



Chinese trade and investment in the Mozambican timber industry

A case study from Cabo Delgado Province

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Abbreviations

CLH	concession license holder
CPI	Investment Promotion Center
CSR	corporate social responsibility
CNY	Chinese Yuan
DNTF	National Directorate for Land and Forests
DPA	Provincial Department for Agriculture
FSC	Forest Stewardship Council
m ³	cubic meter
SLH	simple license holder
USD	United States dollars

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Summary

China's demand for timber has increased dramatically over the past 20 years, so that today, more than 80% of Mozambican timber exports are destined for China.

Demand for forest products presents both opportunities and challenges for Mozambique. As the country's sixth-largest export, timber represents one of the most important industries and sources of income. However, the intense search for resources puts pressure on the sustainable management of the forests.

In an attempt to generate greater domestic value-added and employment through local processing of roundwood, an export ban on first-class timber in the form of logs was put in place in 2007. The effectiveness of this ban on processing activity is debatable.

Virtually no Mozambican-owned companies are engaged in the export of timber. The international trade of Mozambican timber is mainly operated by Chinese companies, which export the timber to the Chinese market.

China is almost the only market for Mozambican timber and as such this market exhibits some peculiar features. Contrary to price trends of global forest products, sawn timber fetches a lower unit price than do logs, due to the preference of manufacturers in China who are willing to pay a premium for logs, which are essential for producing Chinese antique-style furniture. Exporting sawn timber means not only that the product loses value on the Chinese market, but also that a Mozambican-based company must face the costs of running a sawmill and compete with timber from countries that have not illegalized the export of logs. The end result is squeezed profit margins and a strong incentive to break the log-export ban.

Because the share of illegal activity in the timber industry is estimated to be large, integrating these illegal activities into the formal economy could generate significant revenue for the government in the form of taxation. It would also provide greater control and oversight of logging activities than is currently the case.

To capture and maximize the potential benefits that Mozambique could derive from the timber industry, four options exist:

1. **Expand market access:** Given the Chinese preference for logs, attempts to expand Mozambican timber operations into upstream segments of the global value chain through further processing must also entail a diversification of its customer base and access to new markets. The European Union (EU) is the main market for African timber and presents itself as an alternative market for Mozambican timber. Entry to the EU market is, however, increasingly dependent on certification, such as that awarded by the Forest Stewardship Council (FSC), which most Mozambican companies do not have. Assistance should be given to companies wishing to acquire FSC certification.
2. **Increase human capital to meet Chinese standards:** It has been suggested that it should be possible for Mozambican labor to produce semiprocessed components for the production of the antique-style furniture demanded in China. Labor costs, for example, are significantly lower in Mozambique than in China. It is questionable, however, whether Mozambican labor could ever attain the necessary skills that would make them more competitive than Chinese carpenters, who have a more direct knowledge of the aesthetics preferred by the Chinese market. In addition, manufacturers in China hold other advantages, such as infrastructure development and ease of doing business.
3. **Legalize the export of first-class logs:** Although this will not create the desired expansion of employment hoped to be gained through processing, it would allow timber companies to generate higher value on the Chinese market than is currently possible for a company operating legally. Allowing the export of logs will also bring more of the trade into the formal economy, where it can be taxed appropriately. Logs are also more easily traced than sawn timber, making the identification of illegally logged timber more feasible.

4. **Bar new entrants:** Place a quota on the number of license holders to generate sustained profits and align companies' interests with the sustainability of the forests.

At the moment, the industry features numerous license holders, each investing minimal amounts into small-scale equipment. This is to protect against significant loss for each individual company should the forest resources no longer be available. However, it results in each firm trying to cut as much forest as possible as quickly as possible (employing an “if we don't do it someone else will” mentality), attempting to compensate for low profit margins by extracting greater quantities of timber.

Creating higher individual profits from forestry activity may raise people's interest in sustaining the forestry industry. However, increasing profitability is a double-edged sword. It has the positive effect of enabling higher earnings without necessarily increasing the amount of forest. However, increased profits will also generate greater interest in the industry, and without proper controls and enforced legislation this could lead to even greater extraction

as more companies enter the industry, thereby eroding profits.

Quotas need to be set not only for the volume of timber cut each year, but also for the number of actors engaged in the industry. Reducing the number of total licenses and awarding the resultant smaller number of actors greater access to forests would help increase the average productivity and profitability of the remaining licensed companies. A small number of companies operating on a larger scale would mean that each of these companies faces higher sunk costs (costs that cannot easily be redeemed if the company decides to exit the industry or move operations elsewhere) in terms of initial investments while earning higher profits. This would induce companies to take a longer-term perspective and provide them with incentives to operate in a more sustainable manner, even if only for the sake of their own profits. Fewer operators would not only give companies greater space to plan and establish long-term strategies, but would also make the enforcement of rules and regulations by the government a more manageable task.

1. Introduction

The Miombo forests stretch across several countries in southern, central and eastern Africa, including Angola, Zambia, Democratic Republic of the Congo, Mozambique, Malawi, Zimbabwe, and Tanzania. Current practices in the timber, mining and agricultural industries are raising doubts about the continued sustainability of the Miombo forests. Increased demand from emerging economies for natural resources are thought to put additional pressure on forest ecosystems (German et al. 2011). Over the past decade, Chinese demand for timber has boomed, not least because China's domestic supply of timber dramatically decreased due to the logging ban imposed in 1998 (the Natural Forest Protection Program). The search for timber resources overseas is projected to continue to intensify as incomes in China rise (Farooki and Kaplinsky 2012), resulting in an increase in the market for Chinese furniture and other wood products.

Through the research project titled Chinese Trade and Investment in Africa: Assessing and Governing Trade-Offs to National Economies, Local Livelihoods

and Forest Ecosystems, CIFOR wishes to gain a better understanding of the impact that increased demand and investment from China have on the Miombo forests. Zambia, Zimbabwe and Mozambique were chosen as case studies for this project.

This report forms part of the case study on Mozambique, and is intended to give an overview of the domestic value chain and the companies operating in the timber industry, based on data collected through field research into timber activities in the province of Cabo Delgado in northern Mozambique.

The report was preceded by a scoping study (German and Wertz-Kanounnikoff 2012) that identified the timber industry as posing some of the greatest challenges for the Mozambican Miombo forest. It will be followed by an extensive household survey evaluating the impact on local communities and people, and a forestry inventory compiled through GIS remote sensing, to estimate the change in forest coverage over the past 10–15 years.

2. Overview of Chinese demand for and Mozambican supply of timber

2.1 China's booming demand for timber

China's demand for timber products has boomed in the past decade, partly in response to its Natural Forest Protection Program, a national logging ban, which was imposed in 1998 to preserve domestic forests, and more importantly in response to China's growing economy. Between 1990 and 2009, China's share of global timber imports rose from 10% to over 30% (Farooki and Kaplinsky 2012, 75). Canby et al. (2008) find that despite the increase in Chinese demand for forest products, including timber from resource-rich countries in the South, Africa still only makes up a small share of China's total imports. For hardwood specifically, African timber is estimated to take up only a small share of China's imports. Yet, Canby et al. (2008) find that the value of African timber products is higher than that of similar products from other regions.

Although Mozambique is among the top five African timber suppliers to China (Canby et al. 2008), Mozambican timber only constitutes a minor share of China's imports. With over 80% of Mozambican timber exports going to China, the relative importance of the Chinese market to Mozambique, and the insignificance of Mozambique as a source of timber to China are clear.

2.2 Timber exports from Mozambique

Until 1992 Mozambique was ravaged by a 17-year-long civil war and 13 years of struggle for independence. Since the security situation in the country has stabilized, the extraction and export of timber has intensified.

The importance of the timber industry to the Mozambican economy is exemplified by the fact that it is the sixth-largest export commodity (see Figure 1). In 2010, timber constituted 3% of Mozambique's total exports.

The share of the export of logs relative to that of sawn timber rose steadily from the turn of the millennium until 2007, causing concern that Mozambique was not fully exploiting the potential

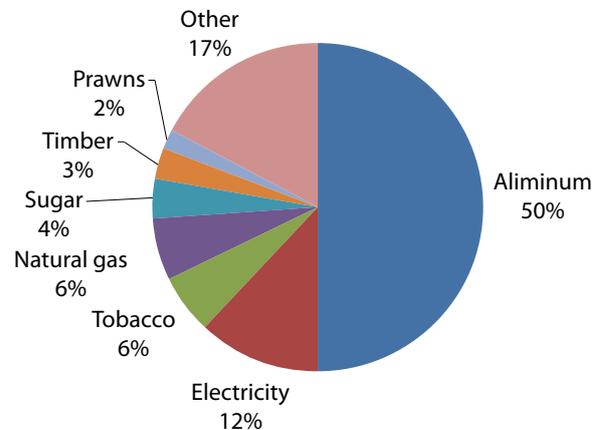


Figure 1. Mozambique's main exports (2010 values)
Source: IPEX

to benefit from value-added processing and job creation in the forestry sector. After 2007, the reported log exports experienced a sharp decline, as a ban on exports of logs of so-called first-class species came into effect. The export of timber from Mozambique has continued to increase since then, with sawn timber now dominating total timber exports according to official reports (see Figure 2). Secondary processed products (such as flooring and veneers), on the other hand, have seen little change over the past decade. However, comparison of Chinese and Mozambican Customs' trade reports suggests that a lot more unprocessed timber is exported than is shown in official Mozambican data (German and Wertz-Kanounnikoff 2012).

When processing wood into sawn timber, waste is incurred, and a cubic meter increase in sawn timber production will therefore have a larger impact on the amount of timber cut in the forests than will the same volume in logs. It can therefore be inferred from the export data that there has been a significant increase in logging activity.

The European Union (EU) imports almost double the volume of African timber as China, but this is not the case for Mozambique timber exports (Canby et al. 2008). Nearly all Mozambican timber is destined for the Chinese market, making Mozambique an extreme case. Around 80% of

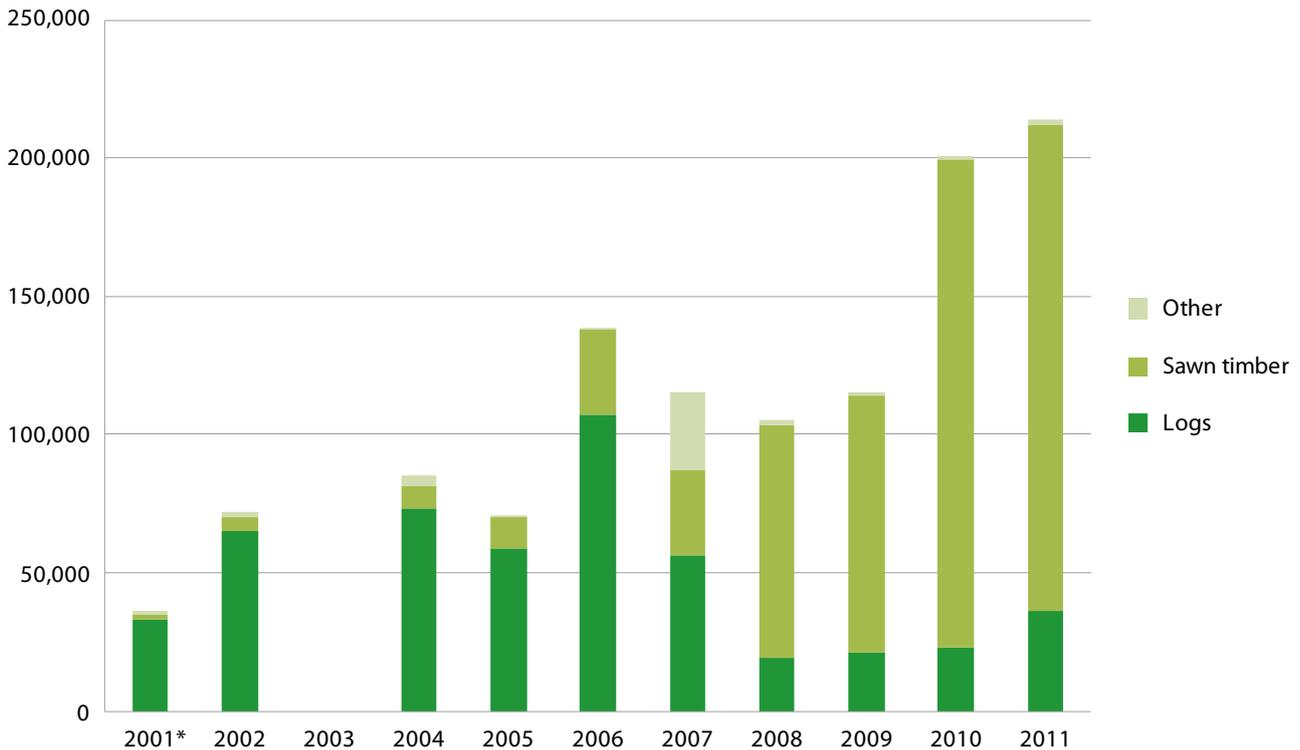


Figure 2. Mozambican timber exports 2001–2011 (m³)

Directorate for Land and Forestry. *Data available for only Zambezi, Sofala, Nampula and Cabo Delgado.

