to the Namibian Attorney General’s office for review.

These activities revealed additional information was needed about traded timber species. At the end of 2015, five timber identification wheels (See example in Figure 8) and a booklet *“Common Timber Species traded in Namibia”* were produced and distributed during workshops in April 2016. Two reports were compiled (one for the donor and a condensed version for the Namibian DoF). The reports are: *“Workshops on Collaborative Forest Management and Timber Trade: Angola, Namibia and Zambia”* and *“Workshops on Cross Border Timber Trade”* respectively. Two additional posters *“Angolan Timber Requirements”* and *“Zambian Timber Requirements”* were produced in September 2016, to be distributed to the relevant authorities to show additional information collected (See Appendix 4). A directory of contact details of stakeholders was compiled and regularly updated. In November 2016, the *“Timber Trade Directory of Contacts – Angola, Namibia and Zambia”* was produced and distributed (see Appendix 4 for many of the cited examples).



Figure 8: Timber wheel developed to assist with the identification of timber species during inspections

Source: K Nott

4. THE LEGISLATIVE AND POLICY FRAMEWORK

De Cauwer *et al.* (2016) cite many studies that conclude the main threat to tropical dry forests in Africa is the increase in human populations. The Food and Agriculture Organization (FAO, 2003) states that the main reasons for deforestation remain the same throughout Africa and these are:

- Expansion of agricultural activities
- Increased demand for forest products especially close to expanding urban areas
- Fire which has been responsible for 31% of forest loss in southern Africa (Sebukeera *et al.*, 2006).

While the reasons for the over-utilisation of forest resources may be similar, the way in which countries deal with these issues and utilise forest resources vary. Some interesting differences can be seen in southern Africa. The timber industry in South Africa is centred round the harvesting of timber products from plantations (Newton *et al.*, 2002) while in Zambia, Angola and Namibia, natural forests are harvested.

This section of the report provides an overview of the policy and legislative frameworks in Zambia, Angola and Namibia, covering the study area for Kiaat, African Rosewood and Zambezi Teak. a summarised overview of the legislative and policy framework within the three countries and SADC is presented in Figure 9 below.

The SADC Protocol on Forestry (2002) remains the over-arching policy framework for forestry collaboration amongst Member States in the region. The Protocol provides guiding principles on co-

operation in protecting, managing and using forests to meet regional and national objectives (DoF, 2011a). Within these protocols, and of relevance to this study, is Article 3: Objectives:

To achieve the objectives of this Protocol, State Parties shall co-operate by:

Point 2 (c) - facilitating the gathering and monitoring of information and the sharing and dissemination of information, expertise and technology concerning forests, forestry and forest industries, throughout the Region;

Point 2 (f) - harmonising approaches to sustainable forest management, forest policy, legislation and enforcement, and issues of international concern

The SADC Forestry Strategy (2010) records the vision within SADC of a “*vibrant and evolving forest sector that contributes significantly to rural development, poverty reduction and, industrial progress, while retaining the vital ecosystem services of forests such as, water supply, climate change mitigation, and protecting biological diversity*”. Its mission is to “*facilitate co-operation among member states to promote the active protection, management and sustainable use of forest resources, through sound policy guidance, the application of requisite skills and the best available technology, in order to enjoy the multiple benefits of forests in perpetuity.*”

The strategy is operationalised through eight strategic programme areas that include: i) climate change mitigation and adaptation; ii) protection of key catchment forests; iii) community-based forest management; iv) forestry and poverty reduction; v) enhanced trade within SADC; vi) cross-border co-operation in 13 fire management zones and management of transboundary forest ecosystems; vii) forest assessment and management of a regional database; and viii) capacity improvement in SADC.

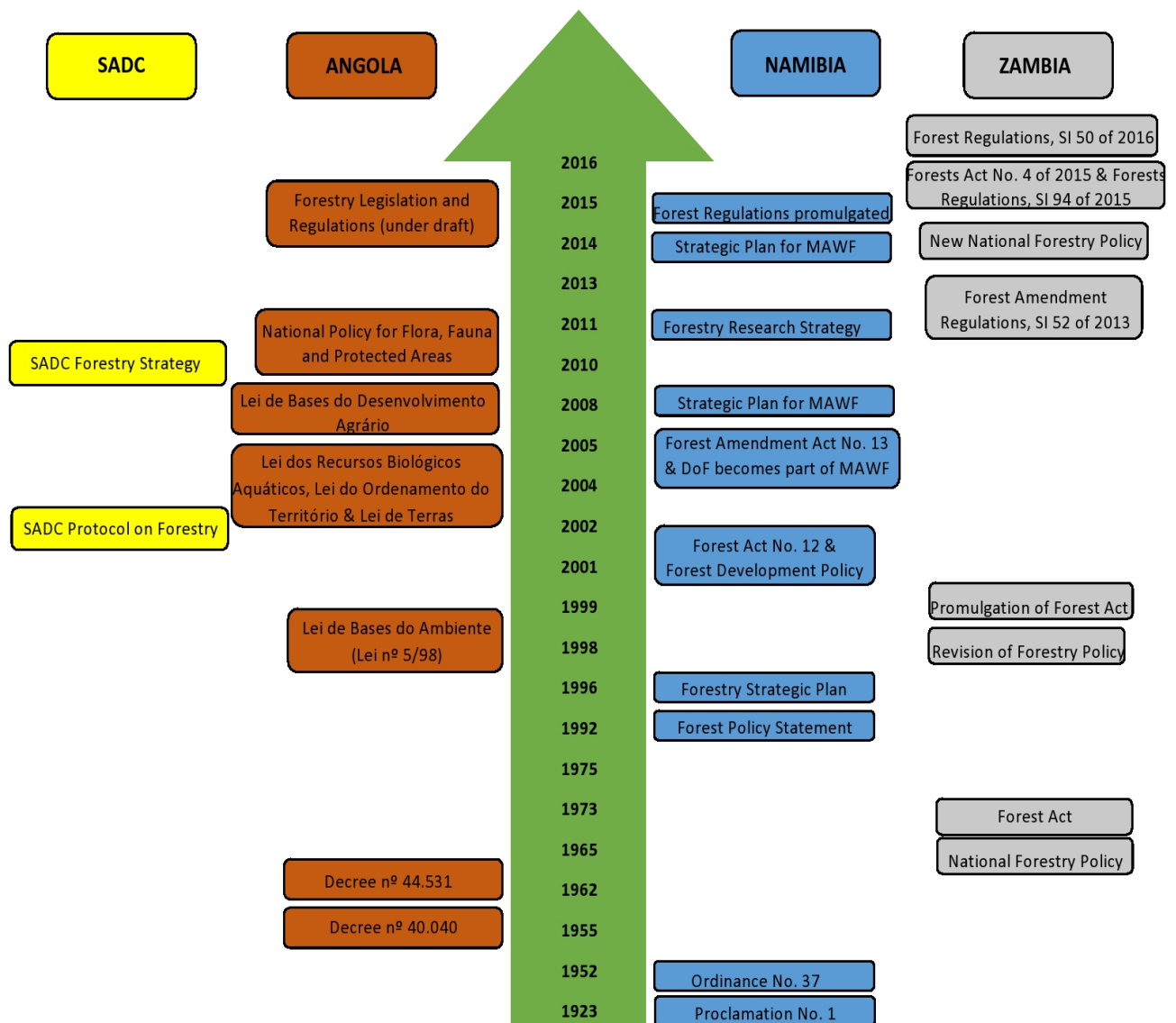


Figure 9: A schematic overview of the country legislative and policy frameworks

Source: K Nott

4.1 Legislative and policy framework for Namibia

4.1.1 Historical overview: Namibia

The first forestry ordinance was issued in 1894 by the German colonial administration to limit the cutting down of trees around settlements and riverbanks and especially around the developing town of Windhoek. This was followed in 1900 by another regulation on the felling of trees for domestic and commercial use. An ordinance issued in 1914 gave farmers non-commercial rights to timber for their own use (Mendelsohn and el Obeid, 2005). The German administration prioritised importation of cultivated exotic timber from South Africa and Germany into Namibia (Mendelsohn and el Obeid, 2005).

The colonial policy of forest exploitation in the communal areas of Kavango and Caprivi (now Zambezi Region) started in the 1930s (Hailwa, 2002). The first permit to cut down 1000 trees in Kavango was issued in 1933 triggering the harvesting of timber in the north-eastern areas of the country continued throughout the South African administration (Mendelsohn and el Obeid, 2005) until 21st March 1990 when Namibia gained its independence. To control and regulate logging, the South African administration promulgated the Preservation of Trees and Forests Ordinance in 1952 and then in 1968, the first Forest Act. There is a list of tree species that were specially protected in terms of the Preservation of Trees and Forests Ordinance of 1952 and the Proclamation of the South West Africa Administration no. 486 in 1972 (Mendelsohn *et al.*, 2005). Protected species included Kiaat, Zambezi Teak, Wild Syringa, Mopane and African Rosewood.

Logging reached its peak in the 1960s and early 1970s when three sawmills were operational in Katima Mulilo, Rundu and Tsumkwe (Bjorkmann, 1999). These sawmills accessed their logs from timber concessions which had been awarded to private entrepreneurs (Mendelsohn and el Obeid, 2005). During the 1970s, attempts to improve sustainable use of woodland resources were made and forest resource inventories and management plans were initiated (Hailwa, 2002).

4.1.2 Current framework: Namibia

The first policy document post-independence was the Namibia Forest Policy Statement of 1992 followed by the Forestry Strategic Plan developed in 1996. The formulation of the Forestry Development Policy (DoF, 2001) as well as the gazetting of the new Forest Act took place in 2001 (GRN, 2001). In 2008, a new strategic focus for forestry was developed as part of the Strategic Plan for MAWF for the period 2008 to 2012 and culminated in the approval of a new strategic plan in August 2014 (M. Otsub pers. comm.).

The Forest Act No. 12 gazetted in December 2001 replaced Proclamation no. 1 of 1923, Ordinance No. 37 of 1952 and the Forest Act of 1968. The Forest Act made provision for the establishment of classified forests such as community forests (CFs) (DoF, 2010; Hazam, 2009; Hazam, 2010; Jones, 2012; Mulofwa, 2005) and forest management areas. In terms of this Act, a Forest Management Plan is required for each classified forest area (Mendelsohn *et al.*, 2005) reflecting one of the biggest changes to the forestry legislation in Namibia (Mendelsohn *et al.*, 2005). Clear guidelines are provided to communities for the registration process of a CF (DoF, 2010). Within CF areas, the members have exclusive commercial rights over the forest resources. This Act provides incentives to local harvesters and the sustainability of forest resources will ultimately depend on the extent to which these incentives encourage sustainable utilisation (Pröpper *et al.*, 2013). However, the benefits generated by CFs are distributed according to a documented Benefit Distribution Plan which often results in only a small part of the benefits reaching the CF members. The Forest Amendment Act (Act 13) of 2005 (GRN, 2005) redefined the composition of the Forestry Council, the function of which is to provide strategic guidance to forestry governance.

The Traditional Authorities (TA) Act, Act 25 of 2000 outlines the structure of TAs widely applied since allowances are awarded by the Ministry of Urban and Rural Development (MURD) based on compliance. Each TA is headed by a chief who has a traditional council usually consisting of 12 members. Some perceived contradictions exist between stipulations of the TA Act confirming the role

of TAs as custodians of communal lands and associated resources, versus the Forestry Act of 2001 (Mendelsohn, 2008) that allocates custodianship to the state. DoF uses a co-operative management approach including the TAs in decisions about allocation of timber resources on communal lands (Moses, 2013). However, this cooperative management structure is occasionally abused as illustrated by recent allegedly irregularly issued permits for access to timber resources (<https://economist.com.na/42391/environment/minister-warns-against-timber-exports/>, viewed 21st May 2019).

The DoF was part of the MET from 1994 until 2005 when it once again became one of the Directorates within MAWF (Mendelsohn *et al.*, 2005). The Directorate of Forestry has two divisions – Forest Management and Forest Research. The mission statement of the Directorate of Forestry is:

“To promote a well-organized forestry sector that is socially, environmentally and economically sustainable, while creating significant and equitable wealth and opportunities”.

Forestry research in Namibia is guided by “A Forestry Research Strategy for Namibia: research in an era of sustainable economic development, biodiversity conservation and climate change” formulated by DoF (DoF, 2011a). The document identifies seven strategic forest research areas:

- Vegetation (forest and rangeland) monitoring programme
- Forest products (value-added) research
- Ecological studies
- Growth and yield studies
- Silvicultural research
- Economic, policy and sociological research
- Management of information.

The Forestry Regulations: Forest Act 2001 were gazetted on 3rd August 2015. Regulations relevant to the timber trade set out:

- Description of six types of permits, namely, import, export, transit, transport, marketing and harvesting each with its own conditions on the back of the permit
- Stipulations for permit books to be printed with numbered permits in triplicate copies: the original (white) goes to the customer, the second copy (pink) goes to the head office in Windhoek for entering into the database and the third copy (blue) stays in the permit issuance book in the office where it was issued
- Standardised information on the permits including—scientific and local name(s) of the timber species and the quantity in m³
- Process and content for harvesting permits:
 - ✓ In communal lands but falling outside CFs and not subject to leasehold—a harvesting application must be submitted, site inspection done by DoF, inspection report approved and only then can a harvesting permit be issued
 - ✓ In communal lands but falling outside of a CF and state forest—the TA must give a letter of agreement/permission to allow for harvesting of timber or wood

- ✓ In CFs—block Permits are issued by DoF, and the Community Forest Management Committee (CFMC) then issue harvesting permits to their members. Report back on permits issued and quantities harvested are submitted to DoF on a quarterly basis
- ✓ In commercial areas—the application must be accompanied by proof of ownership of the land or permission of the landowner as well as a management plan for forest and timber resources.

Annexure 2 of the Forestry Regulations of August 2015 provides a list of protected plant species (Section 22/Regulation 13) that includes the three focal species of the study. Reasons are given for their protected species status based on the extent they are used (GRN, 2015).

The permit system for timber is administered by the regional offices within the Division of Forest Management. Each region operates independently of other regions and currently no national system for permit data capture is in place. Books for the six types of DoF permits allow for specification of commercial or own use. The various types of permits that are issued by DoF are listed in Appendix 5, as well as their fees and validity. There is no report back currently required.

Currently, it is only registered CFs that are allocated an annual total allowable offtake (TAO) for the harvesting of timber. This will be discussed in more detail in Section 5.2.2 where it will be demonstrated that these amounts are very low and are often not used because the small amounts are not economically viable for commercial logging.

4.2 Legislative and policy framework in Angola

4.2.1 Historical overview: Angola

Angolan forest policy and laws largely date back to colonial times (Baptista, 2014). The first legislation on nature conservation and establishment of protected areas was issued on 20 January 1955 through the Decree nº 40 040 (published in the Official Bulletin on 9th February 1955). The Decree covered aspects related to soil, fauna and flora protection, conservation and use of game, establishment of NPs, nature reserves and controlled hunting areas. It pioneered the establishment of an institution (*Conselho de Protecção à Natureza* – Nature Conservation Council) responsible for controlling protected areas and developing important enabling legislation for this effect. This legislation includes the Hunting Regulation (*Regulamento de Caça*, Decree nº 2 873 of December 11, 1957), Forestry Regulation (*Regulamento Florestal*, Decree 44 531 of 1962) and NPs Regulation (*Regulamento de Parques Nacionais*, Decree 10 375 of October 15, 1958).

The literature study on Angolan timber trade undertaken by Baptista (2014) found the annual export of logs and sawn wood was about 6 t in 1918 but increased to 1 000 t in 1921 following the First World War. Export volumes decreased in the 1930s due to the economic recession but reached 3 000 t by the mid-1930s. In 1946 about 9 000 t of timber was exported with annual amounts increasing steadily to 27 000 t in 1950 (Baptista, 2014). Sawmills were established in Angola in the 1950s and wood was exported to Holland, Portugal, Germany and South Africa where it was used as railway sleepers. By 1951, an average of 42 000 t of wood was being exported from Angola annually and by 1965 this had

increased to 88 000 t. During the five-year period from 1963 to 1967, a total of 976 874 t of Kiaat wood was exported from Angola. This is an average of 195 375 t of wood being exported each year.

A Decree nº 43/77 of 5th May 1977 approved the structure of the Ministry of Agriculture and defined five different categories for protected areas, namely NP; strict nature reserve; partial reserve; regional nature park and special reserve. A new State Secretariat for the Environment was established in the 1990s. This new Secretariat developed new strategies and policy approaches leading to the formulation of the Environment Framework Law in 1998 (*Lei de Bases do Ambiente*), No. 5/98 of 19 June 1998. This Act is based on Articles 12 and 24 of the Angolan Constitutional Law. These laws have not been enforced due to the lack of trained personnel.

While much data are available about resources utilised during the colonial era, there are no recent forest inventory data available for the Kuando Kubango Province, as is the case for many of the other provinces (Zweede *et al.*, 2006). Zweede *et al.* (2006) documented that key threats to forest biodiversity, especially in the Kuando Kubango province (where much of the Kiaat resources are found) are uncontrolled burning, charcoal production and slash-and-burn agriculture. Schneibel *et al.* (2013) studied the repopulation of abandoned areas in southern Angola after 27 years of civil war and found an increase of 47 000 ha (2.85% of the study area) of new fields in an 11-year period. Most of these were within 5 km of a road.

The FAO (2000) reported an acute scarcity of human resources such as administrative and professional personnel to ensure the optimal management and planning of natural resources and forestry in Angola. The sector is heavily dependent on the government budget, which often provides just enough for staff salaries. While this may have improved somewhat with time, funding of natural resource management remains a challenge.

4.2.2 Current framework: Angola

From the institutional point of view, the forest sector is within the Ministry of Agriculture and Rural Development and is the responsibility of the IDF which is fully represented in all 18 administrative provinces of the country (FAO, 2000; USAID, 2011). The IDF established in 1989 through Decree No. 41/89 of 22nd July also oversees the development and enforcement of legislation on protected areas and natural resources. They also are responsible for the ongoing management of these resources, including forests. Administration takes place through regional centres. There are at least 17 forestry reserves in the country, covering over 17 000 km², although there is little evidence to indicate that they have been sustainably managed (Mogaka *et al.*, 2001).

Despite many proposed changes, the IDF is still located within the Ministry of Agriculture and Rural Development. The Ministry developed the Forestry Development Licences Order (Order No. 149/00 of 7th July 2000), establishing rules on forestry conservation and related activities. The Order stipulates that only licensed entities can undertake forestry activities, and it describes the process and requirements for the issuing of such licences.

The Ministry of Environment in Angola recognises that forest biomes are under pressure from various forms of utilisation (Kuedikuenda *et al.*, 2009). The factors contributing to the degradation and loss of habitats include urbanization, disorderly occupation of conservation areas, shifting agriculture, as well

as legal and illegal logging. Besides habitat loss from the direct footprint of urbanisation, people living in urban areas remain dependent on wood and charcoal for cooking (Kuedikuenda *et al.*, 2009). In fact, it is estimated that nearly 80% of the Angolan population depends on firewood and charcoal to meet their energy needs. Following the end of the civil war in 2002, the decline in forest resources has escalated, contributed to by the government's own rebuilding of infrastructure such as roads and key buildings, including schools, clinics, police stations and government administration offices. A key influence in the degradation has been fragmentation of forest areas which results from road construction and urban development (Kuedikuenda *et al.*, 2009). Forest resources are also being used or cleared by people returning to previously abandoned areas.

Although new licences for timber harvesting were awarded post-war, there has also been extensive illegal forestry activity taking place. Kuedikuenda *et al.* (2009) reported that the volume of harvesting allowed in Angola in 2004 was estimated at 326 000 m³/year, while deforestation rate was estimated at 0.4% per year.

Timber being exported from Angola usually requires a Phytosanitary Certificate, a permit from IFD as well as an invoice as evidence of its purchase. From the documentation collected, it seems that rights to harvest timber can be obtained through either national or provincial processes. For example, the recently approved Management Plan for the Luengue-Luiana NP, Kuando Kubango (Government of the Republic of Angola (GRA), 2016) indicates that sustainable logging is allowed in the NP. Permit data and site visits indicate that several concessions are operational within the boundaries of the NP but it is not clear how these were awarded and whether they have management plans to ensure sustainability. Cases of CITES permits issued for harvest of timber from non-CITES species were also observed, but these were later found to be fraudulent.

Angolan customs requirements are very similar to Namibian customs requirements. They also use the SAD 500 document which includes information about the exporter, importer, clearing agent, volume, description of goods and mode of transport. The process and documentation for exporting timber from Angola is as follows:

- Documentation needs to be in accordance with stipulations by the Ministry of Agriculture and the IDF
- The owner of the consignment must have the following paperwork:
 - ✓ A release document signed by the customs agent and stamped, it must then also be signed by the police and stamped
 - ✓ A letter from the bank stating that the person has paid the relevant export levies to Angola (export taxes are 1% of the declared value)
 - ✓ Harvesting licence
 - ✓ Transport licence (showing how the timber travelled internally in Angola)
 - ✓ Commercial invoice issued by the company itself (which states the quantity, type of consignment, unit price and total value).