Mozambican timber is used to supply the Chinese market (German and Wertz-Kanounnikoff 2012). According to the annual reports from the National Directorate of Lands and Forests (DNTF), log exports are almost solely destined for China (DNTF 2008).

Although official data imply a reduction in the amount of timber exported as logs, repeated discoveries of illegal exports at the ports indicate that the quantity of logs and timber exported exceed that which is recorded by the government. In their analysis of trade data, German and Wertz-Kanounnikoff (2012) find that Chinese Customs has consistently reported a much higher figure for Mozambican timber imports than is recorded by Mozambican Customs. For 2009 Chinese Customs recorded imports of Mozambican logs that were more than double those recorded as exports to China by Mozambican Customs. The discrepancy supports the idea that large quantities of timber are exported illegally.

Mackenzie and Ribeiro (2009) find “enormous” discrepancies in the statistics between DNTF and Customs in their study of the Zambezia province in Mozambique. Furthermore, they

find that containers were repeatedly reported to the authorities to be filled only to a fraction of the maximum container volume. Given that shipping prices are based on container volume and not weight, they concluded that companies understated the true export volumes. This suggests that the trade in unreported timber may be significant. They estimate that 50% of the timber shipped out of Zambezia is illegal (Mackenzie and Ribeiro 2009, 47). If the discrepancy between recorded imports by China and exported ones from Mozambique can be used as an indicator, Mackenzie and Ribeiro’s estimate is confirmed. The discrepancies, not only between Chinese and Mozambican statistics, but also internally in Mozambique, call into question the reliability of Mozambican trade data.

Illegal exports consist of two main types: timber cut without a license (illegal logging) and since 2007, unprocessed first-class timber. While Mozambican official statistics show a dramatic decline in the export of logs after the 2007 log export ban was imposed, the imports recorded by China display a much smaller decrease and a leveling off for the period 2008–2010. Chinese data further show that 80% of timber imports from Mozambique

are still in the form of logs, indicating that the log export ban seems to have only had a limited effect in terms of inducing companies to export mainly sawn timber.

The illegally exported logs could either be recorded as sawn timber (inflating the sawn timber export statistics), or not be recorded at all by Mozambican Customs (deflating the statistics on overall exports).

2.3 Mozambican forestry regulation

There are two types of licenses available for cutting timber in Mozambique: the simple license and the concession license. Until March 2012, the simple license was valid for a year only, giving the holder the right to cut a certain amount of designated timber species in a specified area. Cutting above the set quotas would in theory result in the imposition of fines on the simple license holder (SLH). Simple licenses are reserved for Mozambican nationals only.

In early 2012, the regulations regarding simple licenses were changed to create incentives for better forest management. License validity was extended to 5 years, and management plans and inventories must now accompany the license application.

The concession license gives the holder the right to cut timber in a large specified area for 25 to 50 years. It is hoped that the long time frame will encourage sustainable practices among the concession license holders (CLHs). The conditions for obtaining a concession license are stricter than those for a simple license. The applying company must provide a management plan, inventory of the forest, and evidence of adequate processing machinery, indicating their compliance with domestic processing requirements. Like the SLHs, the CLHs are subject to annual quotas for each species within their concession based on the respective forestry inventories. The management plans and inventories need to be carried out by forestry consultants approved by the provincial government. In Cabo Delgado, these are mostly conducted by one consulting company. Concession licenses are open to persons of any nationality.

According to some observers, the vast number of actors in the industry has made the forestry sector unmanageable (Mackenzie 2006; Mackenzie and Ribeiro 2009). This is because the large number of licenses makes it hard for forestry enforcement officials to control the industry. Furthermore, given

the short time frame of simple licenses as well as the relative ease by which one can obtain a license, SLHs have little incentive and often no capacity to invest sustainably in their practices.

To reduce the number of companies operating in the industry, the Mozambican government has made it a goal to gradually abolish the simple license while increasing the number of concession licenses. Concession licenses are perceived by the government to be better for the industry, as CLHs need to prove their financial capacity to invest in machinery and equipment, and to provide management plans and forestry inventories. CLHs are also assumed to create more employment due to the larger area covered by the concession and because CLHs run sawmills. The effect of this policy has been much debated as both simple licenses and concession licenses have been granted more frequently (Mackenzie 2006; Ribeiro and Mackenzie 2009).

In Cabo Delgado a similar pattern can be observed. In 2011, there were 24 companies holding in total 35 concession licenses in Cabo Delgado. As can be seen in Figure 3, the number of concessions has been increasing over the past decade.

At the same time, the number of simple licenses has not been decreasing. As can be seen from Figure 3, the attempt to reduce the number of actors by phasing out simple licenses cannot be said to have succeeded in Cabo Delgado. Despite the increasing number of concession licenses, the number of simple licenses has begun to rise again after a brief drop, demonstrating the great demand for timber and the increasing pressure on the forests of Cabo Delgado.

Since the change in regulations in 2012, fines are now to be administered for a range of offences, including cutting beyond the authorized quota, cutting of unlicensed species, cutting outside the cutting season, and transporting timber without a license. Should the illegal export of timber be discovered, the offending company is now subject to a fine. The confiscated timber products are then auctioned off to the highest bidder. More often than not, the buyer will be the offending company.

Licenses are subject to application fees. The licensing fee is generally the greatest contributor to the Forestry and Wildlife Department's revenues.

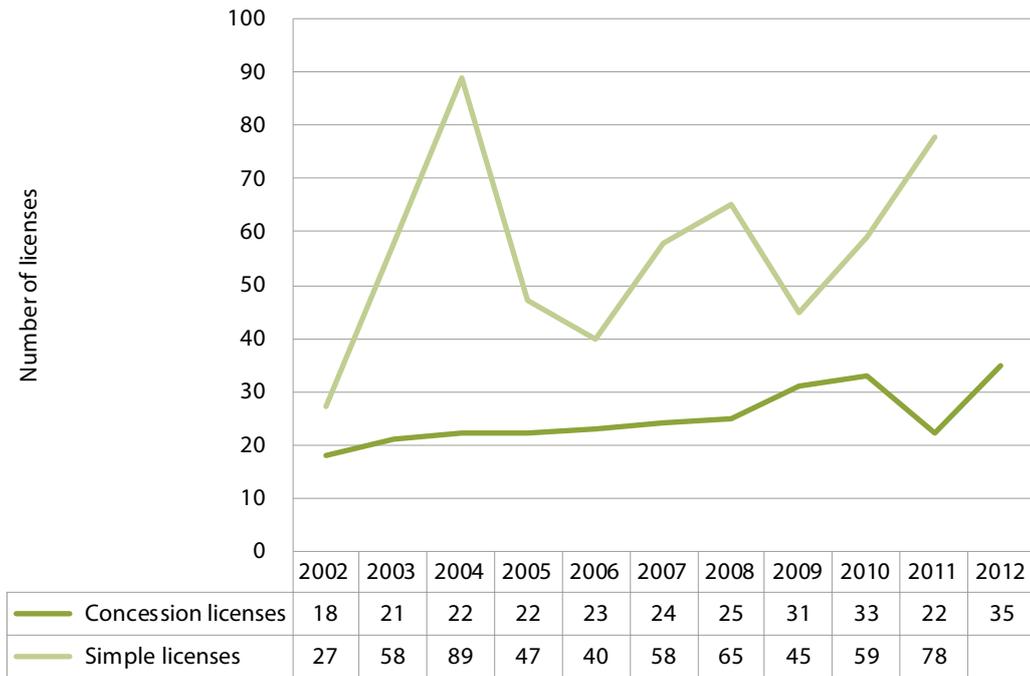


Figure 3. Number of simple and concession licenses (2002–2012)

DPA annual reports

Since 2006, Mozambican law stipulates that 20% of the license fee should be returned to those local communities affected by the concession. The next phase of this project will study the impact on local communities in more detail.

2.4 Previous research on the role of the Chinese in Mozambique's timber industry

Studies carried out on the Mozambican timber industry, focusing on Zambezia Province, yielded worrying results regarding forestry management and the sustainability of this important industry. Mackenzie (2006) and Mackenzie and Ribeiro (2009) find that the enforcement of regulations is lax and that illegal operations occur frequently. Management plans were reported to be substandard and inventories to be unreliable (Mackenzie and Ribeiro 2009, 56). The reports questioned whether the Mozambican timber industry would be profitable if it was managed sustainably.

Prior to the introduction of the log export ban in 2007, a value chain analysis of the timber

industry was conducted in Cabo Delgado by Terra Firma. The study argues that there are no distinctive differences in patterns of business practices by Chinese operators *vis-à-vis* other foreign groups. However, Chinese actors' dominance in the industry and increasing demand from the Chinese market mean that both of these factors will have a significant impact on the challenges faced by the timber industry (Bossel and Norfolk 2007, 54). The findings of this report generally support this argument.

Furthermore, Bossel and Norfolk find that forestry regulations are frequently not enforced and that corruption is a key challenge for the exercise of sustainable forestry management. Those authors also find, as does Mackenzie (2006), that management plans produced when applying for a concession license only pay lip service to the requirements, and do not play a central role in the companies' business plans (Bossel and Norfolk 2007, 55). This led those authors to express doubts regarding the sustainability and future of the industry, if action is not taken to control the current situation (Bossel and Norfolk 2007, 1).

3. Research objectives and hypotheses

The main objective of this report is to give an overview of the timber industry in Mozambique by examining the different stages of the value chain. This will allow us to identify the agents and flows of investment, production, and trade in timber in order to compare the role of Chinese companies' trade and investments to that of domestic and other foreign companies in the Mozambican timber industry.

Common perceptions and previous research shaped the hypotheses that were examined during the fieldwork. The main hypothesis was as follows:

Comparing Chinese timber companies with other foreign and Mozambican companies, there is a difference in their approach, role and operations along the value chain.

This main hypothesis was then divided into several subhypotheses:

1. **Business model:** Chinese timber companies are moving upstream to vertically integrate their activities along the value chain and are sourcing roundwood directly from the forests. There is currently a shift from Chinese companies providing forward finance to Mozambican SLHs, to acquiring their own concessions and thus to establishing direct supplies of wood.

2. **Market access:** Chinese companies enjoy greater market access to China (due to personal networks, shared language, familiarity with the culture, and better knowledge of the Chinese market), generating greater profits and success, as they do not need to depend on intermediaries and they hold a strong bargaining position in the Mozambican market.
3. **Access to factors affecting production machinery, capital and labor:** Chinese companies have better access to more efficient (modern) machinery and capital, giving them a competitive edge over domestic companies.
4. **Value chain activity:** Research from other countries within the Miombo forest region indicates that Chinese companies also tend to operate further downstream in the value chain than domestic companies. Chinese companies operating in Mozambique were expected to follow the same pattern.

The research objectives at this stage of the project did not include the following:

- **evaluating** the impact on local communities
- **investigating** illegal logging in its own right, although aspects of illegal logging are inevitably included in the analysis of the industry due to their sheer volume
- **developing** normative statements about the current situation, or “naming and shaming” agents and practices observed.