Customs services have Regional Directors (RDs), with the RD for Cunene province and Cuando Cubango province being in Ondjiva. The head of Customs Services for Cuando Cubango province based in Katwitwi reports to the Ondjiva-based RD. The Katwitwi border post has law enforcement and control units as well as a clearance unit and is the only gazetted border post shared with Kavango

West and Kavango East Regions. It is further the only border post which has an electronic data capturing system for customs and is thus the official exit point for timber trade between Namibia and Angola. There are eight non-gazetted customs points in Cuando Cubango Province, namely Chetto, Mukwe, Ndiyona/DiRico, Calai, Mushangara/Mucusso, Kahenge/Cuanavale, Mahenzere and Rivungu (to Shang'ombo in Zambia). For these points, data must be entered into the Katwitwi data system but this is challenging and does not always take place.

4.3 Legislative and policy framework for Zambia

4.3.1 *Historical overview: Zambia*

Forest resource management during pre-colonial times in Zambia was affected by the traditional leaders. There were taboos on cutting fruit-bearing trees and some forest areas were set aside as royal forests and were off limits to everyone else. Individual trees were protected for products such as edible caterpillars, shade or medicinal purposes and it was accepted that there was ownership over valuable trees close to homesteads (Vinya *et al.*, 2012).

During the colonial era in Zambia, the management of forest resources in Barotseland (now Western Province) involved local communities and the management activities were structured around the indunas (traditional leaders) who worked closely with the Provincial Forestry Officer (Vinya *et al.*, 2012). After independence, a new forest policy was developed and the Forest Ordinance Cap 105 of 1965 was adopted by the new government. The key features of this ordinance were restrictions on both the harvesting of forest products and opening of new land for cultivation. These activities require a licence to be issued (Vinya *et al.*, 2012).

Following independence in 1964, the first National Forestry Policy was developed and the Forest Ordinance, Chapter 105 of 1965 was adopted by the new government. The Forest Act 199 was passed in 1973. Forest reserves in Zambia were established under the Forest Act 199 of 1973 which repealed the rights of local communities to manage forest resources which became state owned. This act provided for the establishment of several main categories of forest reserves in the country, namely: Local Forests (of which there are 306) and National Forests (of which there are 184) and joint forest management areas, which were aimed at improving community participation in forest management. Although not significant in size, some portions of forests are designated as botanical reserves (Kalinda *et al.*, 2008). The Forest Act 199 of 1973 was replaced by a new Forest Act of 1999.

The forestry policy was revised in 1998 and the new Act adopted in 1999 sought to establish the Zambia Forestry Commission (ZFC). However, the Act was never implemented since the Statutory Instrument (SI) to activate the Act was not signed by the Minister; thus the ZFC was not formed. The ZFC was to have enhanced the contribution of the forestry sector to national development and would have superseded the Forestry Department in the management and monitoring of forest resources (Vinya *et al.*, 2012).

Vinya *et al.* (2012) list several policies which directly or indirectly affect the management of forest resources and observe that the policy and legislative framework for Zambia, relating to the management of natural resources, are not properly synergised and suggest that this has encouraged the unsustainable use of forest resources. Forest offences were not recognised as serious crimes and

the penalties for illegal actions relating to forest resources are much lighter than those implemented for wildlife offences.

A countrywide forest assessment carried out between 2005 and 2008 (Kalinda *et al.*, 2008) concluded that the sustainable management of natural forests depended largely on the land tenure system. Similar results were found by Vermeulen (1995) in Zimbabwe. Most of the forest resources are found on customary land, but these are becoming fragmented through conversion of land parcels to leasehold tenure.

A time series comparison (Government of the Republic of Zambia (GRZ), 2015) indicates a significant deterioration in the integrity and quality of the national forests in Zambia. Forest cover loss between 2000 and 2011 is estimated at 8.65%. The report (Government of the Republic of Zambia (GRZ), 2015) states that in the southern and western parts of Zambia, conversion of forest land to permanent crop agriculture is the main driver of forest cover loss. Other factors identified in the 2015 report were:

- Encroachment through settlement and mining
- Significant reduction in the area under National Forest with more than 280 000 ha of forest being de-gazetted or excised
- Damage by fires caused by human activity
- Certain species of timber trees becoming locally threatened due to over exploitation.

Zambia made the following commitment in its Sixth National Development Plan (SNDP) 2011 – 2015:

“...The focus for SNDP will, therefore, be to reverse deforestation, wildlife depletion, heritage sites degradation, and land degradation. Further, the sector will enhance collaboration among players in natural resources management in order to ensure sustainable exploitation of natural resources...”

Much of the timber exported from Zambia is sourced from the Western Province and there is a strong presence of logging companies primarily from China. (Asanzi *et al.*, 2014). The study of the Western Province of Zambia criticized the labour practices of the Chinese companies and stated that corruption of authorities remains a problem in Zambia (Asanzi *et al.*, 2014).

4.3.2 Current framework: Zambia

Currently the Forestry Department falls under the Ministry of Lands, Natural Resources and Environmental Protection. Timber is regulated with several licences including concession, production, conveyance, timber merchant and export licences. Zambia requires the following documentation for the commercial trade of timber:

- Certificate of agreement between producer and merchant
- Invoice
- Clearance Certificate for timber removal
- Production Licence
- Conveyance Licence
- Phytosanitary Certificate
- Customs and Excise Declaration, and most importantly

- a Timber Export Permit.

Vinya *et al.* (2012) characterise trade in timber in Zambia as favouring foreign companies at the expense of local entrepreneurs. The latter struggle to acquire capital and access to international markets. The Forestry Department decreased timber concession periods from five years to two years and pitsaw licence periods from three years to one year, which according to Vinya *et al.* (2012), is inconsistent with the general philosophy of sustainable forest management. Due to the short concession period, no forest management plans have been developed and interest is focused on utilisation at the expense of forest management.

The export of timber from Zambia to China began in 2006 and by 2012 the export value of the timber had reached USD 4 250 000 (Weng *et al.*, 2014). The logging companies in Zambia usually have concessions of between 5 000 ha and 10 000 ha. Concessions are acquired by purchasing existing companies with concession titles or by entering agreements with existing concession holders who transfer their concessions (Weng *et al.*, 2014). The Chinese logging companies are dependent on the involvement of local, small-scale loggers who are an important part of the supply chain.

Weng *et al.* (2014) observed illegal practices by Chinese logging companies in Zambia—these included Chinese companies not implementing management plans, logging before receiving approval, encroaching on other concessions and customary land, and smuggling round logs via routes with fewer monitoring facilities. The complicity of government officials and the crucial role they play in enabling illegal activities is recognised by Weng *et al.* (2014). Poorly remunerated officials reportedly accept bribes at various checkpoints and allow illegally harvested timber to pass through. The sustainability of the Chinese investment and trade in Zambia is questioned by Weng *et al.* (2014).

The Forest (Amendment) Regulations of 2013 set fees and prices to be paid to government for the harvesting of indigenous forest produce. Also, of concern is the harvesting of Devil’s Claw in Western Province, especially in the Sioma-Ngweze NP since no policy and regulations had been in place until recently (Nyambe, 2013). The price set for a kg of Devil’s Claw is ZMK900 (this equates to about USD150 which far exceeds what the harvester would earn from selling of Devil’s Claw to a local trader or exporter) while that for a cubic metre of Kiaat, African Rosewood and Zambezi Teak timber is relatively low at ZMK1 250 (about USD200).

The new National Forestry Policy was adopted in 2014, and Parliament passed the Forest Act in 2015. Included in the Policy is recognition of local community and private sector participation, revised categories of protected forest areas, and emerging issues including climate change. The new Forest Act allows for participatory management of forest resources by local communities, local authorities and the private sector, the appointment of Forestry Officers as Public Prosecutors, establishment of the Forest Development Fund and the requirement that carbon will be recognized as a forest product.

Since the implementation of the Forest Act of 2015, three SIs have been implemented:

- SI no. 94 of 2015 – The Forest Regulations dealing with export of timber
- SI no. 50 of 2016 – The Forest Regulations relating to concessions licencing
- SI no. 31 of 2017 – The Control of Goods Order addressing (import and export of forest produce, as well as prohibition of importation).

In recent years, there have been several attempts to curb the trade in Mukula. The Forestry Department has placed several bans and a moratorium on the harvesting and trade of this species. Despite these efforts, there has still been widespread illegal harvesting and trade of this species taking place. Although Mukula timber is coming through the Namibian borders, the Eastern Province of Zambia, bordering Malawi and Mozambique, is one of the regions where the Mukula grows in abundance and large quantities were leaving by this route as well. The illegal harvesting of Mukula is a very sophisticated operation. The importers have devised complicated methods with the aim of exporting Mukula illegally, and of evading the payment of taxes and levies.

Because of increasing cross-border timber trade, Tanzania and Zambia signed an agreement on the Coordinated Conservation and Management of the Miombo/Mopane Forest Ecosystem on 29th June 2015. The main objective of the agreement is to promote collaboration and co-operation across borders for improved forest resource and timber trade management. In January 2016, the Ministry of Finance introduced a timber export tax of 40% on the value of the timber being exported. The value is defined by the price paid by the entity importing the timber in the country of destination.

In April 2017, the Government of Zambia suspended the export of logs of any timber species, including Mukula. The Minister of Lands and Natural Resources, Jean Kapata, said during a press briefing (NEWS, 2017) that in accordance with SI number 94 of 2015, timber export permits would only be issued for processed or sawn timber. This means that no round logs will be allowed to be moved beyond 100 km from any concession area; thus, Zambia has effectively closed its borders to in-transit container consignments of round logs. In accordance with the Forests Act (2015), control on harvesting and trade has been delegated to the provincial level. A Central Joint Operations Committee was formed encompassing several government law enforcement departments aimed at inspecting all trucks carrying timber. A total of 477 trucks were impounded between April and June 2017. Investigations indicated that 194 of these trucks were carrying illegal timber (V. Chiiba, pers. comm.).

In June 2017, the Government of Zambia banned the export of all timber from Zambia; hence timber harvested in Zambia can only be processed and used within the country.

5. USE OF TIMBER RESOURCES IN NAMIBIA

Namibia's arid environment and sparse tree cover is one of the reasons that timber resources are limited (Mendelsohn *et al.*, 2005). Many of Namibia's trees are not suitable for timber production because of their small size and bent growth form resulting from harsh growing conditions. A tree is considered to be suitable for the production of planks if its DBH is 45 cm or more. Apart from the fact that there are not many trees that meet the requirements for timber production, they are widely scattered making the commercial harvesting challenging (Mendelsohn *et al.*, 2005).

Under German colonial rule, forestry policy in Namibia concentrated on regulating the use of forest resources around developed areas, but this changed after 1925 (with the change to South African administration) towards forest exploitation. Most of Namibia's forestry resources are within communal lands, which also support 95% of Namibia's farming population. Mogoka *et al.* (2001) state that the main causes of forest destruction in Namibia relates to poverty and lack of livelihood alternatives, while Mendelsohn *et al.* (2005) assert that fire and the clearing of land destroys far more woodland annually than any other activity.

5.1 Forest resource inventories

In the 1980s, rough forest inventories were carried out in parts of the Kavango and Otjozondjupa regions. These were localised and focused on Kiaat and Zambezi Teak. Based on these inventories, concessions were awarded to commercial logging companies (MET, 1998b).

Starting in 1995, with support from the Finnish Ministry of Foreign Affairs, Department of International Development Cooperation (FINNIDA) and later the German Government, DoF conducted a series of resource inventories of forestry areas using standardised stratified systematic sampling methodology (MET, 1997a; MET, 1998b; Laamanen, 2003). For example, in the Zambezi (then Caprivi) region, a total of 900 plots of 30 m radius were measured. Most of these areas are either CFs or state forests. Resource inventories were also done in Nkurenkuru and Tsumkwe—communal areas where timber concessions had previously been granted to commercial logging companies.

These resource inventories have been reviewed and a summary of the percentage contribution of Kiaat to the total species composition of the area is presented in Appendix 1. Forest inventory studies carried out at four sites in Kavango East and West regions (Nkurenkuru, Mashare, Hamoye and Ncaute) by Pröpper *et al.* (2015) measured the percentage contribution of key species to basal area. The results are summarised in Table 4 below. When all inventoried areas are considered collectively, Kiaat contributes 3.49% to the species composition (FAO, 2010).

Site	% of basal area per site		
	Zambezi teak <i>Baikiaea plurijuga</i>	African Rosewood <i>Guibourtia coleosperma</i>	Kiaat <i>Pterocarpus angolensis</i>
Nkurenkuru	14	4	29
Mashare	12	11	9
Hamoye	17	10	11
Ncaute	0	8	15

Table 4: Contribution of three species to % of basal area in Kavango East and West Regions

Source: Pröpper *et al.* (2015)

The Forest Act No. 12 gazetted in December 2001 (GRN, 2001) clearly describes the importance of the Forest Management Plan as the basis for all management and use in classified forest areas. Forestry regulations are implemented through the permit system where permits are issued according to the specifications in the management plan for the forestry area. The management plans and the TAOs are based on the data generated through the forest resource inventory processes.

5.2 Timber resource use

In 1900, a forestry station was started at Brakwater outside Windhoek and Kurt Dinter, a well-known botanist, was appointed to the post. Most of the forestry activities focused on meeting the demands of the German settlers for wood including development of infrastructure such as railways and mines (Mendelsohn *et al.*, 2005). In 1914, a further ordinance prevented farmers from undertaking commercial logging.

In 1920, South Africa was mandated to administer the country and again the initial focus was on the cultivation of exotic timber species, but it soon became evident that this strategy was not feasible. The colonial policy of forest exploitation started in the 1930s in the Tsumeb, Otavi and Grootfontein areas (Chakanga *et al.*, 2001) when large volumes of timber were harvested for props and fuel for the local mines. As the mines developed, so did their demand for timber (Mendelsohn and el Obeid, 2005). For example, in 1926, 42 000 m³ were harvested (Mendelsohn *et al.*, 2005). The first permit to cut 1000 trees in Kavango was issued in 1933 and it is thought that during this time there was already illegal harvesting of timber taking place (Mendelsohn *et al.*, 2005). Commercial timber harvesting (for export) of Kiaat in the Mashare area of Kavango East region, started in the 1950s (De Cauwer, 2013). In 1972, 28 000 m³ of timber were cut. Total amounts harvested during the colonial period are not available. From the early 1970s to the late 1980s, the liberation war prevented the implementation of forestry development activities in northern Namibia (Chakanga *et al.*, 2001).

Historically, the harvesting of timber products was done within concession areas where a quota was allocated for a defined area and the concession awarded to an individual or company. The government derived revenue from the concession. Much of the timber harvested in these concessions was processed at sawmills in Katima Mulilo, Rundu and Tsumkwe (Bjorkmann, 1999). By the early 1990s, timber harvesting had declined. In 1990, a total of 8 850 m³ of timber was processed by these three sawmills (Mendelsohn *et al.*, 2005). The DoF stopped the cutting of timber for export in 1996 and then stopped all commercial timber production in Namibia in 2003 (Mendelsohn *et al.*, 2005). This was

done to provide an opportunity for Namibia to complete resource inventories to ensure that offtakes were sustainable. The three sawmills stayed operational until 2003 (Moses, 2013).

The impact of targeted saw-timber harvesting on the forest resources of Namibia has long been a concern (Pröpper, 2009), especially regarding Kiaat (Mendelsohn *et al.*, 2005; Moses, 2013). Despite the co-operative management approaches between DoF and the TAs and the devolution of management and benefits to members of CFs, Moses (2013) states that illegal logging was widespread in both gazetted CFs and non-gazetted communal lands. As low-tech mobile processing (Figure 10) is used by illegal loggers, products are poor quality and fetch low prices on the informal market (Moses, 2013). Kiaat trees are targeted by illegal loggers since the wood is a valuable timber species but it is light enough that it can be felled and processed using basic equipment and can also be transported more easily than the heavier Zambezi Teak logs (J. Mwikinghi pers. comm.).



Figure 10: Pit sawing of Kiaat *P. angolensis* logs

Source: K. Nott

Forest resource inventories completed by DoF inform forest management plans and the TAO of the area is calculated and documented. This in turn is the basis for issuing of permits for use of forest resources. According to the resource inventories (Appendix 1) the areas with the highest percentage of Kiaat by species composition are CFs in eastern Ohangwena, western Kavango Okongo and Katope. It is in these areas where harvesting of Kiaat is still taking place. Based on the forest resource inventories, TAOs were calculated (Table 5) and included in the forest management plans for each area (MET, 1997a). For example, for Okongo CF, the volume of Kiaat was estimated to be 48 100 m³ or 0,86 m³/ha and the estimated sustainable annual TAO of Kiaat was set at 324 trees for DBH class 15 to 25 cm and 592 trees for DBH class 25 to 25 cm (MET, 2003).

Area	Species	Annual TAO of Timber
George Mukoya CF	Kiaat <i>P. angolensis</i>	87
	African Rosewood <i>G. coleosperma</i>	64
Cuma CF	Kiaat <i>P. angolensis</i>	120
	African Rosewood <i>G. coleosperma</i>	50
	Zambezi Teak <i>B. plurijuga</i>	80
Katope CF	Kiaat <i>P. angolensis</i>	720
	African Rosewood <i>G. coleosperma</i>	480
	Zambezi Teak <i>B. plurijuga</i>	2654
Hans Kanyinga CF	Kiaat <i>P. angolensis</i>	594
	Zambezi Teak <i>B. plurijuga</i>	968
Likwaterera CF	Kiaat <i>P. angolensis</i>	13
	Zambezi Teak <i>B. plurijuga</i>	2
Mbeyo CF	Kiaat <i>P. angolensis</i>	140
Ncamagoro CF	Kiaat <i>P. angolensis</i>	120
Ncumcara CF	Kiaat <i>P. angolensis</i>	12
	African Rosewood <i>G. coleosperma</i>	14
	Zambezi Teak <i>B. plurijuga</i>	4
Ncaute CF	Kiaat <i>P. angolensis</i>	180
	African Rosewood <i>G. coleosperma</i>	200
	Zambezi Teak <i>B. plurijuga</i>	120
Okongo CF	Kiaat <i>P. angolensis</i>	916
	Zambezi Teak <i>B. plurijuga</i>	7727
Kwando CF	Kiaat <i>P. angolensis</i>	19
	African Rosewood <i>G. coleosperma</i>	13
	Zambezi Teak <i>B. plurijuga</i>	344
Sachona CF	Zambezi Teak <i>B. plurijuga</i>	33
Na Jaqna CF	Kiaat <i>P. angolensis</i>	248

Table 5: Total Allowable Offtake (TAO) as described in CF Management Plans

Pröpper (2009) reviewed five CF resource inventories from Kavango region and concluded that the majority of available timber trees in these CFs have low DBH. This means that there are extremely few harvestable trees in the CFs. Pröpper (2009) cites the example of the 15 218 ha Ncumcara CF with a sustainable yield of just 30 trees a year.

Many of the CF management plans were accessed and reviewed during the present study. Their format varies greatly and it is not clear whether standardized processes have been used to calculate the TAO of timber. In some cases, the resource inventory data used for this purpose are outdated and in some of the revised management plans and resource inventories, the calculation of TAO for timber is not provided.

Chakanga *et al.* (2001) describe the process of administering the forest revenue system in Namibia. collected through the permitting system. Charges for permits are set by DoF and collected by the District Forest officers. CFs obtain a block permit from DoF and then issue their own harvesting permits (Pröpper, 2009). The money is sent to the Regional Headquarters of DoF and then to the Ministry of

Finance. The charges on processed forest products include the cost of the permit, income tax paid by the harvester (if eligible) and value added tax (VAT). The current costs of permits issued by DoF are given in Table 6 below.

Type of permit	Cost
Harvest own use	NAD10 (USD0.73)
Transport own use	NAD10 (USD0.73)
Harvest commercial	NAD20 (USD1.50)
Transport commercial	NAD20 (USD1.50)
Marketing	NAD20 (USD1.50)
Export	NAD20 (USD1.50)
Poles own use	40 free then NAD2/pole (USD0.15)
Poles commercial	NAD2/pole (USD0.15)
Firewood own use	1 t free then NAD40/t (USD3)
Firewood commercial	NAD40/t (USD3)
Droppers own use	40 free then NAD0.50/dropper (USD0.04)
Droppers commercial	NAD0.50/dropper (USD0.04)

Table 6: Cost of DoF permits in Namibian Dollars (NAD = ZAR)

In 2001, the forest revenue collected by DoF was NAD420 000 (USD30 886) compared to the budget of the Directorate which was NAD14 849 000 (USD1 091 950) (Chakanga *et al.*, 2001). The bulk of the revenue was generated in Kavango Region from the sale of timber. The operational budget for DoF for the 2013/2014 financial year was NAD114 985 137 (USD8 455 690) and the forest revenue collected from sale of forest products was NAD521 734 (USD38 367) (MoF, 2015).

The first forest resource assessments were done over a two-year period (1997–1998) for two areas in Namibia by Bjorkman (1999). This report indicates that permits were issued to harvest 67 tons or 485 m³ of Kiaat in the study area and that illegal logging in 1997 was estimated at 21 929 m³. This study concluded that physical forest stock in Zambezi (then Caprivi) region decreased during these two years indicating that the forestry sector in this region was unsustainable.

Kojwang (2000) estimated the economic value of forest resources in Namibia at NAD1 058 million (USD77 802 400) annually with firewood and charcoal having the largest value of all the categories considered. Commercial logging of Kiaat and Wild Syringa contributed NAD2.4 million (USD176 489). Kojwang (2000) also stated that Namibia is a net importer of industrial wood and wood products and predicted that this would not change. Due to the limited timber resources in Namibia, all timber used to build and furnish modern houses is imported, mostly from South Africa and is either pine or processed chipboard. Both of these timber products are cheaper than indigenous timber (Mendelsohn *et al.*, 2005). In 2003, Namibia imported 25 210 t of wood products.

The completion of a national forest resource inventory enabled a set of preliminary forest resource accounts to be developed for the whole country (Barnes *et al.*, 2005; Barnes *et al.*, 2010). The total

woody volume for Namibia in 2004 was estimated to be 257 million m³ with a value of current forest use of NAD1.2 billion (USD88 244 700) and a contribution of 3% to the GDP. Namibia's standing forest assets were estimated to have a value of NAD19 billion (USD1 397 210 000) (Barnes *et al.*, 2005; Barnes *et al.*, 2010).

Availability of statistics on production, consumption and trade of wood products in Namibia is scant or non-existent (Chakanga, 2003). In none of the reports reviewed during the present study could any data be obtained about the total amount of wood removed or the total volume of wood for which permits have been issued. The FAO (2010) country report for Namibia assessing forest resources indicates that no detailed data are available on amount of wood removed. Similarly, Mendelsohn *et al.* (2005) highlighted that no data for timber harvested since 1990 in Namibia are available.

The study undertaken in Kavango Region by Moses (2013) found that Kiaat planks are the most important wood product. The average plank was found to have a length of 258 cm, width of 24 cm and thickness of 3.7 cm with a volume of 0.023 m³. The average volume of the 40 Kiaat logs harvested by Moses (2013) was 0.4 m³ and yielded 11 planks. The average total tree volume was 1.63 m³ which constitutes only 23% of the above-ground tree. Heartwood only planks were sold for NAD15 (USD1.10) more than planks with mixed heartwood and sapwood. The finished products produced by local carpenters included beds, doors, chairs and tables (Moses, 2013). Some of the main products manufactured in registered joinery businesses in Namibia are government office furniture and school furniture made from Kiaat (Chakanga, 2003).

Kojwang (2011) developed a method for estimating log volume. A simple non species-specific volume table based on diameter at 1 m from the large end of a log, and log length was produced. This can be used by DoF staff to estimate the volume of confiscated and other logs. The need to develop more species-specific saw log volume tables was identified. However, since law enforcement staff members of DoF often deal with planks rather than logs and many find it difficult to use the tables, wood volume is seldom used as a measure.

Based on their concerns about illegal harvesting practices, DoF officials undertook an investigation into illegal practices in the Kavango Region (DoF, 2012). During the period of one week, the law enforcement team observed eight instances of illegal timber practices—mostly residents harvesting Kiaat planks to supply to local commercial operators. In July 2012, the Director of DoF sent out a letter to all regional offices instructing that the issuance of all permits for sawn timber be stopped (G. Maggs-Kolling pers. comm., 2017). This moratorium remained in place until 2015.

5.3 Community Forests in Namibia

The Forest Act No. 12 gazetted in December 2001 made provision for the establishment of classified forests such as CFs. Currently, there are 32 registered CFs mostly in the woodland areas in the north-eastern parts of Namibia (Figure 11) with the three key timber species Kiaat, African Rosewood and Zambezi Teak. This is where 60% of Namibia's registered CFs are found. Several CFs have also been established in the arid areas of the Kunene region primarily to get legal rights to valuable non-timber forest products (NTFPs) such as the naturally exuded resin from the Omumbiri *Commiphora wildii*

trees. Some of the CFs have wildlife (game) resources and are also registered as communal area conservancies with the same (or overlapping) boundaries.

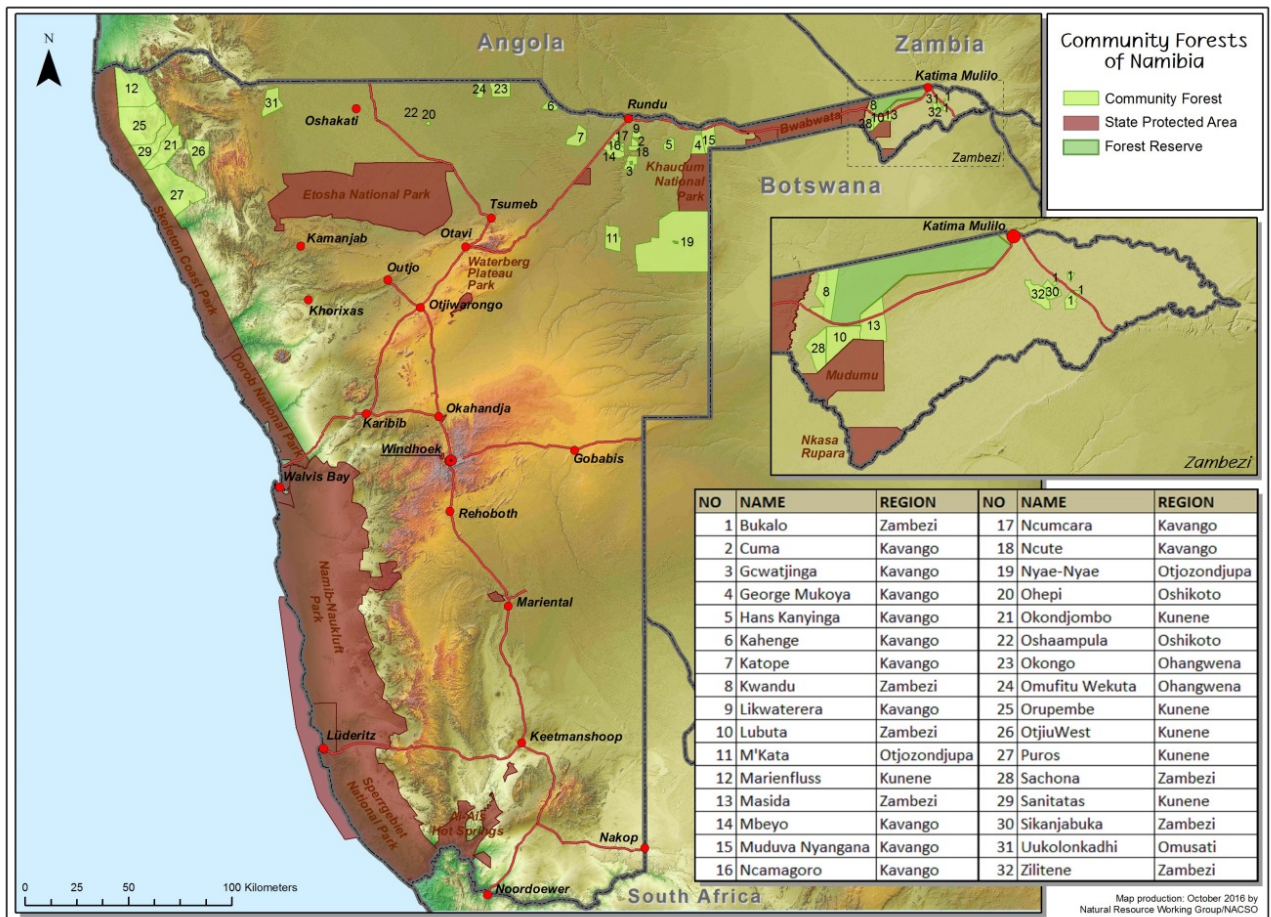


Figure 11: Map showing the registered CFs in Namibia. Source: Natural Resource Working Group / NASCO, October 2016

The establishment of CFs in Namibia was intended to assist communal areas residents to manage their forests and woodlands. Their economic rationale was that timber and NTFPs in these dryland forests could be used sustainably for domestic consumption. Furthermore, markets could be readily found and product sales would generate cash to cover operational costs. Any surplus was to be distributed as a benefit to incentivise community members to conserve their local forests and woodlands, with timber being the mostly likely source of income. However, low timber tree abundance in Namibia, even in the relatively timber-rich north-east of the country where Mendelsohn and el Obeid (2005) report “patchy” distribution, is a key limiting factor to timber exploitation. In the Zambezi Region for example, harvestable Zambezi Teak is largely confined to the Caprivi State Forest, with Kiaat and African Rosewood more widely but sparsely distributed.

Limits to harvesting this “patchy” distribution of timber trees within CFs are set by the TAO or annual timber quota calculated from data generated through a participatory inventory system. Field data are sent to Windhoek to be analysed. However, for technical and other reasons, this system does not work optimally. For example, in 2014-2016 during Namibia’s Community Forest Project, although four inventories were completed in Zambezi Region, no consolidated data were made available due to

computer and staff constraints. This, together with limited assistance to CFs post-gazetting, has hindered the exploitation of timber resources. For example, there has been no public tender for timber resources in CFs. This is unlike the conservancies' trophy hunting quotas where tendering is standard procedure.

Where timber quotas are available, they are generally at levels too low to attract private sector investment. On 16 February 2016, this predicament of insufficient timber trees to be profitable was illustrated at a forestry meeting in Katima Mulilo during the last phase of the Community Forestry in Namibia project. During discussions with the DoF staff members, Sachona CF members and a potential timber merchant from neighbouring Zambia, it was calculated that the merchant would need at least four times Sachona CF's annual quota of 56 Zambezi Teak trees to even start to make his operation viable. Even the combination of the timber quotas from four CFs in the area (Masida, Kwandu, Sachona and Lubuta) was not sufficiently attractive.

Contribution of Timber and Devil's Claw to total annual income of CFs (2014\2015 Financial year)			
Kavango region - Timber producing CFs			
Community Forest	Annual Income	Amount from Timber	% from Timber (excludes droppers, poles and firewood)
Mbeyo	N\$30 680	N\$13 750 (55 trees)	45%
Ncumcara	N\$ 7 126	N\$5 500 (22 trees)	7%
Ncamagoro	N\$ 4 660	N\$14 750 (59 trees)	27%
Kavango region – Devil's Claw (DC) producing CFs			
Community Forest	Annual Income	Amount from DC	% from DC
Katope	N\$135 298	N\$135 297	100%
Muduva Nyangana	N\$105 749	N\$105 749	100%
Zambezi Region – Devil's Claw producing CFs			
Community Forest	Annual Income	Amount from DC	% from DC
Lubuta	N\$ 315 352	N\$315 352	100%
Sachona	N\$457 982	N\$457 982	100%

Table 7: Contribution of Timber and Devil's Claw to total annual income of CFs

For the reasons mentioned above, the CF sales income (and the contribution of timber sales to CF income), has been modest and not as anticipated. Table 7 below shows that for the 2014/2015 financial year, sales figures for CFs relying on timber products in the Kavango region was very modest – with an average of about N\$ 54 000 each for Mbeyo CF, Ncumcara CF and Ncamagoro CF. The percentage contribution of timber to this figure varies from less than 10% for Ncumcara CF to nearly 50% with Mbeyo CF.

In the Kavango and Zambezi Regions, the biggest cash benefit to CFs has come in the form of NTFPs from Devil's Claw (*Hypargophytum procumbens* or *H. zehyeri*). In Katope CF and Muduva Nyangana CF, Devil's Claw sales generate on an average about ten times as much as the timber sales for Mbeyo, Ncumcara and Ncamagoro CFs. In the Zambezi Region, the current contribution of timber sales to CFs

is even less than in the Kavango region. In 2015 and 2016, there were few records of cash generated from timber sales³. One record came from Kwandu CF that cut 30 Kiaat trees but was only able to sell six trees for a total of N\$1 200. Like the Kavango region, CFs generate considerable funds from the sale of Devil's Claw as Table 6 above shows for Sachona and Lubuta CFs.

Thus, anticipated cash benefits from timber sales for CFs in Namibia have not been realized over the past 15 years and proposed sustainable offtake of timber has failed to generate a collective income that can make CFs economically self-sustaining. Even in the case of the timber producing CFs of Mbeyo, Ncumcara and Ncamagoro strategically located on the main road between Rundu and Windhoek, the funds generated are limited. In addition, the transaction costs of managing CFs are too high to be met by the limited collective income stream so there is little proactive forestry management e.g. regular patrols, allocation and monitoring of permits. For example, custom-made duplicate permit books promoted by the DoF cost about as much to replace as the potential value of the permits issued from it.

This has meant that many CFs rely on members of the CFMC to volunteer their time or only work during the Devil's Claw business season. As many CFMC members are subsistence farmers without other income opportunities, this is not a viable long-term option. In CF areas that are also conservancies, the best option for sustainability is to fully integrate CF activities with that of the conservancy. While not bringing about direct income, there is the need to increase awareness of the domestic value of timber and NTFP (grazing for cattle, fuel wood, building materials, medicine and food), as well as the massive indirect benefits of forests and woodlands (shade, wildlife habitat, soil nutrients, carbon absorption).

5.4 Over-utilisation and export of firewood

Although the Mopane tree is a protected species in Namibia, this has not stopped the issuing of permits for Mopane firewood since these are issued for collection of dead wood. However, permit data collected during this study indicates such collection are not restricted to dead wood (Figure 12). Mopane firewood harvesting permits have increased over the years and disquiet has been growing over the harvesting of live mopane trees for sale as firewood. Both the CFMC and the TA have expressed concern to DoF both about the extent of harvesting and high volume exported from Namibia to South Africa via the Ngoma border post.

In response to data made available during the initial stages of this study indicating collection of live Mopane for firewood, an investigation by the DoF staff in Zambezi region was undertaken (DoF, 2016). The area studied by DoF was from the emerging Katima Mulilo CF situated on the B8 road linking Katima Mulilo to the Ngoma border post with Botswana. The DoF findings corroborated the initial results of the TRAFFIC investigation. Despite these results, firewood permits are still being issued by the authorities.

There are also examples of Mopane being used for charcoal production, which is also prohibited in Namibia. The DoF study (2016) established that there are 46 sellers of firewood at 28 different

³ Data on previous Timber sales are limited. Lubuta CF did sell some teak logs in 2010. Before the 2012 ban on logging in communal areas, Timber sales were also recorded from Masida, Bukalo and Izimwe CFs. One Masida CF member estimated an amount between N\$45 000 and N\$ 70 000 over a few years.

locations and approximately 70% of these outlets are selling firewood that has been cut from live trees. The estimated value of this trade is around N\$2 million per year. It appears that most traders along the B8 road did not have valid permits, with only about 33% of outlets having legal permits to harvest and sell firewood. To address this matter of using live trees instead of dead wood for firewood it is recommended that capacity of the CFMC and other members to regulate the firewood sales needs to be built in this area. Improved permit monitoring by DoF Katima Mulilo is required to assist in regulating this trade.

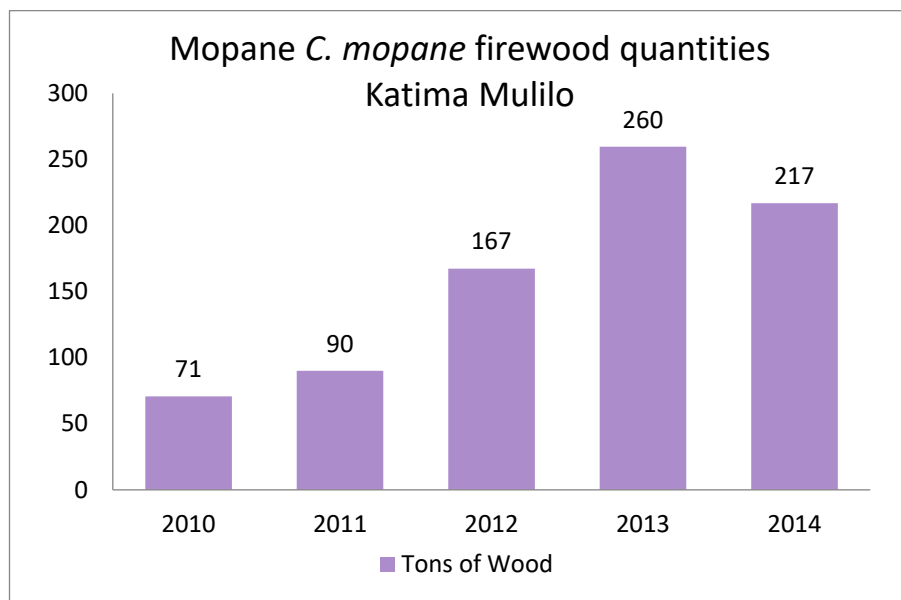


Figure 12: Mopane *C. mopane* firewood sales quantities from Katima Mulilo

5.5 Analysis of timber permit data

Results from the analysis of permit data indicates that most of the timber being exported from Namibia is being extracted in Angola and Zambia, transported through Namibia as an in-transit commodity, *en-route* to destination markets in South Africa and China. The main point of entry from Zambia to Namibia is through Sesheke to Katima Mulilo (Figure 13) then on to Walvis Bay for export via sea. There are various points of entry from Angola including Divundu, Rundu and Nkurenkuru (Katwitwi) from where the timber is transported to South Africa via Windhoek (Figure 13). From Zambia, 6 081 m³ of Kiaat, 7 336 m³ of Zambezi Teak and 19 247 m³ of African Rosewood was exported via Namibia between 2010 and 2016. From Angola 20 047 m³ of Kiaat, 1 131 m³ of Zambezi Teak and 282 m³ of African Rosewood was exported via Namibia during the same period. Thus, based on the available data, 32 664 m³ of Zambian timber and 21 460 m³ of Angolan timber was exported via Namibia during these 7 years. However, these quantities are likely to be underestimates considering the extent of illegal consignments apprehended at roadblocks within the country (V. Chiiba, pers. comm.) and other illegal acts recorded by Weng et al. (2014).

In addition to determining timber quantities, export documentation from country of origin was also gathered. Documentation was found to be inconsistent and varying in quality. In general, the origin of consignments within countries is not clearly stated and the destination of consignments is unclear. It is likely that governments are losing revenue from illegal logging and incorrectly documented exports, while forests are under threat from illegal timber exports. The study highlighted the extent of the

cross-border trade and the urgent need for regional collaboration to ensure sustainable and legal trade.

In Figure 13 below the quantity of Kiaat timber for which permits were issued in each of the DoF offices per year is presented. Rundu (Angola border) and Katima Mulilo (Zambia border) offices were responsible for most of the Kiaat timber permits for most years apart from 2012 when the Bagani office issued permits for over 6 000 m³ of timber.