4. Methodology

A scoping study identifying regions and industries of interest for further research was conducted in 2011 (German and Wertz-Kanounnikoff 2012). The study finds that a geographical concentration of foreign actors (and related impacts) in the forestry sector is shifting from central Mozambique toward the north (German and Wertz-Kanounnikoff 2012). The northern province of Cabo Delgado was identified as a suitable province for in-depth research on the timber industry and its effects on the forests and on national and local economies.

4.1 Research process

The study was conducted in partnership with Universidade do Eduardo Mondlane, which facilitated the field research and made available a network of specialists in the field.

Key informant interviews with various actors were conducted in Maputo and in Cabo Delgado prior to, during, and after the field research. The key informants included Mozambican government representatives at both national and provincial levels, embassy staff, Mozambican forestry experts and consultants, members of NGOs, journalists, and civil society actors (see Table 1).

4.2 Data collection

Data for this research paper were collected from various sources and during different activities:

- review of existing literature
- review of the regulatory framework and laws pertaining to the forestry industry in Mozambique and China
- review of primary documents collected in Mozambique and data collected from various government institutions
- key informant interviews in Maputo and Cabo Delgado
- field interviews of stakeholders along the timber value chain in Cabo Delgado.

4.3 Composition of research team

A majority of the companies and individuals interviewed possessed little or no knowledge of

Table 1. Key informants

Key informants	Number of interviews
Government officials	4
NGO members	3
Forestry experts/consultants/ journalists	8
Association members	2

English, most speaking only Portuguese or Chinese. The research team was therefore composed of individuals with knowledge of both Mozambique and China. This eliminated potential linguistic and cultural barriers, as well as reducing suspicion within some companies toward the project.

4.4 Timing of field visit

The duration of the field visit to Cabo Delgado was 14 days. The the field visit was carefully timed to occur in late March – and early April, just before the cutting season. The rationale behind this was that it would be easier to reach more managers and owners of concessions — first, because they would not be preoccupied and would be more likely to have time to participate in the research project, and second, because they would be easier to locate, as during this time they are usually concentrated in Pemba (the provincial capital, where most companies have their main sawmills and offices) rather than dispersed to different cutting sites.

4.5 Sites in Cabo Delgado

Four districts were identified for the field research in Cabo Delgado Province: Mueda, Montepuez, Mocimboa da Praia and the provincial capital, Pemba, as can be seen in Figures 4 and 5.

These sites were selected so as to gain a good representation of companies with different national origins (Mozambican, Chinese and other foreign ownership) in order to compare the differences between the companies. In addition, Mocimboa and Pemba were selected as they are important processing and shipping sites for timber.



Figure 4. Map of Mozambique showing location of Cabo Delgado Province

4.6 Concession license holders

Given the large presence of Chinese companies and China's status as the dominant export market, a distinction was made between companies' national origins in order to identify differences in business models and activities along the value chain. Companies were classified into one of three categories: Mozambican, Chinese, or other foreign origin. A company was classified as Chinese if its owners and managers were from China.

Although representation of each type of concession holder in each district was ensured, coverage was not restricted to companies solely in these districts. In all, companies with concessions in at least one of 12 districts (from a total of 16 districts) were interviewed.¹

¹ The 12 districts were Balama, Chiure, Macomia, Meluco, Mocimboa da Praia, Montepuez, Mueda, Muidumbe, Namuno, Nangade, Palma and Pemba.



Figure 5. Map of Cabo Delgado Province

Source: Wikicommons

Concession-holding companies were identified by “knocking on doors” in an area of Pemba where most concessionaires (CHLs) conduct their sawmilling operations and have their offices. A list of concession-holding companies was provided by the Provincial Department for Agriculture (DPA).

Nearly 40% of all companies holding concessions in Cabo Delgado were interviewed during the field visit, covering almost 50% of all concessions in the province. Forty percent of all Mozambican concession holders were interviewed, with the corresponding figures for Chinese and other foreign companies being 60% and 29%, respectively (see Table 2). Apart from China, foreign concession holders originate from Germany, Israel, Kenya, Portugal, Singapore, South Africa and Sweden.

A concessionaire generally holds just one license, with a handful of companies having two licenses. The number of licenses is pushed up by two large companies in the province, a Mozambican and a Chinese company, holding four concessions each.

There is an even distribution of concessions across companies with Mozambican, Chinese and other foreign ownership (see Figure 6). Ten of the 24 companies operating at the extraction stage are Mozambican, covering 15 concessions in all. Half of the foreign-owned concessions are held by Chinese companies, with 10 concessions in total, with the other foreign companies holding the remaining 10 concessions. Thus, there is an even distribution of concession licenses across the national groups.

Table 2. Companies and concessions in Cabo Delgado

Nationality	Number of companies holding concessions	Number of companies interviewed	Number of concessions	Number of concessions covered by the study
Mozambican	9	4 (44%)	15	9 (60%)
Chinese	5	3 (60%)	10	6 (60%)
Other	7	2 (28.6%)	10	3 (30%)
Total	21	9 (37.5%)	35	17 (48.6%)

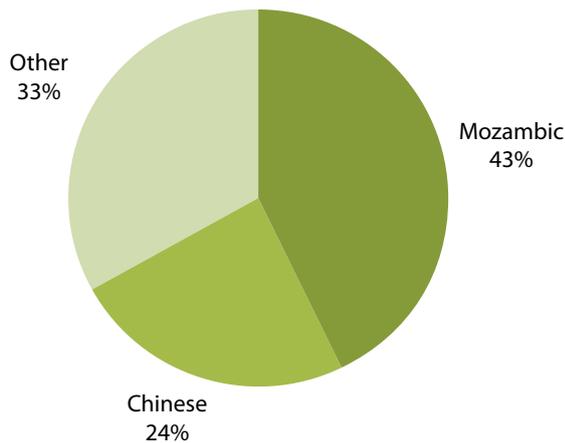


Figure 6. Proportion of companies according to national ownership (2011)

DPA registry of companies

4.7 Other actors interviewed

The following people were also interviewed for this study:

- Simple license holder (1) — Identified SLHs were generally not willing to participate in the study. They were also harder to identify, as they do not own sawmills, which would have given their business a physical presence in the towns.
- Informal carpenters (2) — These are roadside carpenters who produce furniture for the local market on a small scale.
- Timber trading companies without concessions (pure trading companies) (3) — As the field visit did not coincide with the cutting season, nonpermanent timber traders were not present in Cabo Delgado. Only timber trading companies with sawmills in Cabo Delgado could be identified.
- Shipping agencies (2) — The two most commonly reported shipping agencies used by exporters were interviewed.
- Forestry consultant engaged by the timber companies (1) — All management plans in Cabo Delgado are carried out by the same consultancy company.

The next phase of this research project will focus on the impact of the timber industry on households and local communities through an extensive household survey. This group was therefore not included at this stage. *Furtivos* (illegal loggers) were not interviewed either, as these could not be identified.

4.8 Limitations

Timing

Conducting research during the noncutting season meant that access to concessionaires was good. However, it presented obstacles with regard to contact with traders and SLHs. Trading companies (consisting mainly of foreigners) are usually only active in the cutting season and often do not remain in Cabo Delgado during the off-season. This meant that there were only a few trading companies present during the field visit (a trading company is defined here as a company that does not hold a concession license).

The timing of our field visit also meant that direct observation of activity in the concession areas was not possible.

Simple license holders

It was difficult to locate SLHs as the provincial government could not provide us with a list of companies and individuals holding such licenses. Unlike CLHs, who occupy large, visible sawmilling sites and offices in Pemba, SLHs are harder to locate.

Official data

The availability of and access to government data were limited and extremely time consuming. The process to obtain permission to access data often took weeks, and in some instances permission was never given. Annual forestry reports prior to 2006 were missing at the DPA. Some relevant government agencies claimed that they had no database of statistical information at all.

Annual forestry reports from 2006–2011 were obtained from the DPA, as well as a list of registered foreign investment projects from the Center for Investment Promotion (CPI) in Maputo for 2001–2011. Registering with the CPI is voluntary;

only one foreign forestry company had recorded its investments with the CPI, indicating that the CPI figures do not provide a full overview of the investment situation.

5. Findings and discussion

5.1 Timber industry value chain

In order to identify the relevant agents and stages of the value chain, a functional analysis table was created (Table 3). There are eight main stages in the value chain for timber traded with China: extraction; primary trading — the selling of logs to sawmillers (traders and concession license holders) — as well as illegal export of unprocessed timber to China; primary processing at the

sawmills; export to China; two stages of shipping; entry and sale on the Chinese timber market; manufacturing in China; and finally retailing in China.

A small part of the value chain consists of timber used to supply the domestic Mozambican market; two of the largest concessionaires fully engage in this.

Table 3. Functional analysis of the timber value chain in Cabo Delgado

Stage of the chain	Function	Agents	Output
1. Extraction	<ul style="list-style-type: none"> Logging/cutting Transport to sawmill 	SLHs CLHs <i>Furtivos</i> (illegal loggers) DPA	<ul style="list-style-type: none"> Logs Delivery to sawmills
2. a. Primary trading	<ul style="list-style-type: none"> selling/trading logs exporting to China 	SLHs CLHs <i>Furtivos</i> Traders	Logs
b. Processing	<ul style="list-style-type: none"> primary processing higher processing 	CLHs Traders	Sawn timber Planks Flooring
3. a. Mozambican market	Selling to domestic market	CLHs Domestic consumers/ construction industry	Sawn timber Flooring/housing materials
b. Export	Export Shipping	CLHs (Chinese) Traders Shipping agents Customs DPA	Sawn timber
4. Repackaging and transport	Repackaging of goods and transport to final destination port in China	Shipping agents Customs: Singapore and Comoros	Logs, sawn timber
5. Chinese timber market	Import/trade	CLHs (Chinese) Traders	Logs, sawn timber
6. Manufacturing	Production of Chinese furniture	CLHs (Chinese) Chinese furniture manufacturers	Chinese-style carved furniture
7. Retail	Retail of finished products on the Chinese market	Chinese manufacturers CLHs (Chinese) Chinese consumers and construction industry	Chinese furniture Property fittings

Once data were collected, the identified agents and operations along the value chain were placed into a flow chart illustrating the journey of Mozambican timber (Figure 7).

At the extraction stage, timber is cut in the forest by licensed and unlicensed agents. The government earns revenue from the issuing of licenses, of which 20% is to be distributed to the affected local communities.

Simple license holders sell logs to those concessionaires or traders who are in possession of a sawmill. Minor quantities of the cut timber are sold to informal carpenters, who create furniture to be sold locally.

Logs are then either processed into sawn timber or exported (illegally) as logs to China by Chinese concessionaires or Asian traders. In order to export roundwood, bribes have to be paid to the relevant parties (Customs and DPA).

The wood cut into sawn timber is generally sold to traders or Chinese concessionaires and then exported. Small quantities of sawn timber used to produce fittings such as flooring and doors that are supplied to the Mozambican market. However, as the domestic market is small, the vast majority of timber is destined for China.

The timber is then shipped to the Comoros Islands or Singapore, where it is redistributed and loaded onto ships headed for various final destination ports.

When the timber arrives in China, it is either used to supply the traders'/concessionaires' own manufacturing plants or sold on the Chinese timber market to Chinese furniture manufacturers.

Mozambican timber was reported to be used only for Chinese antique-style furniture and it is therefore retailed largely on the Chinese market (there is no re-export to Europe).

5.2 Stages of the value chain

In the following sections, each stage of the value chain and the data collected will be presented.

5.2.1 Extraction

At the extraction stage there are three types of actors involved: CLHs, SLHs, and *furtivos*.

Concession license holders

The role of the concessionaire in the value chain:

Cutting–transport–sawmilling

One of the requirements for obtaining a concession license is to own adequate processing machinery. This, combined with the ban on log exports, has led to all concessionaires operating not only in the extraction phase but also at the primary processing stage (at least on paper), as transporters and sawmillers. Nonetheless, some concessionaires (usually Mozambican) sell timber as logs to sawmills owned by other concessionaires or traders. One reason for this is that larger sawmills have overcapacities and are more efficient in cutting the timber. Concessionaires owning substandard machinery therefore sell their logs to sawmillers with greater capacity.