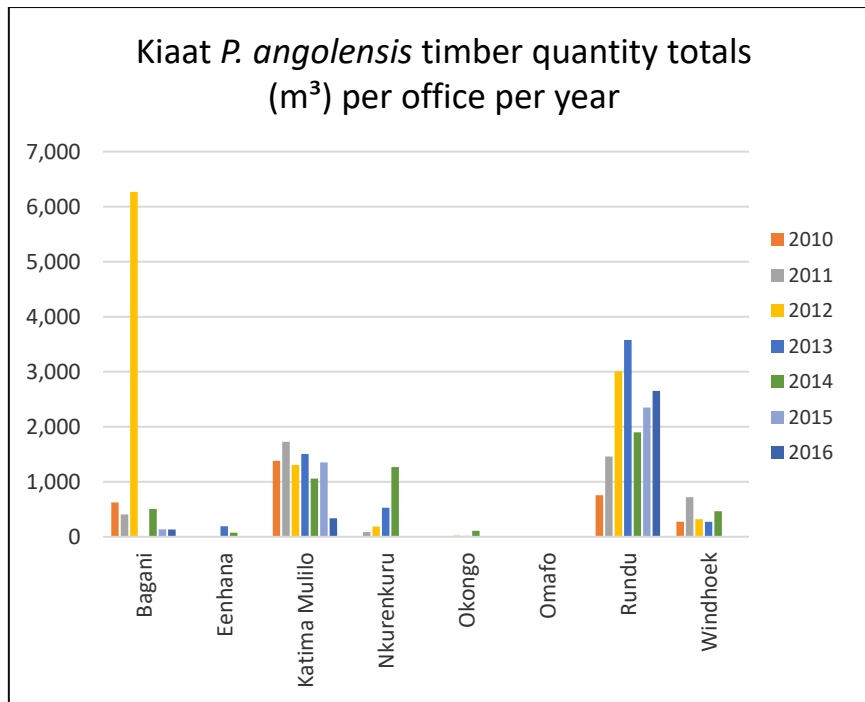


Figure 13: Kiaat *P. angolensis* timber quantity totals (m³) per DoF office per year

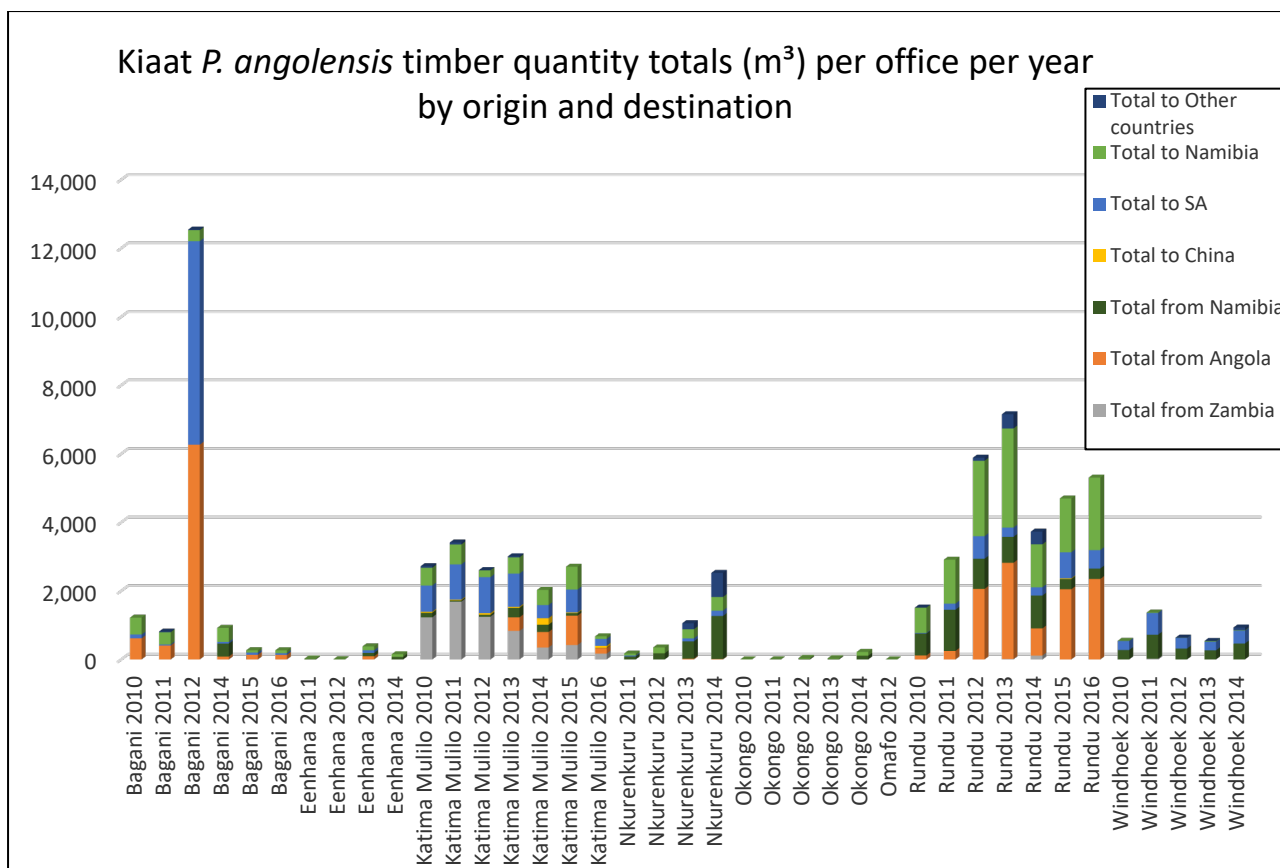


Figure 14: Kiaat *P. angolensis* timber quantity totals (m³) per DoF office per year by origin and destination

When the data presented in Figure 13 is disaggregated in Figure 14, it becomes evident that only small quantities of Kiaat timber are being harvested in Namibia with most originating in Zambia and Angola and subsequently being transported through Namibia to South Africa and elsewhere. While Figure 14 indicates that some of the Kiaat timber from Zambia and Angola remains in Namibia it is not clear if this is the case because their final destination was not traceable according to Namibian permit data.

The quantity of Zambezi Teak timber for which permits were issued in each of the DoF offices per year is presented in Figure 15 below. Most permits were issued by the Katima Mulilo (Zambia border) office.

Zambezi Teak harvested in Zambia is mostly being exported to South Africa (Figure 16). Some of this timber is being processed within Namibia such as for decking for local use and export. Since the permit system does not allow for full traceability of timber consignments within Namibia it was again not possible to determine the role of South Africa in this trade.

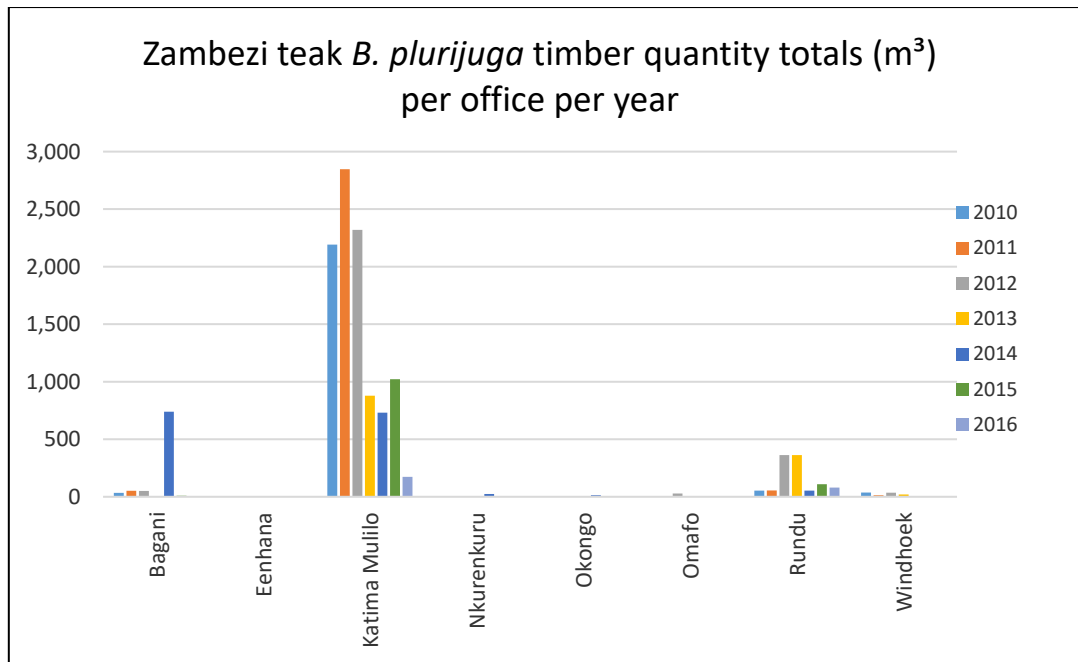


Figure 15: Zambezi Teak *B. plurijuga* timber quantity totals (m³) per DoF office per year

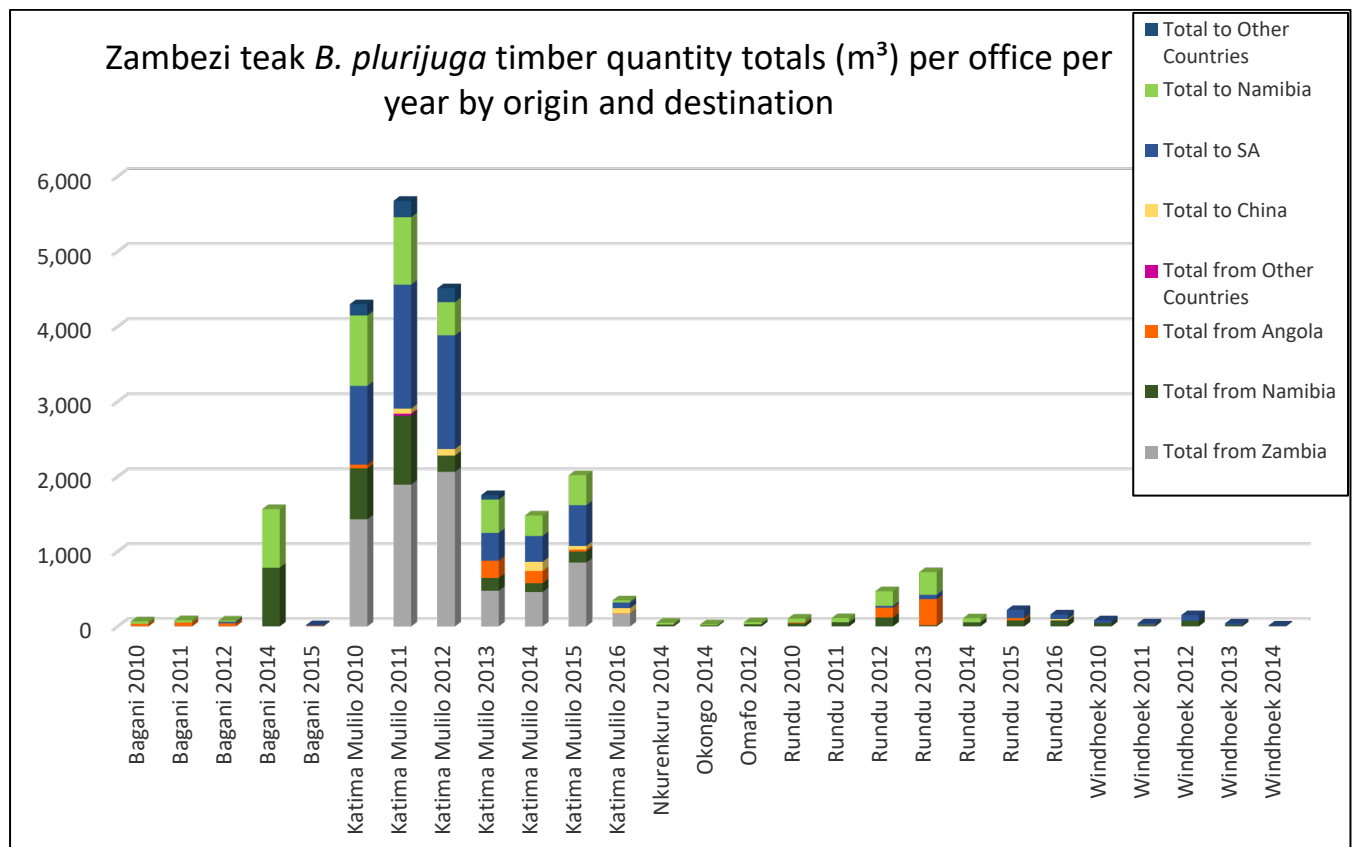


Figure 16: Zambezi Teak *B. plurijuga* timber quantity totals (m³) per DoF office per year by origin and destination.

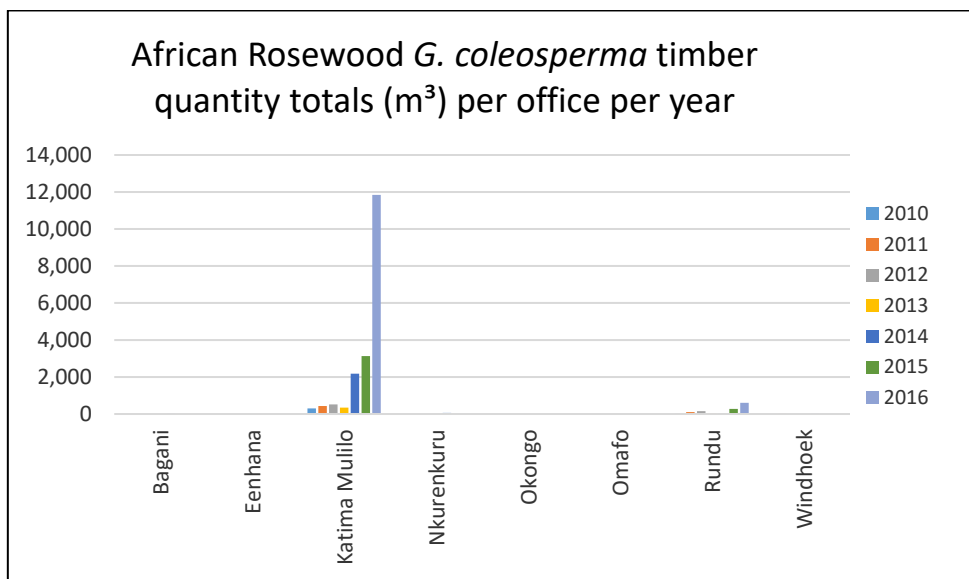


Figure 17: African Rosewood *G. coleosperma* timber quantity totals (m³) per office per year

Almost all the African Rosewood *G. coleosperma* permits were issued from the Katima Mulilo (Zambia border) office (Figure 17) with a sudden increase in the quantity in 2016. African Rosewood timber quantity totals (m³) per office per year by origin and destination are presented in Figure 18 below. This timber is being harvested in Zambia and exported to China via Namibia. The increased volumes documented from 2014 to 2016 requires further study to establish the reasons for the spike. More recent data is also needed to ascertain if the increase was sustained.

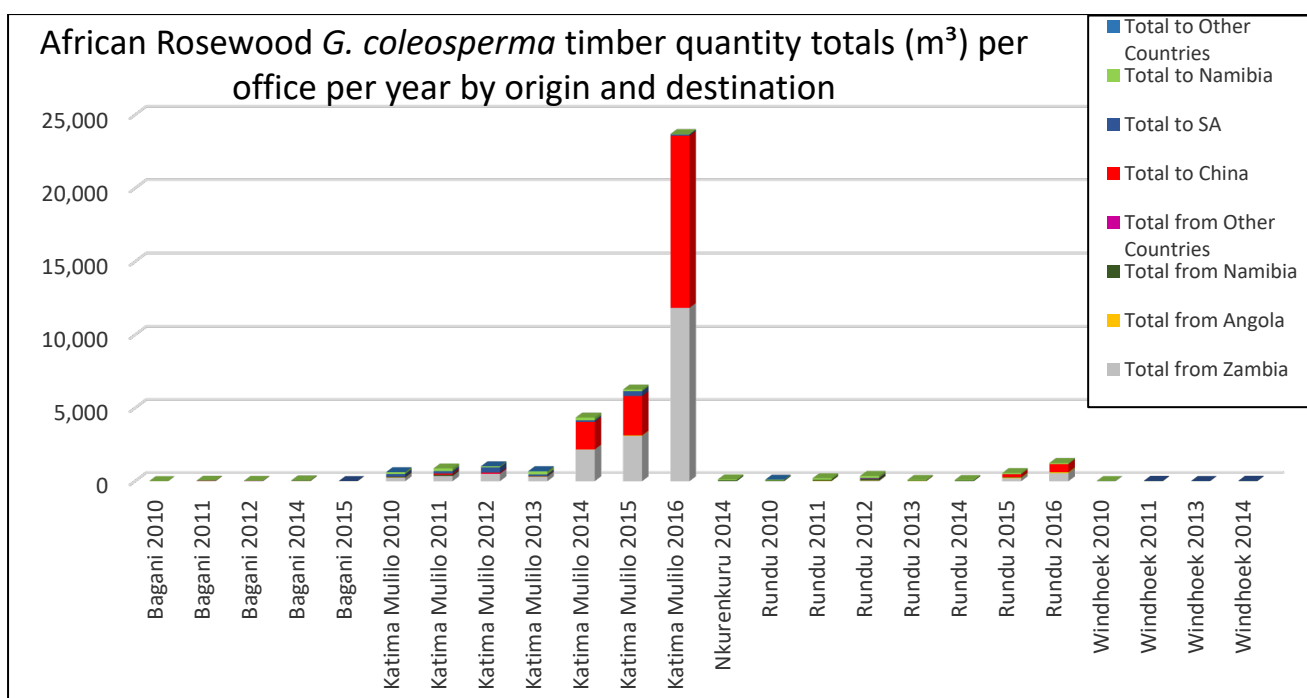


Figure 18: African Rosewood timber quantity totals (m³) per DoF office per year by origin and destination

As from 2015, the Namibian DoF changed their permitting system. With the new system, ‘in-transit’ permits have been introduced for timber only being transported across Namibia and where no wood is being imported into the country itself. In- transit timber data was collected from the inception of the new permit system from the Rundu and Katima Mulilo regional offices. This data has highlighted the large quantity of Mukula timber originating in the DRC in-transit through Zambia and Namibia to Walvis Bay, from where it is shipped to its destination in China.

Year	Quantity (m ³)	Origin Mukula		Destination Mukula	
		Zambia	DRC	China	Other
2015	1 382.4	221.7	1 160.7	1 382.4	0
2016	27 807.9	4 760.4	23 047.5	27 807.9	0

Table 8: Summary of the Namibia Mukula *P. tinctorius* permit data for 2015 and 2016

6. CROSS-BORDER CHALLENGES

The illegal trade of timber from southern African countries has been well documented in numerous studies/reports, has raised much concern and has triggered government interventions especially during the past five years. There are significant lessons to be learnt across the region and between these countries sharing similar forestry, economic and trade profiles. The dynamics of this trade are changing rapidly and what has happened in the past may not be a useful guide for what might be expected in the future. It is likely that governments are losing revenue from illegal logging and incorrectly documented exports, and forests are under threat from illegal timber exports (Anstey, 2016).

Regarding the timber trade dynamics in southern and eastern African countries, Anstey (2016) concludes that:

- There remains significant illegality in timber traded within region and for export beyond
- China is the most significant export market for indigenous natural hardwood timber. Although overall demand for timber from African sources is increasing the dynamics of China's timber requirements are very much driven by market conditions and therefore fluctuates from year to year.
- There is very limited evidence of sustainability in state timber forest harvesting and trade measures in all national cases. Evidence of devolution to participatory forest management approaches (CF management and joint forest management) and private sector concessions with certification have, however, demonstrated a successful approach to sustainable timber harvesting and trade
- There is congruence between illegal timber and illegal wildlife trade in terms of process, geography and solutions
- There are various bilateral MOUs and regional declarations or protocols that can increase opportunities for applied actions and sustainable timber trade.

Meanwhile, the governments of most African countries (including Namibia, Angola and Zambia) and China have agreed on the FOCAC Beijing Action Plan (2018) which includes text on mutual cooperation in paragraph 4.6.4 of the Action Plan, i.e.: *“The two sides [i.e. China and Africa] will promote cooperation on sustainable forest management, and conduct practical cooperation in the trial, demonstration and extension of programs between Chinese and African governments and research institutes to achieve sustainability in forest management and contribute to global ecological governance.”* The Government of China has also committed cooperation assistance towards implementing the FOCAC Beijing Action Plan.

6.1 Identifying cross-border challenges

Prior to this study, the DoF did not have a process in place to aggregate the data from permits issued from the various offices throughout the country. The previous permit system also used the same permit form for all permit types, whether for instance, it was the sale of 10 poles or the transport of 22 tons of sawn timber. The simple data processing used during this study highlighted useful findings on timber trade dynamics in Namibia. Most importantly, it provided evidence that the timber being exported from Namibia is not harvested in the country but is in-transit through Namibia from Angola, Zambia and the DRC.

When considering the timber trade, Anstey (2016) identifies ‘clusters’ of countries with similar timber trade profiles:

- **Entrepot and transit countries** (countries importing natural timber for onward export often beyond region or countries through which timber is transported *en--route* to its destination)
- **Production countries** (countries with significant and often unregulated exports to other countries in-region or elsewhere)
- **Mixed countries** (importing from other countries in-region for domestic needs plus some transit, re-export and own export)

From the data presented in Section 5.5, Namibia is an entrepot country since almost all the timber exported from Namibia is harvested in other countries and is merely in transit through Namibia (Figure 19).

While Angola is considered a production country only, Zambia is both a production country and to some extent a mixed country, and recently also an important transit route for timber from the DRC being exported through Namibia. However, this status has recently changed with the closing of Zambian borders to the transport of container consignments of round logs primarily from the DRC.

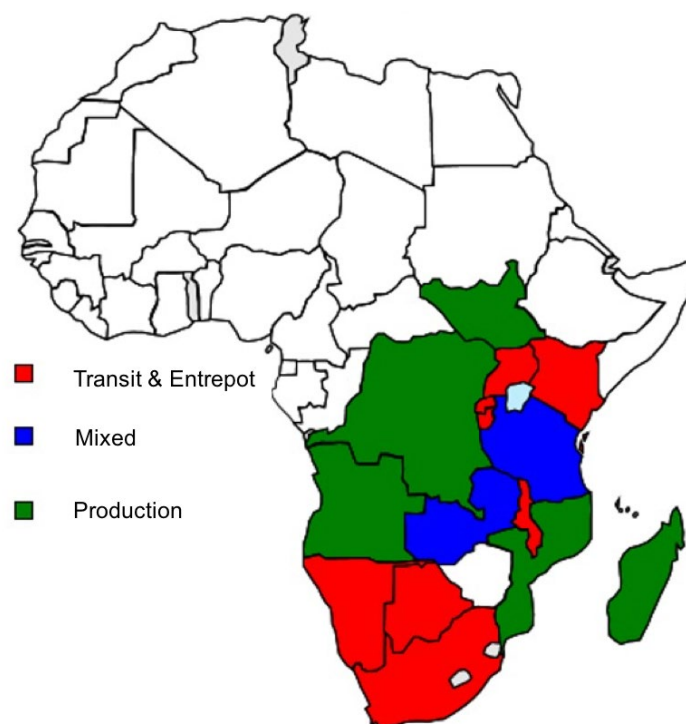


Figure 19: Map showing countries with similar timber trade profiles (Source: Anstey, 2016)

Zambia not only harvests and exports its own timber resources but also needs to manage the in-transit timber trade. Forest resource management challenges identified in Zambia and cross-border timber trade from Zambia (TRAFFIC, 2015a) included the need for:

- Data management to be improved. While much data have been collected in Zambia, it is not readily available to inform management decisions, and this is especially relevant for transboundary data
- Strengthening of the weak management and monitoring systems for timber harvesting and timber trade activities
- Standardization of permits within the country and across borders to facilitate a better understanding of trade documents. Product descriptions and particularly consignment, descriptions are currently problematic with different standards being applied in different countries (e.g. kg, m³, planks). This lack of standardization results in difficulty in detecting forged documents.
- Systems for verification, compliance and monitoring within Zambia and across borders need to be improved and more capacity and resources need to be allocated to these functions.

Angola is a production country and export of commodities generally takes place from one of its well-developed ports. Forest management and timber trade challenges identified (TRAFFIC, 2015a) were especially in relation to non-compliance of customs regulations using non-gazetted border posts and the lack of staffing capacity. Key issues are as follows:

- Timber products exported are currently being undervalued which results in a loss of revenue
- There are only a few formal border crossings and only one designated border post (Katwitwi), hence it can be deduced that a lot of the timber is currently being smuggled into Namibia without payment of the relevant dues
- There is limited verification before Phytosanitary Certificates are issued since officials seldom see the consignment
- The current forestry department staffing structure is inadequate. Staff members are needed on the ground to monitor the management of forest resources, the harvesting of timber, the processing and then the exportation. Currently, there are no forestry officials at any of the Angolan border posts.
- The timber producers are often also the exporters which makes it difficult to understand and monitor the value-chain.

Cross-border challenges identified in the current study relate to the timber consignment documents presented to border post officials. A variety of documents were found to be in use, with lack of consistency of information. Often, the origin and/ or destination of consignments within countries was not clearly stated. Documents had often been photocopied repeatedly so that the information was illegible and their authenticity questionable. Some of the documentation from both Angola and Zambia was fraudulent especially when it was observed that CITES permits were issued for non-CITES species. The Namibian DoF permit system does not have a report back process so it is possible that the same permit could be used repeatedly. However, the biggest challenge identified was that the border officials did not know the permit requirements of neighbouring countries – which documents were required and what they should look like.

The designated border posts through which timber from Zambia and Angola should enter Namibia are Wenela and Katwitwi respectively (see Figure 20). These posts are equipped on both sides of each border to provide the required services for legal import and export of timber. However, this study

found that timber is entering Namibia through several non-gazetted border posts where only a police official is on duty, without the systems to comply with all the cross-border requirements. For example, some Angolan timber traders are reported to receive special permission from Namibian Customs to enter Namibia through non-gazetted border posts provided they make the required payments at the nearest Ministry of Finance office. This is done to assist traders accessing timber from the Luengue-Luiana NP in Kuando Kubango Province to transport it by the shorter route through Namibia where the road infrastructure is better rather than the longer and more difficult route through Katwitwi. The result is that these timber consignments often enter Namibia without the required DoF permits. Trucks entering Namibia through the non-gazetted border posts, thus without obtaining required documentation, are often stopped and their loads confiscated at one of the roadblocks along the main routes within Namibia.

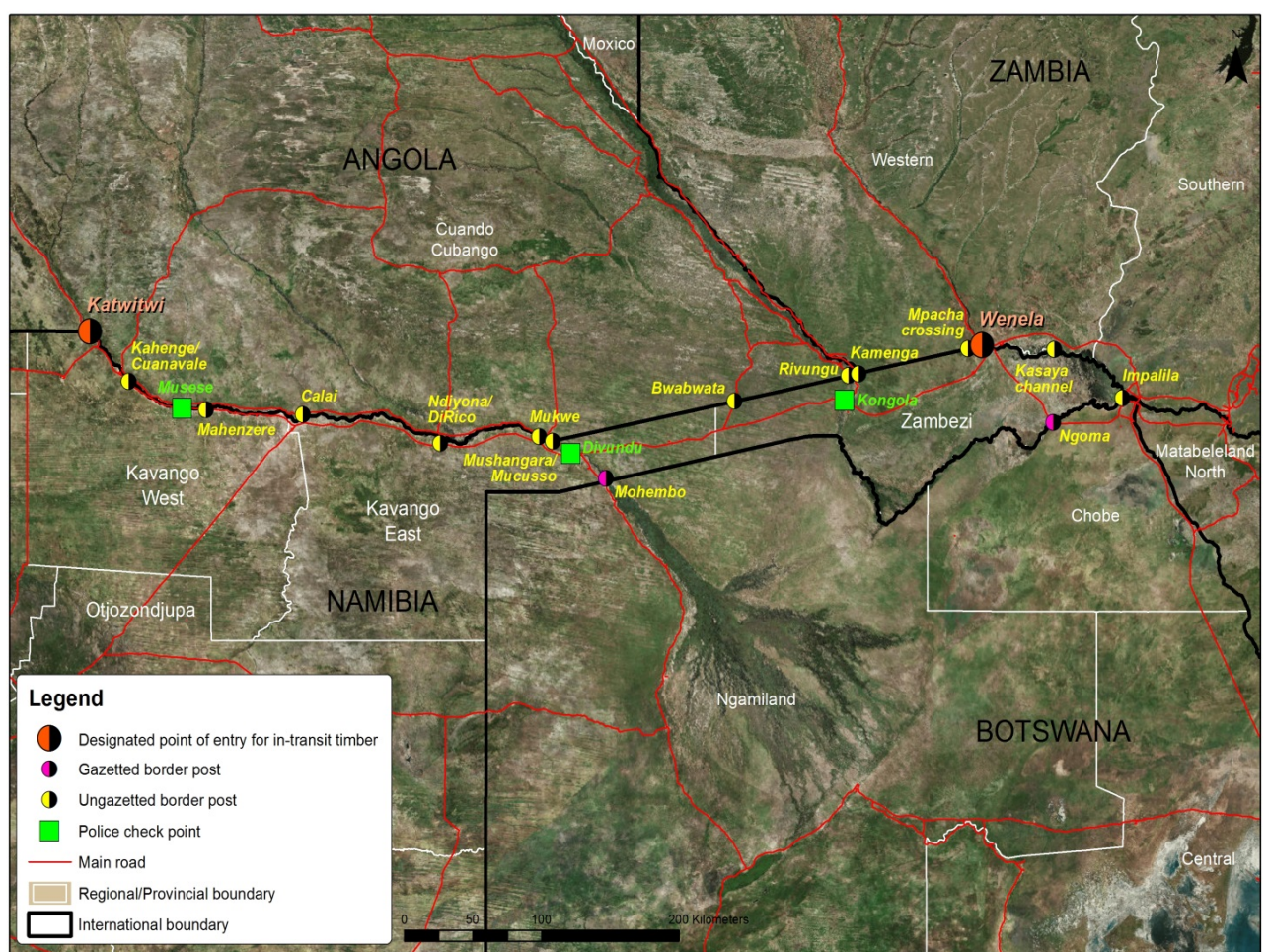


Figure 20: Map showing the designated entry points for timber consignments into Namibia in relation to gazetted and non-gazetted border crossings (*Source: K. Nott, 2019*)

Another difficulty regarding cross-border timber trade was found to be accurate evaluation of loads of timber by inspectors before issuing permits. Not only did the documentation often vaguely describe the load in terms of number of planks or blocks, not m³, but many government officials expressed difficulty both in estimating consignment volume and confirming species identification. Furthermore, when the consignment is loaded into a sealed container, it is difficult to inspect the whole

consignment. Regulations do allow for mandated government officials (e.g. Customs) to open sealed containers for inspection and then to be resealed (Figure 21) but there is seldom the capacity to check or unload the whole container.

The Zambia-Namibia Wenela border post has a scanner for container trucks (Figure 21). Unfortunately, the scanner cannot always be used effectively due to lack of skilled staff besides challenges with the maintenance of the machine itself. At the time of our research the scanner was not functioning due to lack of availability of a suitably qualified technician. During the past year, the pressure on this border post has been considerable with the sudden increase in container trucks from the DRC. During 2016, it was noted that at least 10 trucks carrying timber from Zambia and the DRC drove the more complicated route from Zambia, crossing into Botswana on the ferry at Kazangula, then through Botswana to enter Namibia at the Ngoma border – presumably to evade the scanner at Wenela border.



Figure 21: Containers are opened, inspected and then resealed, or the contents scanned
(Source: K. Nott)

Besides processed timber blocks or planks, an issue repeatedly identified during this study was the cross-border movement of round logs across borders. In the Namibian and Zambian legal frameworks, it is clearly stated that trade of round logs is illegal and that timber must be processed into planks before it leaves the respective countries. In April 2017, the Zambian government closed its borders to trucks carrying round logs and impounded several hundred trucks with illegal timber. Thus, trucks from the DRC are no longer able to transit through Zambia and Namibia to export timber from Walvis Bay.

6.2 Responses to some of these challenges

International agreements such as CITES have set the stage for increasing commitment from Member States to the conservation of their forests. However, it is largely through improved governance at the

national level and supported by regional collaboration that effective forest management, which considers the local context, can be implemented.

The scope of the initial study design was updated to include responses to the challenges identified. These responses discussed below were developed through a consultative process by stakeholders and were implemented jointly with the DoF staff.

6.2.1 Meeting between Forestry Directorates of Angola, Namibia and Zambia

The first workshop on collaboration in forest management and timber trade was held in Windhoek, Namibia in August 2015. This allowed for representatives from Angola, Namibia and Zambia to share challenges and collectively identify practical solutions. Attendees included the Directors of Forestry from the three countries (Figure 22), forestry officials and non-governmental organizations. The participatory workshop provided a forum for the exchange of information and experiences, and collaborative planning of activities targeted at reducing the unsustainable and illegal trade of timber within and from the region (TRAFFIC, 2015a and 2015b).

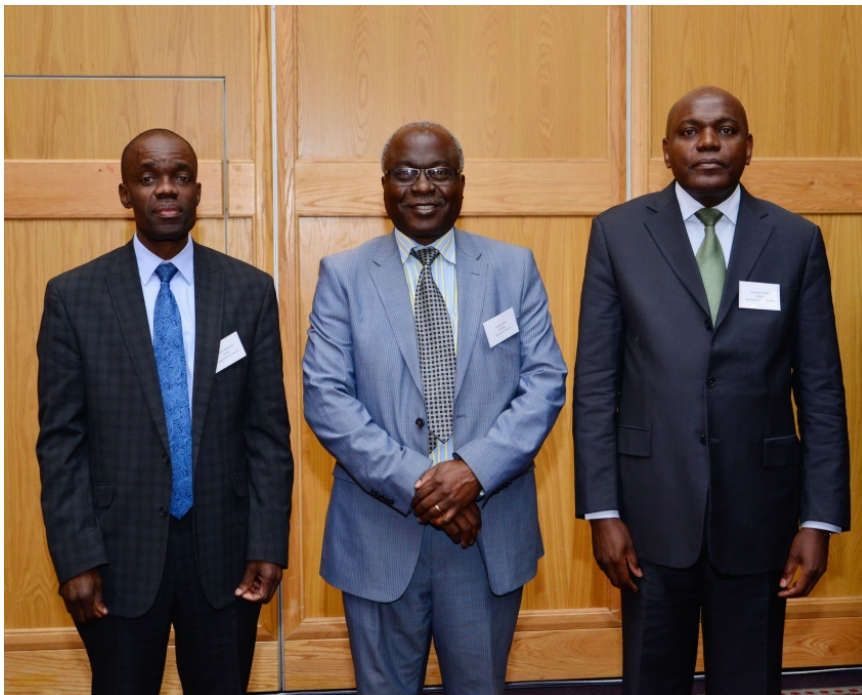


Figure 22: Forestry Director Mukumba (Zambia), Director Hailwa (Namibia) and Director Veloso (Angola) photographed at the August 2015 timber trade meeting in Windhoek

Source: A. Nott

Prior to the workshop, team members of this study had collated and analysed all permit book data on timber trade from eight regional offices in Namibia. These data indicated the amounts of timber sourced from Zambia and Angola and transiting through Namibia, the entry points and the routes of the timber consignments through Namibia. The analysed data were presented at the meeting,

highlighting the extent of the cross-border trade and the urgent need for regional collaboration to ensure sustainable and legal trade.

Key collaborative action themes emerging in response to the identified challenges are presented in Figure 23 below. An Action Plan (Appendix 3) was developed from the identified thematic areas and criteria were set for inclusion, namely activities that addressed shared challenges dealing with cross-border trade of timber. Means of implementation of selected Action Plan items are described in the sections below.



Figure 23: Key themes for collaborative action

Source: TRAFFIC (2015a)

6.2.2 Drafting of MOU for collaboration

To facilitate the desired collaboration and sharing of information, the first action point was the development of an MOU to formalize co-operation. This MOU was drafted immediately after the August 2015 workshop and reviewed by the three Directors in September 2015. It was subsequently reviewed and adapted by the Namibian Office of the Attorney General and at the time of drafting this report is progressing through diplomatic channels for signing by the three countries. The MOU and Action Plan will be implemented by a Joint Technical Committee.

The MOU highlights the following areas of co-operation:

- Transboundary collaboration on law enforcement to reduce and/or to eradicate illegal logging, trade and export of timber
- Exchange of information and data on monitoring of transboundary trade of forest products, including non-timber forest products
- Sustainable forest management
 - a) Management of forest concessions
 - b) Community Forest Management
 - c) Forest certification of timber and non-timber forest products (NTFPs)
 - d) Beekeeping
 - e) Management of forest fires

- f) Promotion of sustainable production and consumption of biomass energy (charcoal, firewood)
- Training and capacity building
 - a) Exchange and dissemination of laws, regulations and policies guiding the forestry sectors in the three countries
 - b) Provide technical assistance to develop institutional capacity in addressing forest issues
- Climate change adaptation and mitigation
- Experience, expertise exchange and lesson learning on Payments for Ecosystem Services and Reduced Emissions from Deforestation and Degradation Initiatives.

The difficulties experienced by the Angolan and Zambian colleagues in obtaining the required authorization to travel and attend the cross-border workshops highlights the importance of the MOU between the three countries. It seems that if the MOU were already in place, this would have facilitated the requests for authorization to participate in these workshops and in other cross-border discussions and activities.

6.2.3 Timber trade directory and cross-border permits booklet

Communication between the country's various government ministries and departments involved in the law enforcement of the timber trade regulations can be challenging. This is true for communications within a country and between neighbouring countries. The need for a directory of contacts related to this trade was listed as a priority in the Action Plan. Contact details of key personal from all sectors having a role in forest and timber trade management were collected and a directory produced and distributed towards the end of 2016 (Appendix 4). The directory is regularly updated and will be periodically distributed electronically to all parties. A revised version of the directory was distributed in June 2017.

A booklet illustrating examples of the documentation and permits required for timber trade between Zambia and Namibia was produced (Appendix 4). Examples of the new permits from Zambia and Namibia (blank) as well as examples of how these should be completed were compiled into a booklet and this was distributed to all relevant stakeholders in Zambia and Namibia in June 2017.

6.2.4 Cross-border workshops and information sharing

When the permit data collection process was completed, posters illustrating the results were produced. DoF offices that contributed data to this study were visited and feedback given (Appendix 2 and Appendix 4). This opportunity was also used to share ways in which the quality of the information recorded on the permits issued could be improved.

Two workshops were held in April 2016 (one in Katima Mulilo and one in Rundu) which aimed to initiate some of the actions in the Action Plan (2015), with emphasis on those activities which has been identified as requiring immediate attention. The workshops were attended by a range of stakeholders including officials from DoF, MAWF, MoF, the Namibian Police Special Forces and customs officials from various border posts. The workshop proceedings were produced and distributed (IRDNC, 2016).

During the workshops, there was much discussion about the sequence of events in clearing a timber consignment from Zambia on the Namibian side of the border post, particularly the sequence of DoF inspection, issuing of transport permit, and release of the consignment by customs officials. Since DoF does not have a permanent presence at the border post, truck drivers are required to travel into Katima Mulilo to obtain the DoF transit permit before the customs officials release the truck. With the increased number of container trucks passing through the Wenela border post, trucks were released on the understanding that they would then stop at the DoF office and obtain a permit. However, trucks were not complying with this instruction. A wide range of stakeholders was involved in the ongoing discussions to reach consensus on the sequencing of the border clearance processes. Once the sequencing issue was resolved, the procedure was captured on a large sign post which was erected at Wenela in May 2016 (Figure 24).



Figure 24: Stakeholders standing at the Wenela border post timber import procedures sign

Source: A. Nott

At the workshops, it became clear that there are issues surrounding the importation of raw Zambian Devil's Claw *Harpagophytum zeyheri* material into Namibia. It is likely that many of the bags of Devils Claw are illegally being brought into Namibia from Zambia, without paying the required border fees. The SI for Zambia is currently under review so it is possible that this situation will change soon. While there was some movement of Devil's Claw from Angola into Namibia between 2013 and early 2015, Angolan Customs officials indicated that this was no longer allowed.

The difficulty in identifying the timber being traded was frequently raised as a challenge. Timber information booklets were printed and provided to all stakeholders, and additional copies were left at DoF offices. To assist further with identification, timber identification wheels were manufactured with

several examples of each of the main types of timber illustrating variations in the timber. These wheels are portable and can easily be carried to a truck or to a field site for reference. The photograph in Figure 25 was taken at the Murarani checkpoint in September 2016 where the wheel was witnessed by the study team being used to identify an illegal consignment of planks. The consignment was confiscated a short while later.



Figure 25: Timber wheel being used to identify the timber species during an inspection
(Source: K. Nott)

Cross-border units and patrols were also discussed at the workshops, and the NAMPOL representatives indicated that they would welcome the participation of DoF officials in law enforcement. Namibian Customs officials also indicated that twice a year (typically in May and November) they conduct cross-border patrols, with one week spent in each country (Namibia, Botswana, Zambia and Angola) to create awareness and patrol the borders. NAMPOL, MET, Ministry of Fisheries and Marine Resources (MFMR), DAPEES, Immigration and Customs and Excise are all currently involved in the patrols. The areas identified as top priority for joint patrols include the Caprivi State Forest (the area East of Kongola) as well as the Kasai Channel (bordering Kasika and Impalila).

The possibility that there is unauthorised re-use of DoF permits was a further workshop discussion point. Since there is no requirement for permits to be returned or report back given on their use, a trader could use the same permit for multiple consignments of timber, especially for transport within Namibia. Unrelated to the re-use discussion, the relatively low cost of the DoF permits was also discussed and suggestions about increasing the costs of the permits (especially when for commercial rather than own use) were considered.

It was also agreed that the processes for the management of Angolan forest resources require strengthening. Timber harvesting in Angola is seasonal, usually occurring between May and

September each year. The newly established Luiana and Mucusso NPs and the legality of timber harvesting from these areas is unclear and requires investigation.

The broadly representative cross-border workshops were able to draw attention to lack of awareness and knowledge of the Namibian DoF timber trade regulations by important groups within the law enforcement sector. This was particularly true of NAMPOL and SFF staff members often the only officials at the smaller non-gazetted border posts, and who had received insufficient training on regulations. After the workshops, the urgency of sharing information was underscored and plans were initiated for sharing information with staff at non-gazetted border posts.

6.2.5 Non-gazetted border post information sharing

It was identified during the August 2015 workshops in Windhoek that there was a dearth of knowledge on possible movement of timber through ungazetted border posts. To address this gap, a total of 16 NAMPOL police stations located in the broader vicinity of the Angolan and Zambian borders were visited in September 2016 and January 2017 to:

- Share information on the timber trade in Namibia and the cross-border requirements of DoF
- Gather the polices' observations and perceptions of the timber trade in Namibia.