According to an industry expert in Mozambique, the requirement for all concessionaires to own processing machinery induces a waste of financial resources. The regulation has caused an influx of cheap low-quality cutters and sawing equipment that now stand idle, with no purpose other than getting the concession application approved. Pooling the logs at fewer but larger and more efficient sawmills would be more efficient, as this would enable a few sawmillers to invest in more expensive modern technology.

According to the consultancy company carrying out the management plans and forestry inventories in Cabo Delgado, the cost for a concession application ranges from USD 10,000 to 20,000, depending on the size of the concession.

Concession sizes vary greatly among the companies interviewed. The smallest concession is just 10,000 ha, whereas the bigger companies have licenses to operate in 200,000 to 300,000 ha of forest. The concession licenses are reportedly valid for 25–50 years.

The quantity extracted from the concession areas also varies greatly. The smallest concession holder reported that he is able to extract 1000 m³ annually from his 10,000 ha concession. The bigger companies may extract about 8000–10,000 m³ of logs annually from the 200,000–300,000 ha covered by their licenses. The volumes extracted depend not only on the quality of the forest in the concession, but also on the volumes the company is authorized to cut by the provincial government. This in turn is based (at least in theory) on the forestry inventory

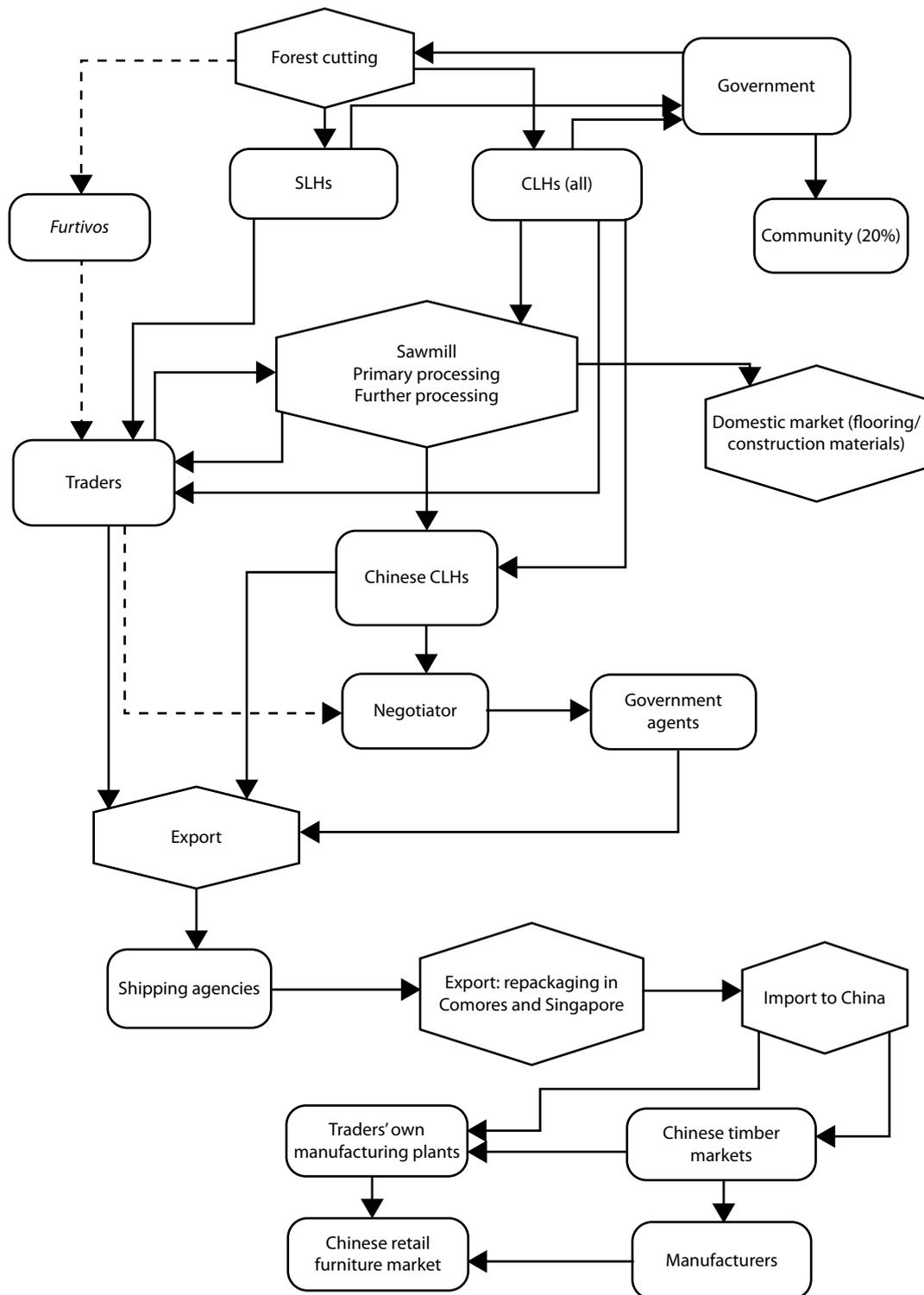


Figure 7. Flow chart of the timber industry in Cabo Delgado

Note: dashed line = illegal activity.

Source: Tallec and Bockel 2005.

provided by the company. Although overcutting of certain species beyond the volume defined by the license was considered to be common by key informants, there is little evidence of this in the provincial annual forestry reports. However,

detailed data on fines and offences were available for the year 2010, when offences for cutting beyond the allowable quota were recorded. These data are, however, not presented in the provincial annual report for 2010.

In 2010, a total of 10 offences were recorded. Two of the reported offences related to overcutting beyond the allowable quota (Figure 8). The logging of species not covered by the concession license was the most commonly reported offence (three offences). Other offences recorded were buying unlicensed timber (presumably illegally cut timber), not marking the logs, exporting first-class timber as logs, and cutting during the off-season. Of the 10 offences by concessionaires that were recorded, only three fines were enforced and paid.

Employment

During the cutting season, the concessionaires employ additional labor, with the smallest CLHs hiring 30–40 workers and the biggest hiring up to 500 seasonal workers.

The size of the concession, volumes cut and numbers of employees vary greatly among Chinese companies. As regards these three factors, the Mozambican, Chinese and other foreign categories of concessionaires display greater diversity internally than between each other. As there are both small and large CLHs of various national origins, the above factors are affected more by the size of the company than by the nationality of the owner.

Species cut

According to the companies interviewed, jambire (*Millettia stuhlmannii* Taub.) is the species most in demand, followed by umbila (*Pterocarpus angolensis* Harms) and pau ferro (*Swartzia madagascariensis* Desv.). Pau preto (*Dalbergia melanoxylon* Guill. & Perr.) is also in demand but to a lesser degree, and

small quantities of chanfuta (*Afzelia quanzensis* Welw.) are also harvested. The provincial data on the recorded volumes cut per species show that jambire is the most commonly cut species, followed by umbila, chanfuta, pau ferro and pau preto. Figure 9 shows the proportion and amount of each species cut annually (for the years that data were available).

Generally, the recorded volume of timber actually cut is lower than the authorized quota set for the licenses (meaning companies are cutting less than they are entitled to if the recorded data are reliable). Only on two occasions has overcutting been recorded by the DPA annual reports: jambire was overcut by 4700 m³ in 2003 and by 1800 m³ in 2011.

Corporate social responsibility and reforestation

With regard to corporate social responsibility (CSR) and the issue of reforestation, interviewed companies referred to the current regulation, which obliges companies to pay a tax earmarked for government reforestation projects. Because of this, they perceive themselves to be absolved from any obligation to engage in reforestation directly. Similarly, 20% of the revenues accrued to the government from license fees are earmarked for the local communities affected by the concessions. Companies therefore tend to view the issue of CSR and reforestation to be the responsibility of the government.

With the exception of the two largest companies (one Mozambican and one Chinese), all interviewed concessionaires said they do not engage in CSR activities. The CSR activities by the largest companies seem to be of sporadic nature in the form of donating timber and planks to local communities, as well as digging wells during the dry season, rather than being a formalized part of their business plans.

The government runs a handful of nurseries to produce and plant saplings. In 2007, two nurseries were established, and in 2008 this number had increased to five. There are currently nine nurseries operating in Cabo Delgado. Figure 10 shows the recorded number of saplings planted annually.

Although the number of nurseries and planted saplings is increasing, the extent of reforestation is still minor compared with the scale of logging in Cabo Delgado.

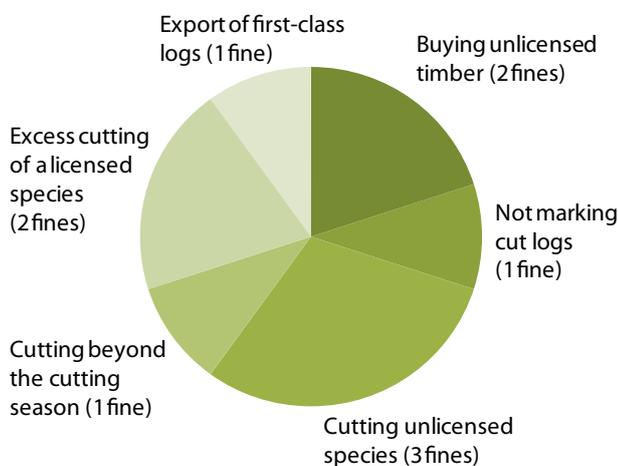


Figure 8. Fines imposed on concession license holders in 2010

DPA data 2010

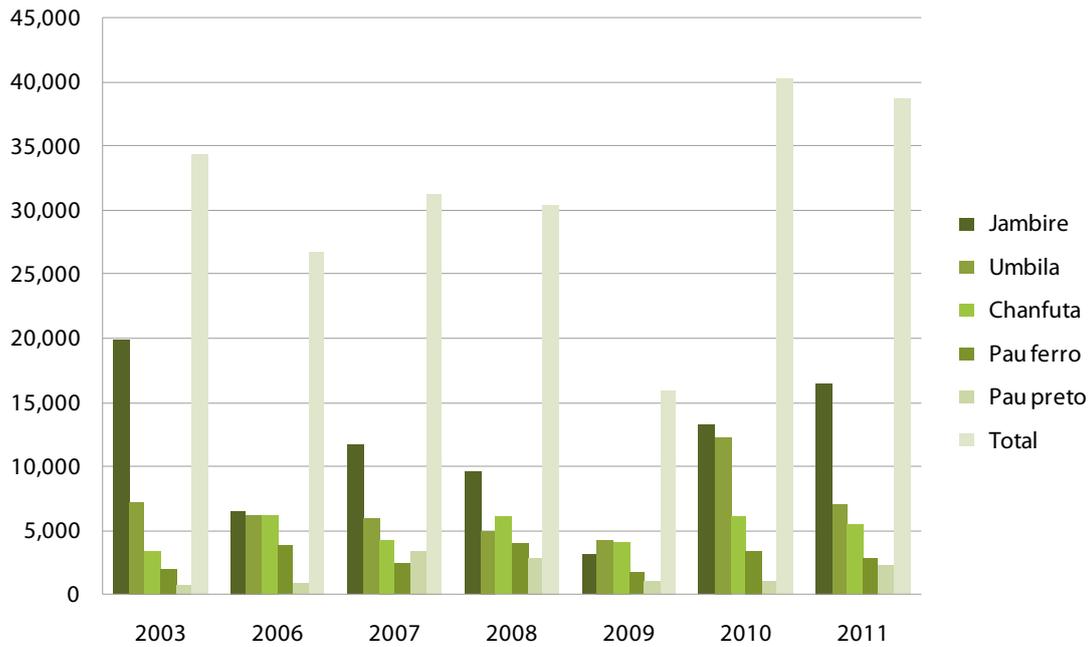


Figure 9. Species cut (2003–2011)
DPA annual reports

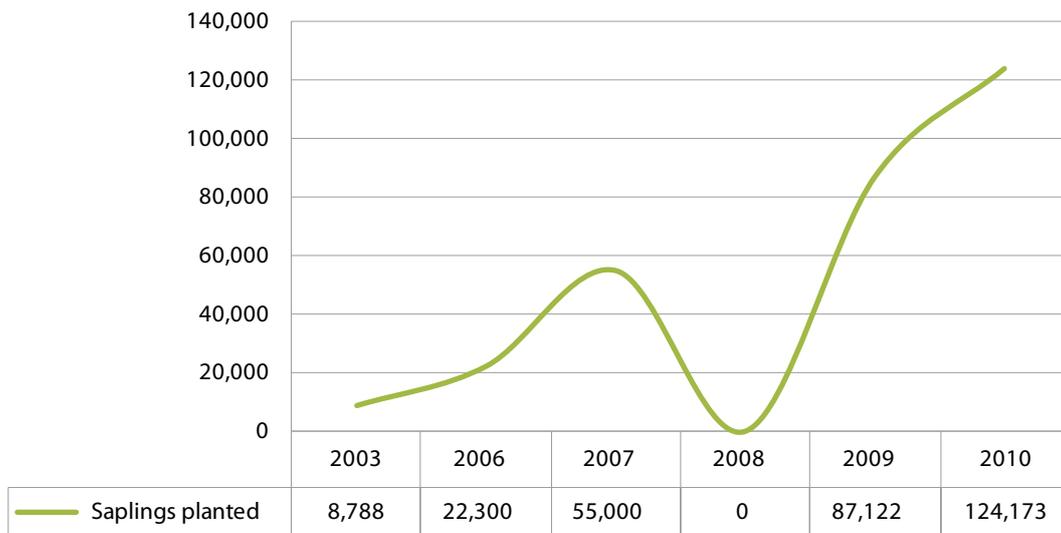


Figure 10. Number of saplings planted annually (2003–2010)
DPA annual reports

The two largest companies say that they have their own private reforestation programs. Due to their greater investments, these companies have a vested interest in the sustainability of the forests.