The police were firstly asked if timber arrives through their respective border post and if so to identify the origin of the wood. Trade routes and previously unknown border posts were identified based on their knowledge. A poster was provided that explained the three most commonly traded timber species and data collected from the Namibian permits. The Namibian regulations and the new DoF permits and requirements were also clarified. Another poster that explained Angolan and Zambian requirements for documentation for the export of timber was presented. This information was well received and appreciation expressed.

Information acquired through these sharing opportunities is summarized below. Figure 20 provides the locations of the non-gazetted border posts and other police checkpoints involved with timber trade. Feedback from selected border posts includes:

- **Chetto** (Angolan border) – timber from Angola destined for South Africa is entering Namibia through this border post.
- **Mushangara** (Angolan border) – direct access from Mucusso in Angola and consignments of planks are transported through this border post and then to South Africa.
- **Mohembo** (Botswanan border) – this border post with Botswana does not generally deal with timber entering or leaving Botswana, although it has recorded treated poles (originating in South Africa in transit via Botswana to Namibia).
- **Divundu checkpoint** – this permanent check point is located near the Angolan border in the vicinity of Mushangara at Bagani Research Station (where there is a Forestry office). The officers are aware of the trucks containing timber from Angola, Zambia and DRC.
- **Musese** – this permanent roadblock is located at Musese Irrigation Project. The officers stated that they do see trucks carrying timber and always refer them back to the Nkurenkuru Forestry office if they do not have a permit.
- **Mahenzere** – This police station is located near the border with Mahenzere, Angola. The officers stated that timber does cross the border and is left at the police station for the timber producer to go through customs clearance and forestry. Forestry officials from Nkurenkuru will come to the

station to do the inspection once customs clearance has occurred. They indicated that only planks/blocks have been noted entering Namibia.

- **Kamenga** – this border post deals with trucks coming from both Angola and Zambia. They do not often have timber coming through this border post, but indicated that they are aware of the requirements should this happen.
- **Kongola** – this is a permanent check point that inspects trucks from both Angola and Zambia. They reported many timber trucks coming through coming through daily since they are on the main route from Katima Mulilo to Walvis Bay. Their biggest issue is in relation to the sealed container trucks which they are not able to inspect.

6.3 Other opportunities for collaborative cross-border management

In addition to the MOU discussed in Section 6.2.2, there are other opportunities for collaborative management where structures are already in place. For example, IRDNC has facilitated the development of cross-border community forums (or transboundary natural resource management (TBNRM) forums) linking conservancies in Namibia's Zambezi Region with neighbouring country initiatives including:

- Kwando Conservancy (Namibia) /CF and Imushu (Sioma Ngewze NP, Zambia)
- Sikunga Conservancy (Namibia) and Inyambo TBNRM forum (Zambia)
- Kasika and Impalila Conservancies (Namibia) and Sekute TBNRM forum (Zambia)
- Salambala Conservancy (Namibia) and Chobe Enclave Community Trust (CECT, Botswana)

These local TBNRM forums have evolved from the need for communities on either side of the international borders to share information on management of shared natural resources. Initial focus was on the need to allow movement of large herds of elephant between areas. Attention has since broadened to encompass resources such as fish and timber, as well as dynamics including illegal activities such as poaching and wildlife crime. These local forums give a collective voice to some of the communities living within KAZA.

Further opportunity for cross-border resource management is via the KAZA TFCA encompassing parts of Namibia, Angola and Zambia. The KAZA TFCA includes 36 formally proclaimed NPs, game reserves, forest reserves, game/wildlife management areas as well as intervening conservation and tourism concessions. The KAZA TFCA is supported by the KAZA Secretariat who co-ordinate activities between member countries and facilitate strategic overview. A key objective of the KAZA TFCA (see Figure 8) is to join fragmented wildlife habitats into an interconnected mosaic of protected areas and transboundary wildlife corridors, which will facilitate and enhance the free movement of animals across international boundaries. KAZA TFCA also has a growing awareness of the need for cross-border management and collaboration of other natural resources that is emerging including NTFPs, fish and timber. Currently KAZA member states are focusing on co-operation in counter-poaching initiatives with several joint cross-border initiatives being discussed and planned. The collaborative management of timber resources and the timber trade needs to be integrated into these initiatives. This study has demonstrated the importance of inclusion of Customs and Excise officials in endeavours to combat illegal trade in natural resource products.

7. CONCLUSIONS AND RECOMMENDATIONS

From the permit data analysis, it is evident that timber trade originating from Namibia is minimal. Rather than harvest for export, indications are that the pressure on Namibia's forest resources is predominantly due to local use of trees for firewood, poles and droppers for fencing but also occasionally for overseas export. In terms of the firewood trade it is recommended that capacity of the CFMC and other members to regulate the firewood sales is bolstered to ensure that only dry wood is being used for firewood and not living trees. To this end, improved permit monitoring by the DoF, particularly in the Katima Mulilo area is required to regulate this trade.

Sufficient harvestable resources are a prerequisite for ensuring sustainable wildlife trade. However, the harsh natural environmental conditions of Namibia result in low growth rates and scattered distribution of harvestable timber species, hence the low TAOs that have been set for timber producing species. In turn, this means that commercial harvesting of timber in Namibian CFs is generally not economically viable. Timber harvesting quotas are nevertheless granted to CFs, but these are too small to enable the CF's to generate sufficient income to cover management costs and provide livelihood benefits.

Recommendation: Strategies to collectively market the timber quotas from neighbouring CFs as a package should be investigated by the Namibian government.

The study clearly revealed that Namibia has been, and still is, used as a conduit for timber harvested in Angola, DRC and Zambia. Almost all the timber exported through Walvis Bay harbour in Namibia comes from neighbouring countries. Timber is also being exported by road to South Africa, but it was not possible to determine how much of this is for use in South Africa versus export to other destinations. From Zambia, 6 081 m³ of Kiaat, 7 336 m³ of Zambezi Teak and 19 247 m³ of African Rosewood was exported via Namibia between 2010 and 2016. From Angola, 20 047 m³ of Kiaat, 1 131 m³ of Zambezi Teak and 282 m³ of African Rosewood was exported via Namibia during the same period. In total, 32 664 m³ of Zambian timber and 21 460 m³ of Angolan timber was exported via Namibia during this 7-year timeframe. During 2015 and 2016, a total of 29 190 m³ of Mukula, mostly from the DRC, was transported through Namibia for export to China. These quantities are thought to be underestimates based on the number and volumes of illegal consignments apprehended at roadblocks within the country.

In 2015, Namibia gazetted new forest regulations and the following year the new permit books were printed and issued to the regional offices. However, opportunities for misuse of the new permit system have arisen due to the lack of a mandatory tracking system for permits issued and the lack of systematic collation, summation and sharing of permit data to guide management decisions.

Recommendation: Namibia should explore the development of a tracking system for permits that have been issued, and also implement systems for the collation, summation and sharing of permit data.

Similarly, in Zambia, the new National Forestry Policy was adopted in 2014, and Parliament subsequently passed the Forest Act in 2015. Since implementation of the Act, three Statutory Instruments (SI's) have been implemented, namely, SI no. 94 of 2015, SI no. 50 of 2016 and SI no. 31

of 2017. Accompanied by the revision of permit documentation from Zambia, the quality of the permitting administration and of data collected have improved. However, this has not prevented illegal shipments of Mukula moving through Zambia.

Recommendation: The Zambian government is encouraged to further improve the enforcement of regulations pertaining to transit shipments of timber.

The timber trade out of southern Angola concentrates on Kiaat trees being harvested just north of the border with Namibia. Transport of these consignments through Namibia to South Africa is facilitated by special permission given by Namibian Customs and Excise for traders to access better road networks via non-gazetted border posts. However, documentation accompanying shipments was found to be inconsistent and varying in quality and generally the origin of consignments was not clearly stated, and the destination of consignments is unclear. It is likely that the Angolan government is losing revenue from illegal logging and incorrectly documented exports, while forests are under threat from illegal timber exports.

Overall, the study highlighted the extent of the cross-border trade and the urgent need for regional collaboration to ensure sustainable and legal trade. The TRAFFIC research found that transboundary policy, capacity building, regulatory and monitoring changes are required between these three countries to support a sustainable timber industry and related trade. Consequently, it is imperative that the process of finalizing and signing the MOU between Angola, Namibia and Zambia is completed so that implementation of the collaborative actions can be implemented. Once the MOU is signed, it will be possible to support the implementation of the Joint Action Plan developed between Angola, Namibia and Zambia in 2015. **The key actions proposed in this MoU are:**

- Harmonise policy and standardize implementation mechanisms (permit systems, customs requirements, documentation (consistency and quality) etc.) between neighbouring countries
- Improve enforcement of timber focussed laws and policies at ports of entry and exit in Namibia, Angola and Zambia through the inclusion of DoF officials in timber related law enforcement actions and the provision of relevant training on, for instance, investigation skills and detecting permit fraud.
- Improve data capture and share key data and analyses at local (regional/provincial) and national levels, so that this information is accessible and can be used to understand the legality of sub-regional timber harvesting operations and thus to inform management decisions
- Continue with strengthening management and monitoring systems for timber harvesting and trade. This includes undertaking and updating Forest Resources Inventories and the implementation of Forest Management Plans.
- Seek mechanisms to make forest management economically viable such as through integrating it with conservancies (Namibia) and increasing awareness of domestic value of timber and NTFPs
- Support solutions identified during this project, for implementation by the three governments, including:
 - ✓ Maintaining the Timber Trade Directory of Contacts for Angola, Namibia and Zambia.
 - ✓ Enhance cross-border management for a range of timber-related issues including understanding different countries systems and regulations and establishing jointly agreed standard operating procedures.

- ✓ Increase the regularity of cross-border patrols.
- ✓ Build capacity on timber species identification using such tools as timber wheels or timber species booklets.
- ✓ Raise awareness of key stakeholders such as police and officials stationed at gazetted and non-gazetted borders used for timber import, export and transit.
- ✓ Explore the expanded use of cross border community forums to assist officials with timber harvest, management and to counter illegal trade.
- ✓ Build a partnership with the KAZA Secretariat to assist with cross border management of timber resources as an extension to their existing mandate.

In addition to these recommendations, the Government of Namibia and its neighbouring states should align its policies to counter the illegal trade in timber trade with the provisions of the SADC Law Enforcement and Anti-poaching Strategy adopted on 3rd February 2017 by the Joint Extra Ordinary Meeting of the Ministers of Environment and Natural Resources and of the Organ on Defence, Peace and Security Cooperation of the Southern African Development Community (SADC). These countries may also wish to seek cooperation assistance from the Government of China, in accordance with paragraph 4.6.4 of the FOCAC Beijing Action Plan (2018).

8. REFERENCES

- African Union (2015). *African Strategy on Combating Illegal Exploitation and Illegal Trade in Wild Fauna and Flora in Africa*. <https://au.int/en/documents/20180207/au-wildlife-strategy>. Viewed 6 August 2019.
- Anonymous (2013). *Pterocarpus angolensis*. http://en.wikipedia.org/w/index.php?title=Pterocarpus_angolensis&oldid=58680834. Viewed 27 June 2014.
- Anstey, S. (2016). Timber trade dynamics in Eastern and Southern Africa: A summary with reflections for future focus. TRAFFIC, Dar es Salaam, Tanzania. Unpublished Report. 12pp.
- Asanzi, P., Putzel, L., Gumbo, D. and Mupeta, M. (2014). Rural livelihoods and the Chinese timber trade in Zambia's Western Province. *International Forestry Review* 16(2), (2014):447-458.
- Baptista, N. (2014). *Literature study of the woody Miombo vegetation and forest management in south eastern Angola with focus on data from the colonial era*. B.Sc thesis, Polytechnic of Namibia, Namibia. 99 pp.
- Barnes, J.I., Nhuleipo, O., Muteyauli, P.I. and MacGregor, J. (2005). *Preliminary economic asset and flow accounts for forest resources in Namibia*. DEA Research Discussion Paper 70. 29 pp.
- Barnes, J.I., MacGregor, J., Nhuleipo, O. and Muteyauli, P.I. (2010). The Value of Namibia's Forest Resources: Preliminary economic asset and flow accounts. *Development South Africa* 27(2), (2010):159-176.
- Bingham, M.G., Willemen, A., Wursten, B.T., Ballings, P. and Hyde, M.A. (2017). *Flora of Zambia*. <http://www.zambiaflora.com/acknow.php>. Retrieved 14 March 2017.
- Björkman, M. (1999). *Forestry Accounts for Namibia: The Value of Timber and Firewood in the Namibian Economy*. B.Sc. thesis, UMEÅ University, Sweden.
- Bolza, E. and Keating, W.G., (1972). African timbers: the properties, uses and characteristics of 700 species. Division of Building Research, CSIRO, Melbourne, Australia. 710 pp.
- Burke, A. (2006). Savanna trees in Namibia – Factors controlling their distribution at the arid end of the spectrum. *Flora* 201(2006):189-201.
- Caro, T.M., Sungula, M., Schwarz, M.W. and Bella, E.M. (2005). Recruitment of *Pterocarpus angolensis* in the wild. *Forest Ecology and Management* 219(2005):169-175.
- Chakanga, M. (2000). *Review and Improvement of data related to wood products in Namibia*. Ministry of Environment and Tourism, Directorate of Forestry. Unpublished report. 55 pp.
- Chakanga, M. and Kojwang, H.O. (2001). *The Forest Revenue System and Government Expenditure on Forestry in Namibia*. Ministry of Environment and Tourism, Directorate of Forestry. Unpublished report. 44 pp.
- Chakanga, M. (2003). *Timber trade and timber industries in Namibia*. Ministry of Environment and Tourism, Directorate of Forestry. Unpublished report.

- Coates Palgrave, M. (2002). **Keith Coates Palgrave Trees of southern Africa. Third Edition.** Struik, Cape Town. 1212 pp.
- Curtis, B. and Mannheimer, C. (2005). *Tree Atlas of Namibia*. National Botanical Research Institute, Windhoek, Namibia. 674 pp.
- De Cauwer, V. (2013). *Mashare – Woody Vegetation*. In: Oldeland, J., Erb, C., Finckh, M. and Jurgens, N. (Eds): Environmental Assessments in the Okavango Region. Biodiversity & Ecology 5: p 117-120.
- De Cauwer, V. (2016). Towards estimation of growing stock for the timber tree *Pterocarpus angolensis* in Namibia. Namibian University of Science and Technology, unpublished report. 14 pp.
- De Cauwer, V., Muys, B., Revermann, R. and Trabucco, A. (2014). Potential, realised, future distribution and environmental sustainability for *Pterocarpus angolensis* DC in southern Africa. *Forest Ecology and Management* 315(2014):211-226.
- De Cauwer, V., Geldenhuys, C., Aerts, R. Kabajani, M. and Muys, B. (2016). Patterns of forest composition and their long term environmental drivers in the tropical dry forest transition zone of southern Africa. *Forest Ecosystems* (2016) 3:23. 12pp
- De Cauwer, V. and Younan, R. (2015). Seed germination of Namibian woodland tree species. *Dinteria* 35:43-52.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2000). Inventory Report on the Woody Resources of Okongo Community Forest. Unpublished report. 60 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2001). *Forest Policy Statement*. The Government of the Republic of Namibia. 11 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2002). Inventory Report for Ohepi, Oshaampula and Ekolola Forests. The Government of the Republic of Namibia. Unpublished report. 53 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2003a). Woody Resources Report of Hans Kanyinga Community Forest. The Government of the Republic of Namibia. Unpublished report. 25 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2003b). Woody Resources Report of Kwando Community Forest. The Government of the Republic of Namibia. Unpublished report. 25 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2003c). Woody Resources Report of Ncamangoro Community Forest. The Government of the Republic of Namibia. Unpublished report. 33 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2003d). Woody Resources Report of Ncaute Community Forest. The Government of the Republic of Namibia. Unpublished report. 30 pp.

- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2004). Woody Resources Report of Katope Community Forest. The Government of the Republic of Namibia. Unpublished report. 10 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2010). *Community Forestry in Namibia Toolbox*. The Government of the Republic of Namibia. 155 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2011a). *A Forest Research Strategy for Namibia (2011-2015)*. The Government of the Republic of Namibia. 60 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2011b). Woody Resource Inventory Report of George Mukoya Proposed Community Forest. The Government of the Republic of Namibia. Unpublished report. 34 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2012). Clean-up Report 2012. The Government of the Republic of Namibia. Unpublished report. 12 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2014). Woody Resource Inventory Report for Hamoye State Forest. The Government of the Republic of Namibia. Unpublished report. 19 pp.
- Directorate of Forestry, Ministry of Agriculture, Water and Forestry (2016). The sale of mopane firewood in the emerging Katima Mulilo Community Forest. The Government of the Republic of Namibia. Unpublished report. 15 pp.
- FAO (2000). *Forestry Outlook Study for Africa (FOSA): Angola*. Rome, Italy. 33 pp.
- FAO (2003). *Forestry Outlook Study for Africa (FOSA): Sub-regional Report for Southern Africa*. Rome, Italy. 74 pp.
- FAO (2010). *Global Forest Resources Assessment 2010: Country Report Namibia*. Rome, Italy. 41 pp.
- FOCAC (2018). *Forum on China-Africa Cooperation Beijing Action Plan (2019-2021)*. https://www.focac.org/eng/zywx_1/zywj/t1594297.htm (viewed on 6 August 2018)
- Geldenhuys, C.J. (1997). Sustainable harvesting of timber from woodlands in Southern Africa: Challenges for the future. *Southern Africa Journal of Forestry* No. 178:59-72.
- Geldenhuys, C.J. (2014). Sustainable use of Miombo woodlands: simple silvicultural practices the key to sustainable use of Miombo fuel wood and poles. *The Southern African Forestry Journal* April 2014:20-21.
- Government of the Republic of Angola (2016). Management Plan (MP) for the Luengue-Luiana National Park. Ministry of Environment, Angola.
- Government of the Republic of Namibia (1975). *Ordinance 4 of 1974 Nature Conservation Ordinance*. Windhoek, Namibia.
- Government of the Republic of Namibia (2001). *Government Gazette: Forest Act, 2001*. Windhoek, Namibia.

- Government of the Republic of Namibia (2005). *Government Gazette: Forest Amendment Act, 2005*. Windhoek, Namibia.
- Government of the Republic of Namibia (2015). *Government Gazette no. 5801: Forest regulations: Forest Act, 2001*. Windhoek, Namibia.
- Government of the Republic of Zambia (2010). *Integrated Land Use Assessment (ILUA) 11*. Project document, Ministry of Tourism, Environment and Natural Resources, Zambia. 78pp.
- Government of the Republic of Zambia (2013). *Amendment to Forest Regulations Statutory Instrument no. 52 of 2013*. Ministry of Lands, Natural Resources and Environmental Protection. P 411-414.
- Government of the Republic of Zambia (2015). *United Nations Convention on Biodiversity: Fifth National Report*. Ministry of Lands, Natural Resources and Environmental Protection. P 20-22.
- Hailwa, J. (2002). Tropical Secondary Forest Management in Africa: Country Paper Namibia – Realities and Perspectives. *Workshop Proceedings Tropical Secondary Forest Management in Africa*. ICRAF and CIFOR, Kenya. 18 pp.
- Hazam, J. (2009). Enforceability of Community Forest By-laws. Unpublished report. 8 pp.
- Hazam, J. (2010). Key Provisions of the Forest Act Regarding By-Laws. Unpublished report. 2 pp.
- IRDNC (2016). *Workshops on Cross Border Timber Trade: Workshop Proceedings*. IRDNC, Namibia. 31pp.
- IUCN (2017). *The IUCN Red List of Threatened Species. Version 2016-3*. <http://www.iucnredlist.org>. Downloaded on 10 January 2017.
- Jones, B.T.B. (2012). Recognition and Support of ICCAs in Namibia. *CBD Secretariat Technical Series* no. 64. 43 pp.
- Kalinda, T., Bwalya, S., Mulolwa, A. and Haantuba, H. (2008). *Use of integrated land use assessment (ILUA) data for forestry and agricultural policy review and analysis in Zambia*. FO and Ministry of Tourism, Environment and Natural Resources, Zambia. 119 pp.
- Kasperek, M. (2008). *Sustainable Forest Management and Conservation Project: Evaluation of Pilot Measures in Botswana, Malawi, Mozambique and Namibia*. GTZ/SADC Sustainable Forest Management and Conservation. 198 pp.
- Kojwang, H.O. (2000). Forest Outlook Studies in Africa: Namibia. Unpublished report. 30 pp.
- Kojwang, H.O. (2011). A Simple Method for Estimating Sawlog Volumes in Namibia. Ministry of Environment and Tourism, Directorate of Forestry. Unpublished report. 19 pp.
- Kuedikuenda, S. and Xavier, M.N. (2009). *Framework Report on Angola's Biodiversity*. The Government of the Republic of Angola, Ministry of Environment. Luanda, Angola. 61 pp.

- Laamanen, R. (2003). Supplement to the Manual for Woody Resource Inventories. Considerations for community forest inventories. Ministry of Environment and Tourism: Directorate of Forestry. Unpublished report. 24 pp.
- Lemmens, R.H.M.J. (2008.) *Pterocarpus tinctorius Welw.* In: Louppe, D., Oteng-Amoako, A. A. & Brink, M. (Editors). *Prota 7(1): Timbers/Bois d'œuvre 1*. PROTA, Wageningen, Netherlands.
- Loots, S. (2005). *Red Data Book of Namibian Plants*. Southern Africa Botanical Diversity Network Report No. 38.
- Mannheimer, C. and Curtis, B. (2009). *Le Roux and Müller's Field Guide to the Trees and Shrubs of Namibia*. National Botanical Research Institute, Windhoek, Namibia. 576 pp.
- Mendelsohn, J. (2008). Customary and legislative aspects of land registration and management on communal land in Namibia. RAISON, Windhoek, Namibia. Unpublished Report. 78 pp.
- Mendelsohn, J. and el Obeid, S. (2002). *The Communal Lands in Eastern Namibia*. Research and Information Services of Namibia. Windhoek, Namibia. 58 pp.
- Mendelsohn, J. and el Obeid, S. (2003). *Sand and Water: A profile of the Kavango Region*. Research and Information Services of Namibia. Windhoek, Namibia. 129 pp.
- Mendelsohn, J. and el Obeid, S. (2005). *Forests and Woodlands of Namibia*. Research and Information Services of Namibia. Windhoek, Namibia. 152 pp.
- Mendelsohn, J. and el Obeid, S. (2006). *A digest of information on key aspects of Kavango's geography and sustainable development practices*. Research and Information Services of Namibia. Windhoek, Namibia. 19 pp.
- Milledge, S.A.H., Gelvas, I. K. and Ahrends, A. (2007). *Forestry, Governance and National Development: Lessons Learned from a Logging Boom in Southern Tanzania*. An Overview. TRAFFIC East/Southern Africa /Tanzania Development Partners Group /Ministry of Natural Resources of Tourism, Dares Salaam, Tanzania. 16 pp.
- Milledge, S. and Xueyan, L. (2007). *Illegal logging and governance in Tanzania and links with China*. TRAFFIC East Africa and China Programme. Beijing, China. 10 pp.
- Ministry of Environment and Tourism (1997a). The Government of the Republic of Namibia. The National Forest Inventory of Namibia – System Description. Unpublished report. 64 pp.
- Ministry of Environment and Tourism (1997b). The Government of the Republic of Namibia. Woody Resources of East and South Tsumkwe, Otjinene and Okakarara Districts. Unpublished report. 22 pp.
- Ministry of Environment and Tourism (1998a). The Government of the Republic of Namibia. Directorate of Forestry. Forest Inventory Report of Nkurenkuru Concession Area. Unpublished report. 16 pp.
- Ministry of Environment and Tourism (1998b). The Government of the Republic of Namibia. Forest Inventory report of the Caprivi Region. Unpublished report. 67 pp.

- Ministry of Environment and Tourism (1998c). The Government of the Republic of Namibia. Directorate of Forestry. Woody Resources of Western Tsumkwe. Unpublished report. 27 pp.
- Ministry of Environment and Tourism (2002a). The Government of the Republic of Namibia. Directorate of Forestry. Inventory Report on the Woody Resources in the Oshikoto Region. Unpublished report. 53 pp.
- Ministry of Environment and Tourism (2002b). The Government of the Republic of Namibia. Directorate of Forestry. Mashare Forest Inventory Report. Unpublished report. 27 pp.
- Ministry of Environment and Tourism (2003). The Government of the Republic of Namibia. Directorate of Forestry. Participatory Integrated Forest Management Plan for Okongo Community Forest. Unpublished report. 50 pp.
- Ministry of Finance (2015). Government's Accountability Report for the Financial Year 2013/2014. 510pp.
- Ministry of Lands, Natural Resources and Environmental Protection (2015). The Government of the Republic of Zambia. *United Nations Convention on Biodiversity Fifth National Report*. 66 pp.
- Mogaka, H., Simons, G., Turpie, J., Emerton, L. and Karanja, F. (2001). *Economic aspects of community involvement in sustainable forest management in eastern and southern Africa*. Nairobi, Kenya. 153 pp.
- Moses, M. (2013). *Assessment of trade-offs between timber and carbon values of Pterocarpus angolensis (Kiaat) in the Kavango Region of Namibia – a comparison of current and potential values*. M.Sc thesis, University of Stellenbosch, South Africa. 119 pp.
- Mulliken, T. (2009). *The Role of CITES in Controlling the International Trade in Forest Products. Implications for Sustainable Forest Management*. Food and Agriculture Organization of the United Nations. Rome, Italy. 99 pp.
- Mulofwa, J. (2005). Experiences with the creation and enforcement of community forest by-laws. Okongo Community Forest: A Technical Handbook. Unpublished report. 11 pp.
- Newton, D.J. and Bürgener, M. (2002). South Africa's Timber Trade – 'In-transit'? TRAFFIC East/Southern Africa: South Africa. Unpublished Report. 60 pp.
- Nyambe, N. (2013). Devils Claw harvesting in parts of the Shangombo and Sesheke Districts: an option for bio-trade in Zambia? WWF Zambia. Unpublished Report. 12 pp.
- Orwa, C., Mutua, A., Kindt, R., Jamnadass, R., Simons, A. (2009). *Agroforestry Database: a tree reference and selection guide*, Version 4.0. <http://www.worldagroforestry.org/af/treedb/>. Viewed 27 June 2014.
- Phiri, D., Zulu, D., Lwali, C., and Imakando, C. (2015). Focusing on the Future of *Pterocarpus tinctorius* (Mukula) in Zambia: A Brief Review of Its Ecology, Distribution and Current Threats. *International Journal of Agriculture, Forestry and Fisheries*. 3(6):218-221.
- Pröpper, M. and Vollan, B. (2013). Beyond awareness and Self Governance: Approaching Kavango Timber Users' Real-life choices. *Land* 2013 (2): 392-418

- Pröpper, M. (2009). Sawing Kavango Timber Commons: Levels of Action and Agency upon Local Natural Capital. *Networks, Resources and Economic Action*. University of Hamburg, Hamburg, Germany: 171-188.
- Pröpper, M., Gröngröft, A., Falk, T., Eschenbach, A., Fox, T., Gessner, U., Hecht, J., Hinz, M. O., Huettich, C., Hurek, T., Kangombe, F. N., Keil, M., Kirk, M., Mapaire, C., Mills, A., Mukuya, R., Namwoonde, N. E., Overmann, J., Petersen, A., Reinhold-Hurek, B., Schneiderat, U., Strohbach, B. J., Lück-Vogel, M., Wisch, U. (2010). Causes and perspectives of land-cover change through expanding cultivation in Kavango. – In: Hoffman, M. T., Schmiedel, U., Jürgens, N. [Eds.]: *Biodiversity in southern Africa. Volume 3: Implications for land use and management*: pp. 1–31, Klaus Hess Publishers, Göttingen and Windhoek.
- Pröpper, M., Grongroft, A., Finckh, M., Stirn, S., De Cauwer, V., Lages, F., Masamba, W., Murray-Hudson, M., Schindt, L., Strohbach, B. and Jurgens, N. (2015). *The Future Okavango – Findings, Scenarios and Recommendations for Action*. Research project Final Synthesis Report 2010-2015: 70-83
- Romeiras, M., Figueira, R., Duarte, M.C., Beja, P. and Darbyshire, I. (2014). Documenting Biogeographical Patterns of African Timber Species Using Herbarium Records: A Conservation Perspective Based on Native Trees from Angola. *PloS One* 9(7):1-11.
- SADC (2002). *Protocol on Forestry*. 14 pp.
- Sebukeera, C., Muramira, E., Momokama, C., Elkholei, A., Elbagouri, I., Masumbuko, B., Rabesahala, V. (2006). *Africa Environment Outlook 2*. Chapter 6: Forests and Woodlands. Nairobi, Kenya. 196-223.
- Shackleton, C.M. (2001). Re-examining local and market-orientated use of wild species for the conservation of biodiversity. *Environmental Conservation* 28(3), (2001):270-278.
- Shackleton, C.M., Guthrie, G., Main, R. (2005). Estimating the potential role of commercial over-harvesting in resource viability: a case study of five useful tree species in Africa. *Land Degradation & Development* 16(2005):273-286.
- Schneibel, A., Stellmes, M., Revermann, R., Finckh, M., Roder, A. and Hill, Z. (2013). Agricultural expansion during post-civil war period in southern Angola based on bi-temporal Landsat data. *Biodiversity & Ecology Volume 5: Environmental Assessments in the Okavango Region*. Hamburg, Germany p. 311-319.
- Schwartz, M.W., Caro, T. M. and Banda-Sakala, T. (2002). Assessing the sustainability of harvest of *Pterocarpus angolensis* in RukwaRegion, Tanzania. *Forest Ecology and Management* 170 p. 259-269.
- Silow, C.A. (1976). Edible and Other Insects of Mid-western Zambia. Studies in Ethno-entomology II. Occ. Pap. V. Inst.Allm. Jamforand. Etnogr., Uppsala, Sweden: Almqvist & Wiksell, pp. 64–69.
- Syampungani, S. (2008). *Vegetation Change Analysis and Ecological Recovery of the Copperbelt Miombo Woodland of Zambia*. Doctoral thesis, University of Stellenbosch, South Africa. 159 pp.

- Telapak (2012). *Correspondence regarding evidence of legal irregularities in plantation concession*. PT Suryamas Cipta Perkasa. 14 pp.
- Timberlake, J. and Chidumayo, E. (2011). *Miombo Ecoregion Vision Report*. Occasional Publications on Biodiversity no. 20, Biodiversity Foundation for Africa, Zimbabwe. 80 pp.
- TRAFFIC (2009). *The Fair Wild Standard in practice: certification and more*. Cambridge, UK. 2 pp.
- TRAFFIC (2009). *WWF's Global Forest & Trade Network: Common Framework for Assessing Legality of Forestry Operations, Timber Processing and Trade*. WWF for Nature, Global Forest & Trade Network. 12 pp.
- TRAFFIC (2013). *Publications: Timber Trade*. Cambridge, UK. 16 pp.
- TRAFFIC (2013). *Wildlife and Forest Crime*. CCPCJ22. 4 pp.
- TRAFFIC (2015a). *Collaboration on Forest Management and Timber Trade: Angola, Namibia and Zambia Joint Workshop*. Windhoek, Namibia. 26pp.
- TRAFFIC (2015b). *Angola, Namibia and Zambia vow to take action on illegal timber trade*. <https://www.traffic.org/news/angola-namibia-and-zambia-vow-to-take-action-on-illegal-timber-trade/> (released 7th August 2015).
- Treanor, N.B. (2015). *China's Hongmu Consumption Boom: Analysis of the Chinese Rosewood Trade and Links to Illegal Activity in Tropical Forested Countries*. Forest Trend Support Series: Forest Trade and Finance. DFID and FGMC. 42 pp.
- USAID (2011). *USAID Country Profile ANGOLA: Property Rights and Resource Governance*. 28 pp.
- Van Den Bosch, S. (2009). MILE 20, Namibia - Despite the investment of millions of donor dollars, the permit system in Namibia's Community Forests has failed dismally, say biodiversity experts. *The Namibian* (Namibia), 14 May 2009.
- Vermeulen, S.J. (1996). Cutting of trees by local residents in a communal area and an adjacent state forest in Zimbabwe. *Forest Ecology and Management* 81(1996):101-111.
- Vinja, R., Syampugani, S. and Kashole, D. (2012). *Forest Sector in Zambia: Reviewing progress and addressing challenges and opportunities*. Norwegian Church Aid, Zambia. 53 pp.
- Weng, X., Putzel, L., Kandulu, M.M., Ekman, S.S., Zafinikamia, M.B., Assembe-Mvondo, S., Cerutti, P.O. and Lescuyer, G. (2014). The Africa-China timber trade: Diverse business models call for specialised policy responses. *CIFOR brief no. 28 March 2014*. 12 pp.
- ZHANG Ke and SHEN Wei (2017). *Tracking the Mozambican Tropical Hardwood Trade in China*. Available at <https://www.traffic.org/site/assets/files/12756/namibia-timber-2020-final-vweb.pdf>
- Zweede, M., Safford, H., Juergens, G. (2006). *Trip and Assessment Report*. USDA Forest Service Forest Resource Assessment Trip Kuando Kubango Province, Angola: In support of the USAID Southern Africa's Okavango Integrated River Basin and the Angolan Ministry of Agriculture and Rural Development's National Institute for Forestry Development and Management Project. 39 pp.

9. APPENDICES

Appendix 1: Contribution (%) of Kiaat *Pterocarpus angolensis* to species composition in forestry areas where resource inventories have been undertaken

Forestry Area	Name of Species	Composition of Trees (%)
KAVANGO EAST AND WEST REGIONS		
George Mukoya Community Forest	<i>Pterocarpus angolensis</i>	3
	<i>Terminalia sericea</i>	16
	<i>Burkea africana</i>	36
	<i>Baikiaea plurijuga</i>	2
	<i>Guibourtia coleosperma</i>	2
Hamoye State Forest	<i>Pterocarpus angolensis</i>	17
	<i>Terminalia sericea</i>	4
	<i>Burkea africana</i>	42
	<i>Baikiaea plurijuga</i>	9
	<i>Guibourtia coleosperma</i>	1
Hans Kanyinga Community Forest	<i>Pterocarpus angolensis</i>	14
	<i>Terminalia sericea</i>	4
	<i>Burkea africana</i>	35
	<i>Baikiaea plurijuga</i>	5
	<i>Guibourtia coleosperma</i>	12
Katope Community Forest	<i>Pterocarpus angolensis</i>	18
	<i>Baikiaea plurijuga</i>	72
	<i>Guibourtia coleosperma</i>	10
Mashare Forest	<i>Pterocarpus angolensis</i>	6
	<i>Burkea africana</i>	65
	<i>Baikiaea plurijuga</i>	16
Ncamangoro Community Forest	<i>Pterocarpus angolensis</i>	13
	<i>Terminalia sericea</i>	6
	<i>Burkea africana</i>	52
	<i>Guibourtia coleosperma</i>	11
Ncaute Community Forest	<i>Pterocarpus angolensis</i>	14
	<i>Terminalia sericea</i>	4
	<i>Burkea africana</i>	41
	<i>Baikiaea plurijuga</i>	6
	<i>Guibourtia coleosperma</i>	9
Nkurenkuru Area 1	<i>Pterocarpus angolensis</i>	30
	<i>Terminalia sericea</i>	3
	<i>Burkea africana</i>	13
	<i>Baikiaea plurijuga</i>	30
	<i>Guibourtia coleosperma</i>	3
	<i>Colophospermum mopane</i>	0
Nkurenkuru Area 2	<i>Pterocarpus angolensis</i>	19
	<i>Terminalia sericea</i>	4
	<i>Burkea africana</i>	11
	<i>Baikiaea plurijuga</i>	44
	<i>Guibourtia coleosperma</i>	1

OHANGWENA REGION		
Ekolola Community Forest	<i>Pterocarpus angolensis</i>	3
	<i>Terminalia sericea</i>	15
	<i>Burkea africana</i>	18
	<i>Baikiaea plurijuga</i>	14
Okongo Community Forest	<i>Pterocarpus angolensis</i>	14
	<i>Terminalia sericea</i>	6
	<i>Burkea africana</i>	11
	<i>Baikiaea plurijuga</i>	30
	<i>Guibourtia coleosperma</i>	3
OSHIKOTO REGION		
Oshikoto Region	<i>Pterocarpus angolensis</i>	2
	<i>Terminalia sericea</i>	23
	<i>Burkea africana</i>	16
	<i>Baikiaea plurijuga</i>	6
	<i>Colophospermum mopane</i>	1
Ohepi Community Forest	<i>Pterocarpus angolensis</i>	7
	<i>Terminalia sericea</i>	32
	<i>Burkea africana</i>	16
Oshaampula Community Forest	<i>Pterocarpus angolensis</i>	0
	<i>Terminalia sericea</i>	25
	<i>Burkea africana</i>	9
OTJOZONDJUPA REGION		
East and South Tsumkwe	<i>Pterocarpus angolensis</i>	1
	<i>Terminalia sericea</i>	19
	<i>Burkea africana</i>	5
	<i>Guibourtia coleosperma</i>	1
Western Tsumkwe	<i>Pterocarpus angolensis</i>	20
	<i>Terminalia sericea</i>	5
	<i>Burkea africana</i>	43
	<i>Baikiaea plurijuga</i>	2
	<i>Guibourtia coleosperma</i>	2
ZAMBEZI (CAPRIVI) REGION		
Bukalo Forest Areas	<i>Pterocarpus angolensis</i>	<1
	<i>Terminalia sericea</i>	32
	<i>Burkea africana</i>	16
	<i>Baikiaea plurijuga</i>	1
	<i>Guibourtia coleosperma</i>	<1
	<i>Colophospermum mopane</i>	13
Kwando Community Forest	<i>Pterocarpus angolensis</i>	3
	<i>Terminalia sericea</i>	3
	<i>Burkea africana</i>	4
	<i>Baikiaea plurijuga</i>	38
	<i>Guibourtia coleosperma</i>	1
Sikanjabuka Community Forest	<i>Pterocarpus angolensis</i>	0
	<i>Terminalia sericea</i>	13
	<i>Burkea africana</i>	1
	<i>Colophospermum mopane</i>	75

Salambala Conservancy	<i>Pterocarpus angolensis</i>	<1
	<i>Terminalia sericea</i>	14
	<i>Burkea africana</i>	1
	<i>Colophospermum mopane</i>	66
Zilitene Community Forest	<i>Pterocarpus angolensis</i>	0
	<i>Terminalia sericea</i>	5
	<i>Burkea africana</i>	<1
	<i>Baikiaea plurijuga</i>	<1
	<i>Colophospermum mopane</i>	80
Zambezi Region	<i>Pterocarpus angolensis</i>	2
	<i>Terminalia sericea</i>	13
	<i>Burkea africana</i>	12
	<i>Baikiaea plurijuga</i>	12
	<i>Guibourtia coleosperma</i>	3
	<i>Colophospermum mopane</i>	24

From: MET, 1997b, 1998a, 1998b, 1998c, 2002a, 2002b; DoF 2000, 2002, 2003a, 2003b, 2003c, 2003d, 2004, 2011b and 2014

Appendix 2: Summary of the stakeholder consultations done throughout the project period

Date	Stakeholder Consultation that Occurred
August 2014	KN meetings in Kavango East and Zambezi Regions with DoF and relevant Namibian stakeholders.
September 2014	KN meetings in Windhoek with DoF, WWF and SASSCAL. AN DoF data collection in Windhoek.
October 2014	KN meetings in Kavango East, Kavango West and Zambezi Regions with DoF. KN meetings in Zambia with forestry department. AN meetings and data collection in Eenhana, Okongo, and Rundu DoF offices.
November 2014	AN data collection in Rundu DoF offices.
January 2015	AN data collection in Windhoek, Katima Mulilo, Bagani, Rundu, Nkurenkuru, Okongo, Eenhana and Omafo DoF offices.
February 2015	KN meetings in Windhoek for DoF and KfW. KN meetings in Kavango West and Zambezi Regions with DoF.
March 2015	KN meetings in Kavango West and Zambezi Regions and Windhoek with DoF. KN meetings in Lusaka, Zambia with forestry department. KN and AN meetings in Windhoek with SASSCAL.
April 2015	AN & KN meetings with DoF and SASSCAL in Windhoek.
May 2015	AN & KN meetings with DoF and SASSCAL in Windhoek.
June 2015	KN meetings with Zambezi and Kavango West DoF. KN meetings with DoF Windhoek. AN follow up meetings and distribution of posters and data with Windhoek, Katima Mulilo, Bagani, Rundu, Nkurenkuru, Okongo, Eenhana, Omafo and Ongwediva DoF offices.
August 2015	AN & KN collaborative workshop with forestry departments of Angola, Namibia and Zambia. KN meetings with SASSCAL in Windhoek.
September 2015	KN & SA meetings at World Forestry Congress. Meeting at WFC with Forestry Directors from Angola, Namibia and Zambia to review draft MOU.
October 2015	KN meeting with Chief Forester in Rundu. KN meeting with DoF, SAREP and SASSCAL in Windhoek.
November 2015	KN meetings with SASSCAL and DoF. AN data collection at Rundu DoF.
February 2016	KN meetings with DoF in Windhoek. KN meetings with DoF staff in Kavango East and Zambezi Regions. KN meeting with KAZA Secretariat
March 2016	AN meetings with DoF regarding cross-border workshops.
April 2016	KN and AN meetings with DoF in Zambezi, Kavango East and Kavango West Regions, meetings with Zambian and Angolan border officials. AN, KN & SA cross-border workshops in Katima Mulilo (for Zambian and Namibian officials) and in Rundu (for Angolan and Namibian officials).
June 2016	AN meeting with Chief Forester in Rundu.
July 2016	KN meetings with DoF Katima Mulilo.
August 2016	KN meetings with DoF Windhoek.
September 2016	KN meetings with DoF Katima Mulilo and Zambian forestry officials at Sesheke, Kazangula and Livingstone and relevant Zambian wood timber merchants. AN meetings with 12 different police stations/border points in Kavango East and West Regions.
October 2016	AN meetings with DoF staff in Windhoek, Mururani and Divundu police blocks.