The emergence of the Chinese concessionaires
Data on the distribution of concessions by national origin exist for the years 2001, 2003 and 2011. Looking at these figures, the change in the presence

of Chinese companies at the extraction stage in the past 10 years is evident.

The trend toward securing a direct timber supply is illustrated in Figure 11. Chinese companies have over the past decade moved upstream and now operate in the extraction phase as concessionaires. They are by far the largest group of foreign actors in Cabo Delgado’s timber industry.

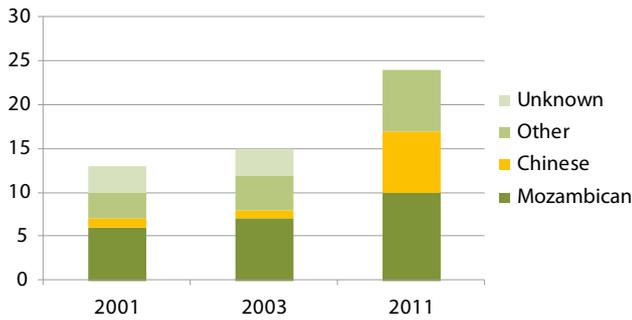


Figure 11. Concession holders by national origin (2001–2011)

DPA annual reports

Moving upstream

It is evident that Chinese companies have displayed an interest in moving upstream to source the timber directly from the forests. One of the reasons given for this by Chinese companies is that it is cheaper than buying timber from SLHs and other concessionaires. Engaging directly in the cutting also means greater control of the quality of logs.

One Chinese concessionaire has fully vertically integrated his operations through the entire value chain from cutting the timber to retailing Chinese furniture in China. Starting as a furniture manufacturer, the company explained, sourcing timber was difficult, as intermediaries were unreliable. The company originally placed orders with SLHs. However, SLHs would frequently sell the timber to other traders instead, leaving the company with a shortage of the timber needed to run its manufacturing operations in China. Entering Mozambique initially as traders and buying timber from SLHs, the company quickly decided to apply for a concession. Obtaining direct control of the raw material was seen as the only way to ensure timely and reliable supply of timber that met the quality needs of the company.

Yet, according to Asian companies interviewed, acquiring concession licenses is increasingly difficult as there is very little “good bush” left in Cabo Delgado. Most of the productive forests are already under concession licenses. In addition, obtaining a license is expensive and time consuming. For larger concession areas, the license needs to be approved by the government in Maputo, meaning that a good network and relations beyond the provincial department are necessary to ensure a smooth application process, according to one respondent.

Access to capital

The Chinese concessionaires acquire capital from various sources. Access to capital through bank loans in China was not mentioned by interviewees. An interviewee from one of the large Chinese companies explained that it is extremely difficult to obtain a bank loan in China for investments in the timber industry. The owner of one company stated that he had used his own personal savings to start his business in Mozambique. Another company with manufacturing facilities in China reported investing capital to finance the concession license. Yet another concessionaire company explained that they were being forward financed by a manufacturing company in China. When asked if there was any assistance offered by the Chinese embassy, all companies responded that there was no cooperation and very little communication with the Chinese embassy.

Simple license holders

Until very recently, the simple license was valid for 1 year only, giving the holder the right to cut a certain amount of predetermined timber species in a specified area. Cutting above the set quotas would in theory result in the imposition of fines on the SLH. However, in early 2012, the regulations pertaining to simple licenses were amended, and the simple license is now valid for 5 years. Similar to the concession license, simple license applicants are now also required to provide a management plan and a forest inventory.

Access to capital

The application requirements for a simple license are fewer and much less costly than those for a concession. While the new regulations place more demands on simple licenses, similar to those for concessions, they are still reserved for Mozambican nationals only. As a result, foreign companies that could not meet the criteria stipulated for concessions enter into informal partnerships with Mozambicans to gain direct access to timber by forward financing the SLH. In exchange for capital to pay for the license and necessary equipment, the SLH supplies the timber to the foreign entity providing the finance. Another manner in which traders/sawmillers facilitate SLHs to operate is by renting out the needed equipment, with payment being either in the form of timber or money.

Against initial expectations, interviewed trading companies reported that forward financing is in fact

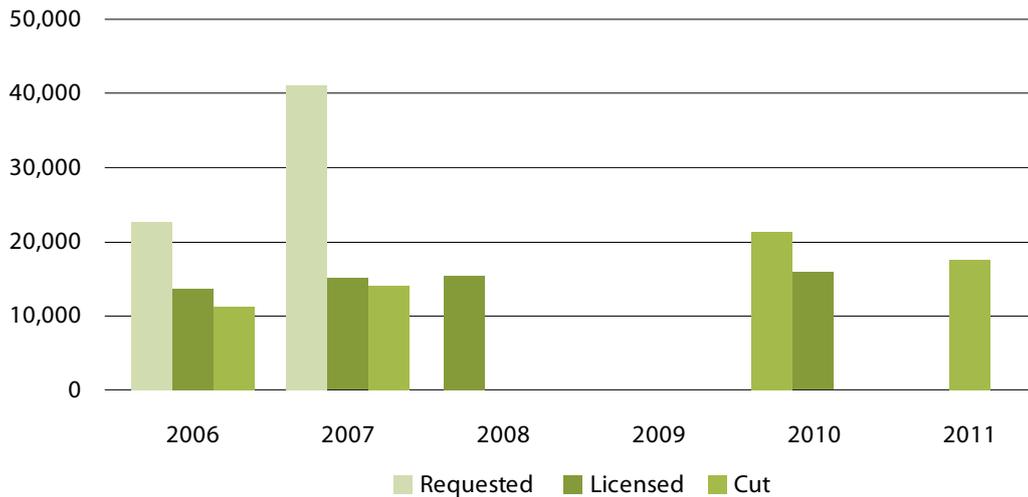


Figure 12. Volume of timber requested, authorized and cut (m³) 2006–2011

DPA annual reports

highly risky and littered with conflict. There are no guarantees that an SLH will not sell the timber to a company other than the one providing the finance. After logging, the SLHs tend to sell the logs to the highest bidder, rather than selling the logs at a discounted price to his financier (the trader) as initially agreed upon. Although it may still occur occasionally, it is not a strategy on which traders and exporting concession holders wish to rely. Forward financing has by and large been abandoned according to several respondents.

Conflicts

Various interviewees said that SLHs often cut timber outside their designated area. According to an NGO representative, they are therefore often involved in conflicts with local communities. If an SLH is assigned area A, 20% of the license fee will be returned to the local community in area A. However, the SLH will frequently enter an informal agreement with the community leader of a neighboring area (B) and cut timber in area B. This causes great resentment and anger among people in area B, as they receive no compensation for the cutting of their forests.

Volumes requested, authorized, and cut

Each year, license holders must request authorization from the DPA to cut timber in their designated areas. The license holders must also report back to the DPA on how much logging took place during the year. The data on authorized cutting volumes for SLHs and volumes actually cut contain severe gaps, with full information

available only for 2006 and 2007 on how much was requested by the SLHs, approved by the government, and finally cut (see Figure 12). In both these years, the requested volumes far exceeded the authorized cutting volumes.

The authorized cutting volumes have remained fairly stable over the years, regardless of the change in number of actors. In 2010 overcutting was reported. Although it is uncommon for the total figures to show that overcutting of timber occurs, according to forestry experts in Cabo Delgado, overcutting within certain species is frequent. This is compensated for by cutting less than the allowed amount of other species. Unfortunately, data on cutting by SLHs on a species level are not available.

Offences

Detailed data on offences and fines exist for 2010. Figure 13 illustrates the various recorded offences by SLHs and *furtivos*. In total, 27 offences by SLHs were recorded in 2010, but only 11 fines were paid. The most common offences were cutting unauthorized species and transporting timber without a license, followed by excess cutting of licensed species and cutting in the off-season.

Value chain activity

After cutting the trees, SLHs sell the logs to traders or concessionaires who transport the logs to their sawmill. The price paid for the timber is not stable but depends on the time of year and the quality of the logs. On average, the price hovers around USD 300/m³ for the most sought-after

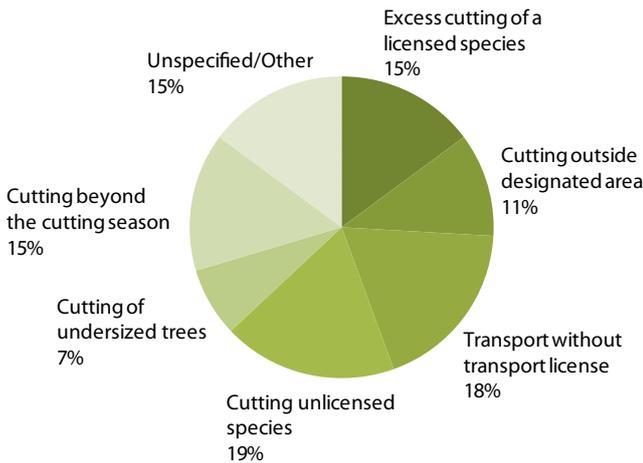


Figure 13. Fines imposed on simple license holders in 2010
DPA annual reports

species. Traders reported paying SLHs a slightly lower price than the one concessionaires receive, as the quality of the logs provided by SLHs is often inferior. SLHs do not have the same capacity to find, cut and transport the bigger logs that could raise the value of the timber, given that less waste is produced when processing such logs. Key informants explained that a majority of the SLHs are newcomers to the industry with little prior knowledge or experience, resulting in inefficient logging management. According to key informants and companies interviewed, the timber industry is falsely perceived to be highly lucrative by those who are not directly engaged in it. In addition to this, Cabo Delgado is a poor province with few other developed industries. Thus, timber is the only income-generating activity other than agriculture, small-scale mining and tourism. This may change in the coming years as oil and gas have been discovered in Cabo Delgado, which may divert the interest currently shown in timber into other industries.

Furtivos

No actors in this group were interviewed; however, their existence in the industry is evident from interviews with local carpenters, traders, and forestry enforcement officers.

According to both traders and forestry enforcement officers, the timber cut by *furtivos* is commonly taken from natural conservation parks. Traders reported that it is very easy to obtain timber from protected areas, and that they are frequently offered such timber by illegal loggers.



Figure 14. Illegally harvested impounded by forestry enforcement officials in southern Cabo Delgado
Photo by Huang Wenbin

The price for illegally cut timber (see Figure 14) is reported to be lower than that cut by license holders for the same reason that SLHs receive a lower price than concessionaires: the quality of logs is inferior. This practice is also found to be true in Zambezia province by Mackenzie and Ribeiro (2009, 27). According to traders, logs cut by illegal loggers are of low quality since the *furtivos* do not possess the necessary skills or equipment to select the best and biggest trees. The traders said that buying illegally cut logs is thus not worth the risk of being caught.

Informal carpenters producing furniture for the local market stated that they buy their logs from sellers alongside the roads, logs that are presumably unlicensed. Although no company interviewed admitted to purchasing illegal logs, *furtivos* interviewed in Zambezia stated that they regularly sell to traders (Mackenzie and Ribeiro 2009). It is difficult to estimate the extent of the *furtivo* activities as no formal business will admit to sourcing wood from them. However, several traders stated that they are often offered illegal timber from conservation areas. One concessionaire with concessions near the Tanzanian border expressed frustration over widespread logging taking place by Tanzanian *furtivos* in forests licensed to him. Based on the evidence found in Zambezia by Mackenzie and Ribeiro (2009), there is reason to believe that the extent of illegal logging is also substantial in Cabo Delgado.

5.2.2 Sawmills — primary processing

There are two main groups of agents at the primary processing stage: CLHs and traders. Concessionaires

must by law own a sawmill. They are thus present at the primary processing stage of the value chain, regardless of the national origin of the company.

All the interviewed Chinese trading companies operate sawmills, with over 80% of them having begun their activities in Cabo Delgado as simple traders engaged only in buying timber. Since the 2007 log-export ban, Chinese traders have increasingly started operating sawmills to process timber bought from SLHs who are not required by law to own processing machinery.

Input — sourcing wood

As concessionaires must also operate a sawmill, they naturally use wood from their own concessions. In addition, they source wood from other concessions and from SLHs. Chinese companies seem to source wood from a greater range of suppliers than do Mozambican companies. One Chinese company reported that two-thirds of its timber is sourced from SLHs, with the remaining one-third coming from their its concession.

One Mozambican company reported that its sawmill is also rented out to process timber bought by SLHs wishing to sell it to traders who do not have processing facilities in Mozambique, or by traders who have bought logs and wish to export them as processed timber.

Two out of three trading companies reported that they are frequently offered illegally cut logs from natural reserves. The quality of logs cut by *furtivos* was, however, said to be of such inferior quality, due to their lack of skill and equipment, that it is neither in the companies' financial interest to buy from them, nor worth the risk.

Input costs

Logs were consistently reported to be bought by concessionaires and sold to trading companies for about USD 300/m³ for jambire, the species most in demand. The prices for other species lie in a similar range (USD 250–350) according to the concessionaires and traders interviewed, both on the sellers' and the buyers' side, with sellers generally reporting a slightly lower figure and buyers a slightly higher one.

The price fluctuates depending on the time of year and the quality of the logs. SLHs are normally paid less, as their logs are often smaller and of poorer quality than those cut in concessions.

The price for logs has been relatively stable over the past 10 years according to nearly every respondent.

Employment

The number of people employed at sawmills seems consistent across the board at 30–40 full-time workers, with larger concessionaires correspondingly hiring more workers (in some cases over 100 full-time workers). Chinese and Asian sawmillers also reported having 3–4 Chinese staff on the ground. This also holds true for a Mozambican company using Chinese machinery.

Processing machinery

All Chinese companies interviewed operate their sawmills using Chinese machinery. One non-Chinese Asian company and a Mozambican company also use Chinese processing equipment and have hired Chinese workers to operate the equipment. Mozambican and other foreign companies, on the other hand, generally reported using machinery from Portugal, South Africa or Sweden.

The reasons for the widespread use of Chinese machinery (see Figure 15) were reported to be familiarity with the equipment and the instruction language. The cost of such machinery is also lower than that of European machinery, and is of superior quality to South African machinery, according to a Mozambican company and forestry expert in the area.

The cost of Chinese equipment used to produce sawn wood was reported by two companies to lie in the range of CNY 150,000–210,000 (USD 24,000–34,000) per cutting machine. The conversion rate (indicating how much of a log is actually transformed into sawn timber and how much waste is produced) was consistently reported to lie in the range of 70–80% for Chinese machinery.

The Chinese machinery has a high depreciation rate, requires frequent repairs, and in general has a short life span. One company reported having to replace their machines on a yearly basis due to intense usage. It was argued that despite high maintenance requirements, spare parts are cheap and easy to import from China, making Chinese machinery nonetheless preferable.

The difference in quality between Chinese and European machinery was visible from the visits to sawmills. Relatively new Chinese machinery had

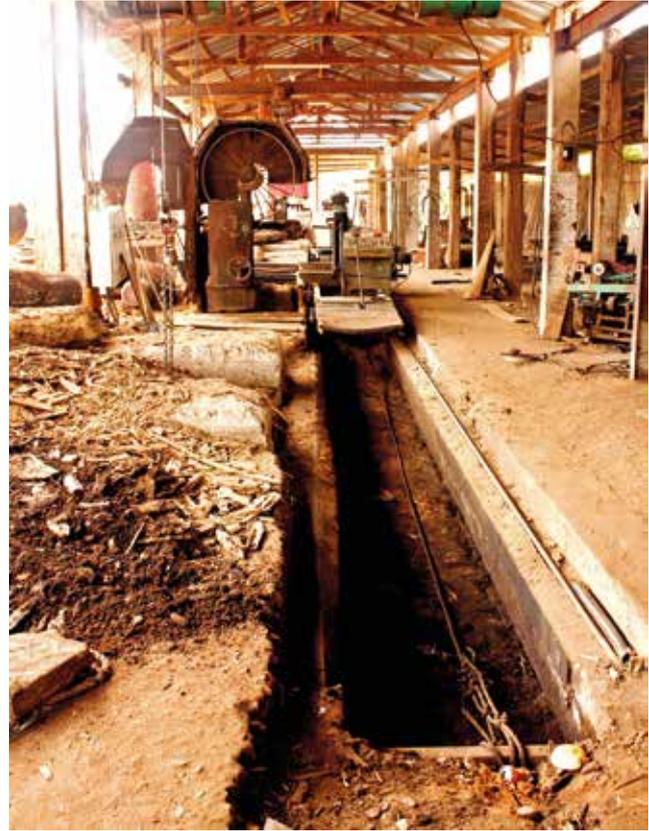


Figure 15. Machinery imported from China

Photo by Sigrid-Marianella Stensrud Ekman

already started to rust, whereas Swedish machinery showed little exterior wear and tear despite being in use for some years.

Processing capacity

Not surprisingly, the output of the sawmills showed a correlation with the size of the concessions held by the respective companies (the access to inputs). Most companies have a processing capacity of 3000–4000 m³/year, with the biggest companies reporting production capacities twice as large as this.

Companies employing the use of machinery from the reported that they have significant overcapacity but lack the funds to buy additional logs from SLHs. They attempt to remedy the situation by renting out the machinery to SLHs and/or traders who do not own their own sawmill in Cabo Delgado. One respondent suggested that the requirement for all concessionaires to own processing facilities is wasteful. According to a forestry expert, several concessionaires simply buy cheap, inefficient equipment to meet the criteria needed for obtaining a concession without any intention of actually using it. Fewer sawmills with more efficient machinery would reduce costs by achieving economies of scale and would produce minimal waste.

Product lines

Simple planks are by far the most common timber product in Cabo Delgado. Only two companies reported producing products other than simple sawn timber: one Chinese and one Mozambican company. These are two of the largest companies in the province by far, and have the capacity to diversify and develop their product lines. The additional products, which consist mainly of flooring and fittings for houses such as doors and windows, are sold domestically. The Mozambican company also uses these products to supply its own property developments and construction projects. The Chinese company currently produces 3000 m² of flooring a year, but the factory is undergoing renovation with “several million” CNY invested to boost production to 300,000 m²/year after completion. Given Mozambique’s strong and fast-growing property market, there might be enough demand to absorb this supply, but the Chinese company has yet to establish a sales office and marketing plan. Both these companies stressed the importance of developing their product lines in order to survive in the Mozambican timber industry. The South African market was reported by companies to be insignificant and stagnant, while the EU market is impermeable due to lack of certification such as that awarded by the FSC.

One Chinese company, also operating downstream in the value chain in the manufacture of furniture in China, stated that they are currently looking into the possibility of developing their product lines in Cabo Delgado to include artwork and carvings in order to make full use of the timber waste resulting from cutting the logs into planks. At the time of the interview, they were not certain whether it would be worth the cost of importing the necessary skilled labor and equipment.

Markets for sawn timber

After processing, Mozambican companies sell their sawn timber to Chinese concessionaires or Asian trading companies who then export it to China.

As most Mozambican companies are unable to obtain the FSC certificate required to export to Europe, they are limited to selling to countries where such certification is not required. China is the only buyer of significance of Mozambican timber. Timber companies in Mozambique are therefore subject to the specific demands of the Chinese consumers. Mozambican timber is mainly used to produce Chinese antique-style furniture. Processing timber locally in Mozambique into products that meet the Chinese demand is considered difficult due to a lack of the skills needed to produce such furniture.

Barriers to further processing in Mozambique

Most companies operating in Cabo Delgado only commit to the minimum processing of timber needed to fulfill the requirements for exportation, with most of the value-added processing taking place in China.

Of the interviewed companies, more than 50% had considered the tax incentives given by the Mozambican government for companies processing further downstream. Yet none of the companies currently takes advantage of these. Some companies had applied for the tax reduction, but failed to be approved. Three-quarters of those respondents who had considered using the incentives reported that the application and qualification processes were too difficult and overly bureaucratic, and one company claimed that the incentives were insignificant relative to the effort it takes to obtain them. The two biggest and most successful timber companies in Cabo Delgado were among those who had considered the incentives but had not been able to benefit from them. This indicates the level of difficulty that exists for smaller companies that do not have sufficient capacity to follow such bureaucratic procedures.

Interviewed trading companies and exporting concessionaires expressed the desire to export unprocessed logs, as these fetch a higher price in the Chinese market than sawn timber. Other reported barriers for deeper processing to take place in Mozambique were as follows:

- The Chinese market has peculiar and strict requirements for timber. Buyers therefore prefer logs as this gives them greater freedom in terms of use of the timber. Processing the logs into sawn timber reduces the value of the timber in the Chinese market (40% of respondents).
- There is a lack of skills and technology in Mozambique to process the timber into products desired by the Chinese market. The machinery needed is expensive, and it would require great amounts of capital to ship and install it and to employ expatriate skilled workers to run it (40% of respondents).
- Without an FSC certificate, Mozambican timber products have no market other than China. The Chinese market demands only logs. “Europe does not accept Mozambican timber products, and the Chinese market does not want them” (20% of respondents).
- The incentives presented by the government in Mozambique have little effect on the decision whether or not to further process timber in Mozambique because the Chinese market simply does not demand timber that is processed to a high degree (33% of respondents).
- One Chinese respondent reported that they had attempted to move more processing operations to their Mozambican facilities, but it proved too costly, and they have now returned to producing only basic sawn timber that fulfills the minimum requirements for exporting.
- Mozambican timber is mainly used to produce Chinese antique-style furniture. Not only do such manufacturing skills not exist in Mozambique, but to ship the final product to China would be more costly than to ship logs, as furniture takes more space. “It just does not make sense to engage in manufacturing in Mozambique,” one respondent said.

To summarize the findings, there is only one real market available for Mozambican timber at the moment, which is China. The products demanded by the Chinese market are highly culturally specific and require distinct skills and an understanding of Chinese consumers’ tastes.

Skills in carpentry do exist in Mozambique. Informal small-scale carpenters can be seen

operating in primitive workshops in Pemba and selling their products along the roadside. Despite the basic nature of these makeshift workshops, a high level of craft is displayed in the products they produce.

In order to achieve further processing in Mozambique, one of two things must change. Either Mozambican manufacturers must gain skills to produce Chinese antique-style furniture competitively relative to Chinese manufacturers, or Mozambican timber companies must gain access to other markets, perhaps through acquiring FSC certification. Despite some growth, the domestic market is limited, and neighboring markets such as South Africa were not reported to be of any significance.