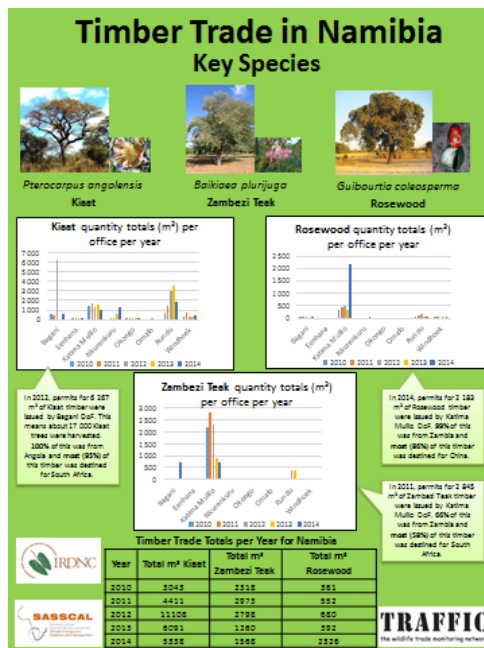
January 2017	<p>KN meetings with DoF Windhoek and SASSCAL.</p> <p>KN meetings with DoF Kunene Region.</p> <p>AN data collection in Rundu, Bagani and Katima Mulilo DoF offices.</p> <p>AN meetings with 4 different police stations/border points in Zambezi Region.</p> <p>AN meetings with Zambian forestry officials at Sesheke, Kazangula and Livingstone.</p>
February 2017	<p>KN meetings with DoF Windhoek, Rundu and Katima Mulilo.</p> <p>KN meetings with Customs officials at Wenela Border Post.</p> <p>KN meetings with Director of Forestry and Senior Officials in Lusaka to share data and project outcomes especially wrt Mukula.</p>
March 2017	<p>KN meetings with Attorney-General's office regarding the MOU.</p> <p>KN meetings with Director re finalisation of MOU</p> <p>AN meetings with Forestry officials for approval of signage</p>
April 2017	<p>KN meeting with Director re finalisation of MOU</p> <p>KN meetings with NACSO WG to share outcomes</p>
May 2017	<p>KN presentation Timber Trade case Study at WCO INAMA workshop in Windhoek</p> <p>AN facilitation of the erection of signage at Wenela border post along with Customs officials, Forestry officials and Special Forces.</p>

Appendix 3: Action Plan drafted by Angolan, Namibian and Zambian representatives at the August 2015 workshop

1. Institutional Arrangements: Tri-Partite Memorandum Of Understanding Among Namibia, Angola, And Zambia To Address Transboundary Forest Management (Under The 'Umbrella' Of Permanent Joint Commissions & SADC Forest Protocol)	
Key issue	Action
Need to facilitate collaborative management between 3 countries	Development of Tripartite MoU – develop, review, sign and implement
2. Documentation	
Key issue	Action
Policy and legislation as well as regulations	Collect all the relevant docs and get translations done – make available to all three countries.
Permits, licences and cross-border requirements	Document process and requirements for timber to cross borders. Compile file/folder with copies of the needed documents and examples of the required information to be filled in. Format should allow for sections to be updated or added as changes occur.
Cross-border requirements	Develop posters that list the required information at border crossings and arrange for display at relevant border posts at main identified border crossings between Namibia, Zambia and Angola.
Permits and documents at Namibia/Angola border posts	Translate templates of Namibian permits into Portuguese and display laminated examples at border posts Identify border crossings and processes between Namibia and Angola.
Meeting/training of staff on either side of border posts	Bring staff together to explain folder and poster – training session at main identified border crossings between Namibia, Zambia and Angola.
3. Border control Collaboration with customs, joint inspections, monitoring, capacity, border post meetings	
Key issue	Action
No forestry officials at border posts	Create cross-border control unit –strengthen quarterly patrols to include all enforcement agencies on both sides of the borders.
Inadequate information sharing	Set up quarterly meetings between Namibian and Angolan and Zambian officials.
Unsorted timber coming from Angola	Organize a meeting with Customs, Timber traders and police and Angolan forestry and customs staff. Note also discuss entry points at meeting.
Identification of products and document related training	Timber identification training - this can be done by Forestry officers. Run a session on training for trainers, develop

	identification materials packs (booklets, posters). Run joint training sessions with Angolan and Zambian officials.
No forestry officials at border posts	Motivate for appointment/placement of equipped forestry official at Rundu, Katwitwi, Ngoma and Wenela.
4. Communication between Angola, Namibia and Zambia <i>How we keep in touch about things that are going on, research results, changes in policy and legislation, communication at different levels.</i>	
Key issue	Action
Lack of clarity on who to contact and contact details	Establish directory of contact details - a booklet with directory of emails, websites, cell and office numbers, postal addresses of key officials at central and local levels.
Share information on bans, changes in policy and legislation	Directors to communicate statutory instrument directly with neighbouring directors via email to directorate offices.
	Translate of all policy, legislation, regulations and permits.
	Current versions of policy, legislation, regulations and permits to be available on directorate websites and to be circulated via email to directorate offices.
Share best practices and research findings	Hold biannual meetings to share emerging issues, action plans, successes and failures, research. To include forestry, customs, immigration and police offices at the operational level from all border regions. Funding to be discussed.
5. Data and Information sharing <i>Share data on trade and forest products, considering what data should be shared/who shared with, sharing of best practices and management information systems. Trade data sharing</i>	
Key issue	Action
Making data accessible for decision making and management	Update backlogs of trade data.
	Develop online bibliography/library for each country where management plans and updated policies are available easily and quickly.

Appendix 4: Publications and training materials produced



Forestry Permits How to fill in this form

Remember to tick and indicate the correct type of permit.

For companies, please tick out the whole company name as well as origin.

If no ID or passport number is available the birth date of the owner should be used.

The scientific name should never be used. All species is not acceptable under the permit. Any animal is not acceptable under the quantity limit.

Make sure the validity date is filled in completely.

Make sure the permit is signed and stamped.

Write accurately as possible.

Under the permit number, indicate if it is a renewal or if there is a marketing permit associated (e.g. R 1892).

This structure and name of the consignee, Name should always in full (no abbreviations).

Make sure that each line corresponds to the correct species and quantity information.

Under loading point, indicate where the consignment came from and what equipment was loaded (e.g. Angola Bantu).

Under destination, indicate where the final destination is (e.g. Walvis Bay China).

MINISTRY OF AGRICULTURE, WATER AND FORESTRY
DIRECTORATE OF FORESTRY, PRIVATE AND LOCAL WOODS
FOREST PERMIT

PERMIT NUMBER: 000100

MINISTRY OF AGRICULTURE, WATER AND FORESTRY
DIRECTORATE OF FORESTRY, PRIVATE AND LOCAL WOODS
FOREST PERMIT

PERMIT TYPE: Marketing | Export

PERMIT: Commercial | Other | Commercial | Other | Commercial | Other

Permittee is hereby granted in terms of the Forest Act, 1982 (Act 112 of 1982) as amended Act No. 11 of 2007 for:

Permit holder Name: _____
National ID/Passport Number: _____
Address: _____
Contact Telephone No: _____
Name, Age, Sex, No. of Dependents: _____
Signature: _____

Permittee is hereby granted in terms of the Forest Act, 1982 (Act 112 of 1982) as amended Act No. 11 of 2007 for:

Species: _____
Quantity (m³, kg or mt): _____
Origin: _____
Destination: _____
Loading Point Address: _____
Transport Agent/Carrier Registration No.: _____

THIS PERMIT IS VALID FROM: _____ UNTIL: _____

AMOUNT PAID: _____ RECEIPT NUMBER: _____
Name of Issuing Officer: _____
Position and Date: _____

Signature of Permit Holder: _____

Angolan Timber Requirements

Needs: release document (signed and stamped by Customs and Police in Angola), letter from the bank stating duties have been paid, tax invoice, harvesting license, transport arrangements (when leaving Angola) and license (for internal travel), phytosanitary certificate, forestry permit and export permit

- Harvesting is seasonal: **between May and September** annually

Namibian Timber Requirements

- Directorate of Forestry:
 - Transit permit - goods are travelling through Namibia
 - Import permit - goods are entering Namibia to stay
 - Transport - goods are moving within Namibia
 - All permit conditions are on the back, but **Phytosanitary Certificates and Export Permits** from country of origin are required
- Directorate of Veterinary Services: provide **Phytosanitary Certificate** and treatment if foot and mouth outbreak is prevalent
- Customs Clearance: require a **tax invoice** with the address of the buyer, address of the seller and both VAT numbers
 - consignments (in quantity or size) cannot change while in transit
 - Provisional VAT payments must be made at border post

Important!

- Timber species must be given scientific names, not local or English names
- Timber quantities must be written as m³ (meters cubed)
- No photocopied permits are allowed, must be the **original** permit
- Only **sawn timber** can enter Namibia (no unprocessed wood or round logs)

Zambian Timber Requirements

- Needs:** tax invoice, phytosanitary certificate, Clearance Certificate signed by the Director of Forestry Lusaka with accompanying documents, a Conveyance Licence and an Export Permit.
- No charcoal or round logs are to be exported from Zambia
- Mukula (*Pterocarpus chrysotrix*) harvesting is **banned** in Zambia and can only be exported with special permission from Lusaka.

Namibian Timber Requirements

- Directorate of Forestry:
 - Transit permit - goods are travelling through Namibia
 - Import permit - goods are entering Namibia to stay
 - Transport - goods are moving within Namibia
 - All permit conditions are on the back, but **Phytosanitary Certificates and Export Permits** from country of origin are required
- Directorate of Veterinary Services: provide **Phytosanitary Certificate** and treatment if foot and mouth outbreak is prevalent
- Customs Clearance: require a **tax invoice** with the address of the buyer, address of the seller and both VAT numbers
 - consignments (in quantity or size) cannot change while in transit
 - Provisional VAT payments must be made at border post

Important!

- Timber species must be given scientific names, not local or English names
- Timber quantities must be written as m³ (meters cubed)
- No photocopied permits are allowed, must be the **original** permit
- Only **sawn timber** can enter Namibia (no unprocessed wood or round logs)

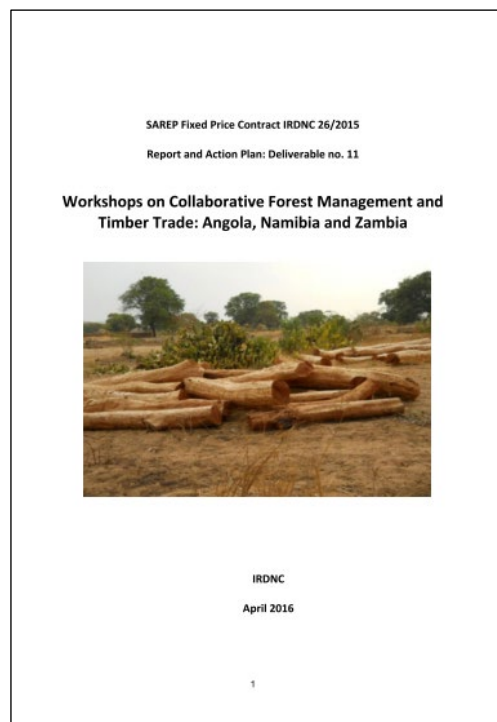
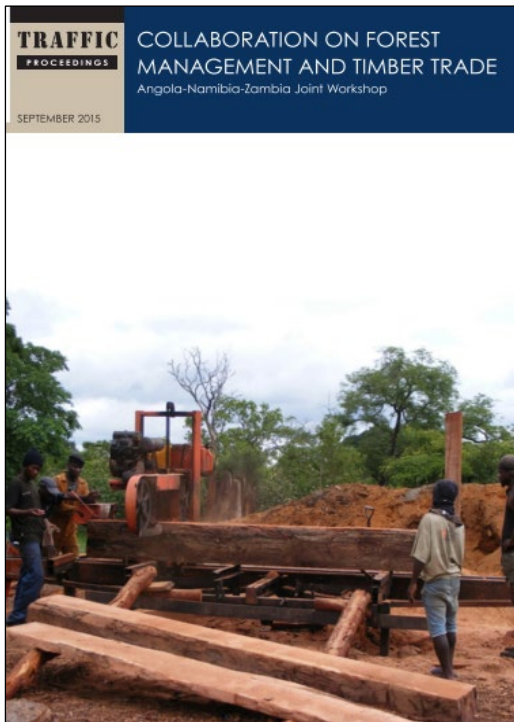
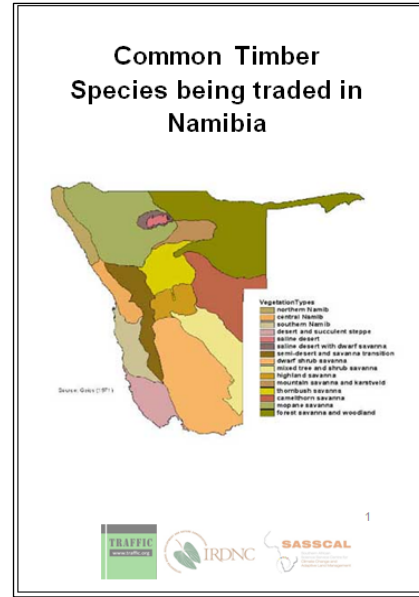


A Critical Assessment of the Economic and Environmental Sustainability of the Namibian Indigenous Forest/ Timber Industry

LITERATURE REVIEW REPORT

**Karen Nott
IRDNC
October 2014**

TRAFFIC East/Southern Africa (TESA) project (ESA164.00)



Timber Trade Directory of Contacts Angola, Namibia and Zambia

Produced in November 2016



Cross Border Timber Trade Permits

*Examples of Legal Permits
Required from Namibia and
Zambia to trade and transport
timber*

June 2017



Appendix 5: Types of timber permits issued by DoF

Forest Product	Tree Species	Price Commercial	Price Own Use
TIMBER (Saw Logs >45 cm DBH) - price per tree			
Protected species	<i>Pterocarpus angolensis</i> <i>Baikiaea plurijuga</i> <i>Burkea africana</i> <i>Guibourtia coleosperma</i> <i>Colophospermum mopane</i> <i>Combretum imberbe</i>	N\$200 (living) N\$150 (dry)	
Non-protected species		N\$100 (living) N\$80 (dry)	
Exotic species	<i>Eucalyptus spp.</i> and others	N\$ 100	
POLES			
Poles (15-30 cm DBH)	<i>Colophospermum mopane</i> <i>Terminalia sericea</i> <i>Acacia erioloba</i> <i>Baikiaea plurijuga</i> <i>Burkea africana</i>	N\$15 each N\$10 each	First 40 free, then N\$5 each
Rafters (2-3 cm in diameter)		N\$5 per bundle of 10	First 100 free, then N\$1 per bundle of ten
Droppers (3-6 cm in diameter)		N\$2 each	First 100 free, then N\$0.50 each
Exotic poles treated (15-30 cm DBH)	<i>Eucalyptus spp.</i> and others	1.6m N\$10 each 1.8m N\$15 each 2.1m N\$20 each 2.4m N\$25 each 2.7m N\$30 each 3.0m N\$35 each 3.5m N\$40 each	
Exotic poles untreated (15-30 cm DBH)	<i>Eucalyptus spp.</i> and others	1.6m N\$5 each 1.8m N\$8 each 2.1m N\$10 each 2.4m N\$12 each 2.7m N\$15 each 3.0m N\$20 each 3.5m N\$25 each	
REMOVAL OF TREES FOR DEVELOPMENT - price per tree			
Live or dry trees	All species except invasive bush species	N\$200 (living) N\$150 (dry)	
FIREWOOD			
Bundle		N\$4 each	Free
1 tonne or m ³		N\$60 each	First tonne free, then N\$30 per tonne
Wood for charcoal production	For bush control purposes only	N\$100 per tonne of wood used	

Type of Permit	Validity	Service Fee
Harvesting Permit (Commercial Area)	3 months	N\$60
Harvesting Permit (Communal Area)	7 days	N\$20
Harvesting Permit (Own Use)	3 days	N\$10
Marketing Permit (Commercial Area)	3 months	N\$60
Marketing Permit (Communal Area)	1 month	N\$20
Transport Permit (Commercial)	7 days	N\$20
Transport Permit (Own Use)	3 days	N\$10
Export Permit (Commercial for value added forest products)	7 days	N\$20 per tonne (up to 10 tonnes), then N\$5 per tonne
Export Permit (Commercial for raw forest products)	7 days	N\$50 per tonne (up to 10 tonnes), then N\$20 per tonne
Export Permit (Own Use, up to 1 tonne)	7 days	N\$20
Import Permit	7 days	N\$20
Transit Permit	4 days	N\$50

Appendix 6: Summary of the permit data collected for three species of timber per DoF office per year

OFFICE	YEAR	Quantity (m ³)			Estimated number of trees		
		Kiaat	Zambezi Teak	African Rosewood	Kiaat	Zambezi Teak	African Rosewood
Bagani	2010	624.3	34.2	1.9	1 687.4	92.5	5.2
	2011	406.3	51.9	3.9	1 098.3	140.4	10.5
	2012	6 266.9	51.0	1.8	16 937.5	137.9	4.8
	2013	0	0	0	0	0	0
	2014	506.3	738.9	25.7	1 368.5	1 997.3	69.4
	2015	134.5	8.8	5.5	363.6	23.8	14.8
	2016	133.0	0	0	359.5	0	0
Eenhana	2010	0	0	0	0	0	0
	2011	11.6	0	0	31.3	0	0
	2012	2.8	0	0	7.6	0	0
	2013	190.4	0	0	514.7	0	0
	2014	75.4	0	0	203.7	0	0
Katima Mulilo	2010	1 381.3	2 191.8	305.5	3 733.2	5 923.9	825.7
	2011	1 728.1	2 847.1	433.6	4 670.5	7 694.8	1 172.0
	2012	1 305.4	2 319.4	519.2	3 528.2	6 268.6	1 403.3
	2013	1 506.2	878.2	343.9	4 070.7	2 373.6	929.7
	2014	1 057.0	731.0	2 183.3	2 856.8	1 975.7	5 900.8
	2015	1 352.5	1 021.8	3 132.2	3 655.5	2 761.6	8 465.3
	2016	336.9	173.5	11 847.2	910.6	468.9	32 019.5
Nkurenkuru	2010	0	0	0	0	0	0
	2011	86.1	0	0	232.8	0	0
	2012	185.3	0	0	500.9	0	0
	2013	527.9	0	0	1 426.6	0	0
	2014	1267.8	24.3	60.8	3 426.4	65.6	164.3
Okongo	2010	0.7	0	0	1.76	0	0
	2011	1.4	0	0	3.8	0	0
	2012	21.0	0	0	56.8	0	0
	2013	16.5	0	0	44.6	0	0
	2014	109.9	13.0	0	297.2	35.2	0
Omafo	2010	0	0	0	0	0	0
	2011	0	0	0	0	0	0
	2012	0.2	28.0	0	0.5	75.7	0
	2013	0	0	0	0	0	0
	2014	0	0	0	0	0	0
Rundu	2010	756.1	53.5	49.1	2043.5	144.7	132.8
	2011	1 460.1	55.2	100.6	3946.2	149.1	271.8
	2012	3 007.4	362.9	158.7	8 127.9	980.9	428.9

	2013	3 577.8	362.3	40.6	9 669.7	979.1	109.8
	2014	1 899.8	54.0	41.1	5 134.8	146.0	111.1
	2015	2 347.9	109.5	278.0	6 345.9	296.0	751.5
	2016	2 652.8	79.9	607.9	7 169.8	216.2	1 642.9
Windhoek	2010	275.8	36.3	4.9	745.3	98.2	13.2
	2011	719.4	13.6	13.7	1 944.3	36.7	37.1
	2012	318.6	36.1	0	861.0	97.6	0
	2013	271.7	20.0	7.0	734.5	54.1	18.9
	2014	465.6	6.4	14.7	1 258.4	17.1	39.8

TRAFFIC is a leading non-governmental organisation working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.

The Director
TRAFFIC
Southern Africa Programme Office
c/o IUCN - ESARO
1st Floor, Block E, Hatfield Gardens, 333
Grosvenor Street,
PO Box 11536 Hatfield Pretoria 0028,
South Africa

Phone: (27) 12 342 8304-6
Email: trafficesa@traffic.org
Website: www.traffic.org

UK Registered Charity No. 1076722,
Registered Limited Company No. 3785518.