All companies asked why they lacked an FSC certificate replied that they were either not interested in FSC certification because they only aim to export to the Chinese market (stated by Chinese companies), or that the requirements for the FSC certificate were impossible to meet due to lack of capacity. One respondent said that one of the criteria for FSC certification is that no unlicensed hunting is allowed to take place in the concession. However, Mozambican law stipulates that local people have the right to hunt in concessions for subsistence, meaning companies cannot deny or prevent such hunting within their concessions. Mozambican law therefore contradicts the requirements of the FSC and makes the certificate unattainable, according to the respondent.

5.2.3 Export and shipping

Nearly all timber from Cabo Delgado is exported to China, with smaller amounts being shipped to South-East Asian countries such as Vietnam, Thailand, and Singapore. The main agents operating at this segment of the value chain are Asian trading companies (a trading company is defined here as a company that does not hold a concession license), Chinese concessionaires, and shipping agents. Mozambican concessionaires do not export to China on a regular basis, but rather sell their timber to Chinese trading companies and Chinese concessionaires who engage in export. Other foreign concessionaires also engage in export, but at a much smaller scale. Export destinations are closely linked with company origin.

Detailed data on export destinations and export volumes are hard to obtain, but exist for 2010.

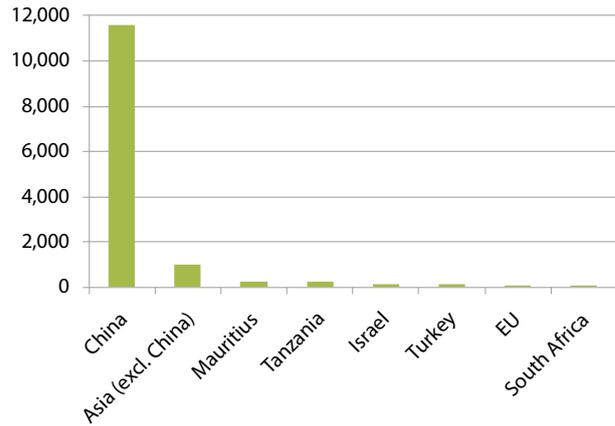


Figure 16. Timber exports by destination 2010 (m³)
DPA data

Figure 16 illustrates the dominance of Asia, particularly China, as the main market for Mozambican timber.

During the mid-1990s, exportation of Mozambican timber from Cabo Delgado was dominated by South African traders who began supplying the Chinese market. Within 5 years, Chinese traders had established their own trade links with Mozambican loggers and out-competed the South African intermediaries. One trading company confirmed the hypothesis that Chinese traders are moving north from the central parts of the country to find new sources of timber in Mozambique.

Moving upstream

In total, there are 16 agents registered with the DPA as official exporters of timber, of which nine have their own concession. At least 12 of the exporters are of Asian origin, most being Chinese, and nearly all of them supply the Chinese market. Three of the exporting companies interviewed are ‘pure traders’, engaged only in the export/import of timber in Mozambique. They do not have any operations further upstream other than sawmilling (due to the log-export ban).

Of the companies interviewed, all but one exporting company with further downstream operations (such as furniture factories in China) also hold concession licenses in Cabo Delgado or elsewhere in Mozambique, illustrating how manufacturing companies have cut out the intermediary (the trader) in order to better control the supply of timber.

There is a general perception that Chinese companies first establish themselves as traders before moving upstream by acquiring concessions. Two out of three Chinese concessionaires asked had begun operations as traders before becoming concessionaires, confirming that some traders have moved upstream. One trading company interviewed expressed interest in acquiring a concession in the future. However, two out of three trading companies interviewed replied that they were not considering moving upstream as there is not enough good-quality forest left to make the investment worthwhile. The quest for concessions in Cabo Delgado seems to have stagnated because the most profitable areas have already been licensed.

Figure 17 illustrates the distribution of companies in Cabo Delgado and their operations along the value chain

value chain. One Chinese company is fully vertically integrated along the entire value chain, whereas most Chinese companies operate on one half of the value chain, that is, from extraction to export or from export to manufacturing/retail in China. As illustrated in Figure 17, no Mozambican companies engage in export of timber to China.

Access to capital: Forward financing

One Chinese trading company interviewed was forward financed by a Chinese furniture manufacturing company. The investing company sends staff to Cabo Delgado during the cutting season to inspect the quality of the wood purchased by the trading company and to monitor the operations of the trading company to ensure that the agreement is not broken. No other companies reported being forward financed.

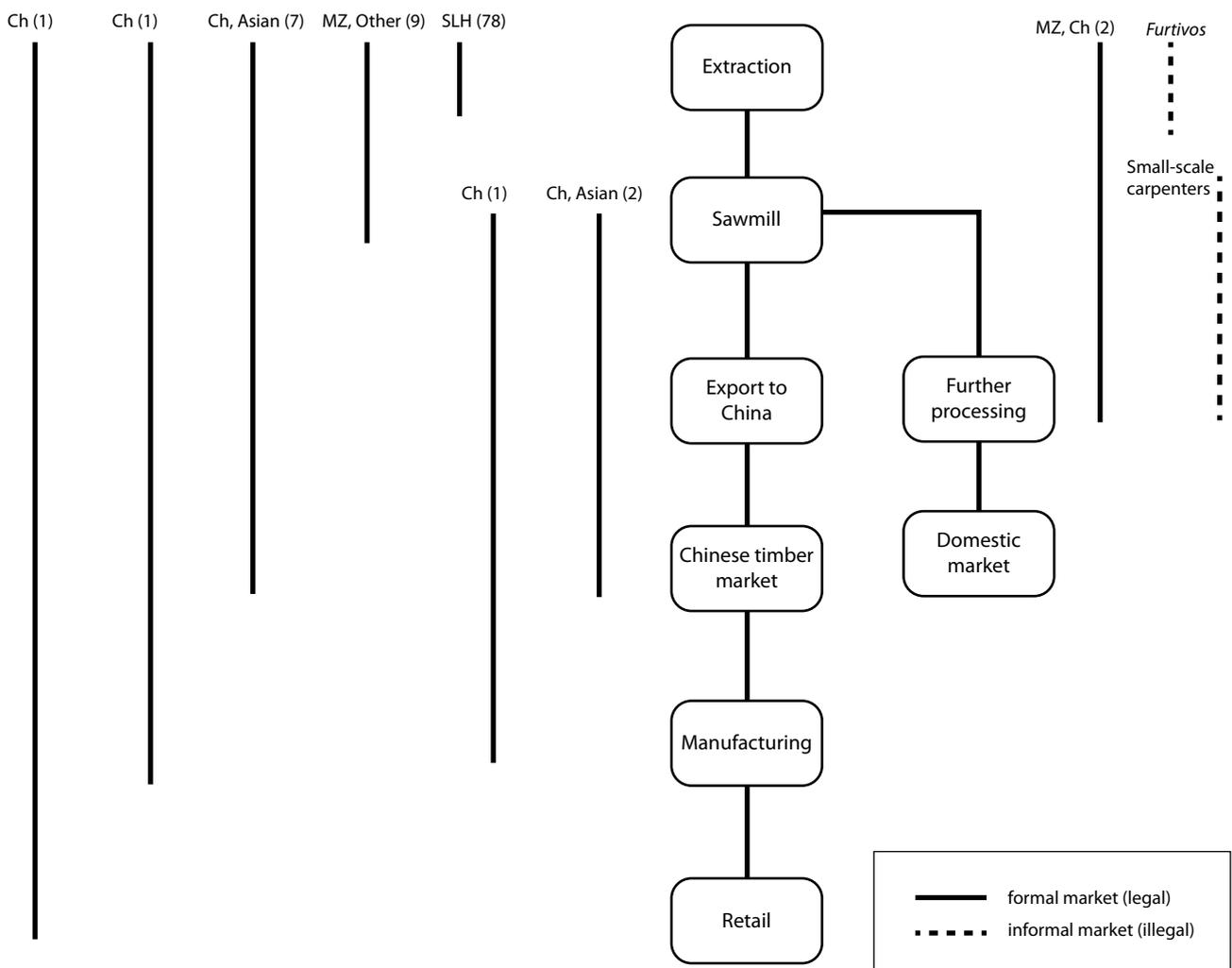


Figure 17. Operations along the value chain
(Ch = Chinese, MZ = Mozambican, Other = other foreign company)



Figure 18. Chinese sawmill in Pemba, Cabo Delgado province

Photo by Sigrid-Marianella Stensrud Ekman

Packaging

Shipping agents provide containers to the sawmills, where they are packed with timber and later picked up again by the shipping agent. The shipping agents stressed that they take no part in the packing of the containers. During the packing, two officials from the DNTF and one Customs official should be present to record and approve the process. Only containers that are 20 feet long are used for timber exports in Cabo Delgado according to interviewed shipping agents. These can hold approximately 10–12 m³ of timber.

Shipping

The shipment of a container from Pemba to various ports in China was consistently reported to cost around USD 2000 by both shipping agencies and exporting companies. Depending on the shipping company, the cargo is shipped to an intermediate port — in the case of our interviewees, Singapore or the Comoros — where the containers are repackaged and loaded onto ships en route to the various final destinations. This is done because it is not cost efficient to establish direct shipping routes from Cabo Delgado to all the ports in China

(Guangzhou, Hong Kong, Fujian and Shanghai), as the quantities of timber headed for each destination are not sufficient. Cabo Delgado does not export other goods in large quantities to China that would economically justify several direct routes to China.

The timber is subject to export taxes in the range of 5–10% for processed timber and 15–25% for logs (only first-class wood is subject to the log-export ban). For a container filled with timber valued at USD 3300/m³ (logs) and USD 4200 (sawn timber), this would represent a tax of USD 480–750 and USD 210–420, respectively, for each container of timber shipped abroad.²

The illegal export of logs

The illegal export of logs is a widespread problem, according to various key informants. Because timber in the form of logs fetches a higher price than sawn timber in the Chinese market, companies have a strong incentive to break the log-export regulations.

² USD 3300 = 110 m³ of logs valued at USD 300/m³.
USD 4200 = 11 m³ of sawn timber, which equals 14 m³ of logs given a conversion rate of 70–80%, valued at USD 300/m³.

The following cost structure was reported for the various bribes needed to be paid in order to export one container (11 m³) of logs:

- two officials from DNTE, USD 75 each
- one Customs official, USD 70
- a high-ranking official in the DPA or higher government bodies, USD 200
- a 'fixer' or intermediate arranging the delivery and negotiation of the bribes, USD 100.

The costs for side payments per container of logs thus amounts to USD 520, making the total cost for shipping a container of first-class timber logs to China USD 2520.

According to key informants in Cabo Delgado, containers with illegal timber (whether it is illegally cut or illegally exported as logs) are only caught at port if one or more people in the above cost structure have not received payment. Being caught thus has little to do with increased efficiency of law enforcement. To reduce the opportunity for smuggling, the port in Quelimane, Zambezia, now requires all containers to be packaged on site rather than at the sawmill (Mackenzie and Ribeiro 2009, 46). This could be an example for Pemba to follow.

As long as the additional shipping costs caused by corruption do not outweigh the loss of revenue from the lower price paid for sawn timber, the problem of the illegal export of logs can be expected to continue.

5.2.4 The Chinese market

Half of the interviewed Asian exporting companies reported using imported timber to supply their own furniture manufacturing operations in China. These same companies, according to detailed 2010 data, export solely to China. The other trading companies export mainly to China, where they sell their timber to Chinese furniture manufactures, usually based on pre-orders. One company that fully integrated its operations along the value chain, from extraction in Mozambique to retailing Chinese furniture, explained that the decision to acquire a concession was due to the frequent failure of suppliers to fulfill the orders placed.

According to the companies interviewed, Mozambican wood is exclusively used to produce antique-style (Ming and Qing dynasty) furniture for the Chinese market. There is no significant re-export of Mozambican timber in the form of furniture to European or other OECD markets.

Given the preference for logs over sawn timber, logs fetch a higher price on the Chinese market. Whereas sawn timber is priced at USD 600–650/m³, logs are commonly valued about USD 100 higher at USD 750/m³, according to trading companies interviewed.

Timber companies required by law to process timber before it enters the international market must therefore not only carry the extra costs associated with running a sawmill, but also face a lower value for their product in China. Given the lack of FSC certification, companies operating in Mozambique have few alternative markets to turn to. In addition to this, Mozambican timber must compete with timber from other countries that may not be subject to log-export bans. There is a massive incentive for companies to illegally export timber as logs.

However, the price differential between logs and sawn wood seems to be closing. Figure 19 displays the price of jambire (in logs and sawn timber) on the Chinese market between 2007 and 2012. The price for timber experienced a sharp drop in late 2007 to early 2008. Sawn timber saw a smaller decrease in price than logs, resulting in the narrowing of the gap between the two (Figure 20).

It appears that the value of sawn timber has increased steadily relative to that of logs in the past 5 years. However, the price of sawn timber is still lower than that of logs. In addition, 1.4 m³ of logs is needed to produce 1 m³ of sawn timber based on the conversion rates reported by sawmillers in Cabo Delgado.

Although sawmilling may create additional employment, processing timber into sawn wood ironically does not create value added given the current price structure for logs versus sawn timber.

5.3 Other findings

Chinese companies are perceived by Mozambican companies to operate in a collaborative and organized manner, fixing the price of timber at a lower level than the prevailing market price. Chinese companies, on the other hand, stated that the competition among themselves is ruthless. Various other accounts confirm that Chinese companies do not appear to cooperate or stand united. Neither does the Chinese embassy provide support or assistance to these companies, and nor does it exercise any control or overview of the Chinese operators.

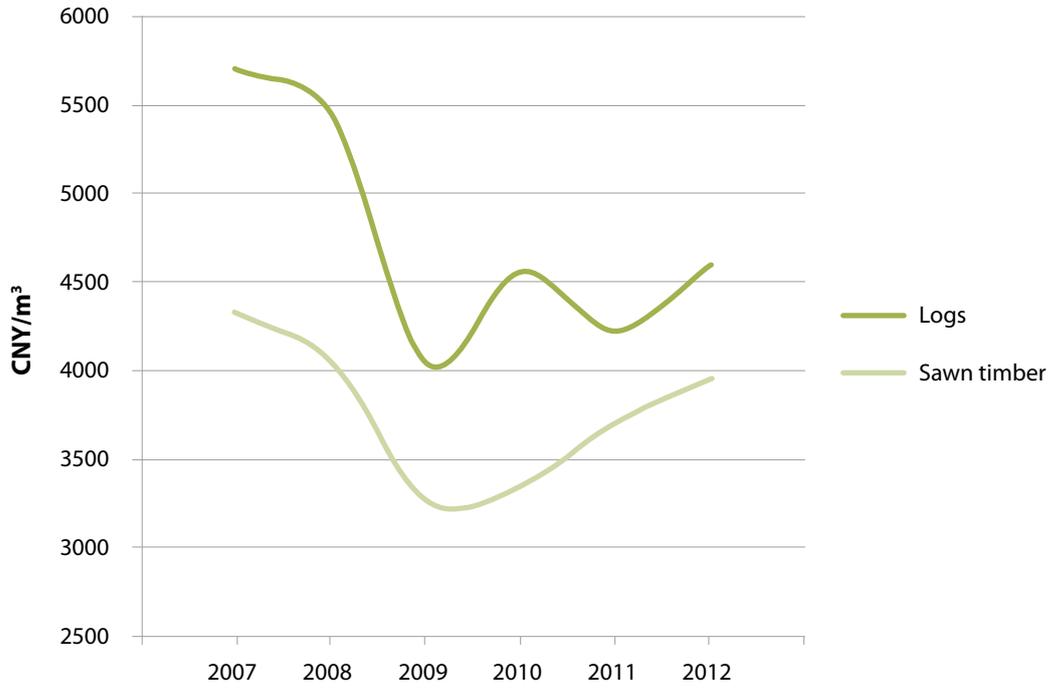


Figure 19. Price of jambire on the Chinese market (2007–2012)

Guangdong Yuzhu International Timber Market, May 2012

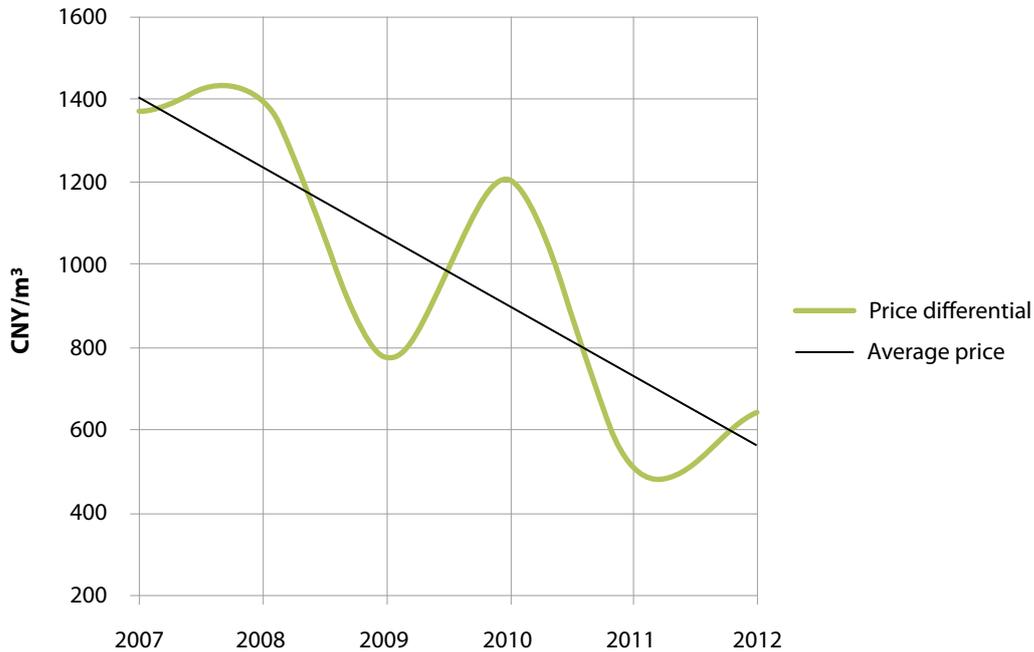


Figure 20. Price differentials between logs and sawn timber (2007–2012)

Guangdong Yuzhu International Timber Market, May 2012

Both Chinese and Mozambican trade associations reported that their members had attempted to collude in order to fix the price of timber. However, in both instances they had been unsuccessful.

As soon as one company was tempted to break the price fixing, the others quickly followed suit. There are indications that the price for timber is established by market forces rather than by a

quasi-oligopolistic system set up by private actors in Mozambique. Given the number of actors on both the supply side and the demand side, with relative easy entry to and exit from the industry, as well as homogeneous products, the situation resembles that of perfect competition.

5.4 Legal versus illegal export of timber to China

Figure 21 shows a rough calculation of the cost and revenue structure for legally versus illegally exported timber (export of first-class wood as logs).

While this above calculation is based on rough and simple data, it nonetheless gives an indication of the strong financial incentives to engage in the illegal exporting of first-class timber in the form of logs. Moreover, these calculations do not include

the full costs of running a sawmill, which would further reduce the profitability of conducting business legally.

It is, however, important to point out that Mozambican labor costs are much lower than those in China. The 2012 minimum wage for a Mozambican agricultural worker was set at USD 85/month, almost half that of a Chinese worker (USD 190 per month, Fujian–Guangdong province average). The demand for logs over sawn timber can therefore not be explained by lower labor input costs in China. The lack of skills needed to produce Chinese-style furniture, or even semiprocessed components for such products, could explain the preference for Chinese- over Mozambican-based sawmills, despite the huge labor-cost differential.

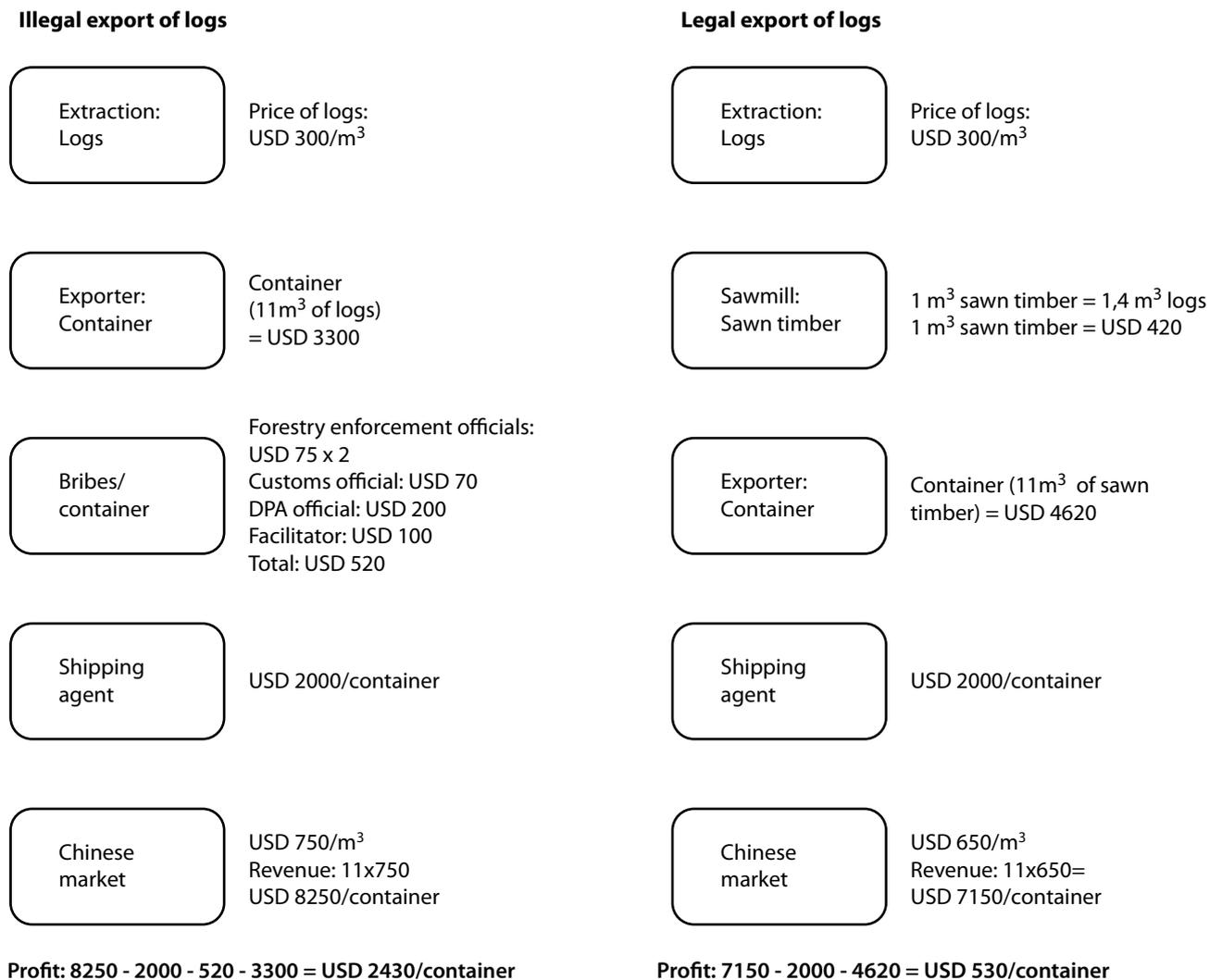


Figure 21. Export of first-class wood as sawn timber (legal) versus logs (illegal)

Mackenzie and Ribeiro (2009), conducted field research in China, found that lack of trust was a major issue among agents involved in the timber trade. Chinese manufacturing companies lacked trust in local Chinese sawmillers and placed even less trust in sawmillers based in foreign countries. Chinese manufacturers prefer to buy logs and saw the timber themselves. The issue of trust was even more pronounced between Chinese and Africans and is a difficult barrier to overcome (Mackenzie and Ribeiro 2009, 39). The lack of trust is exemplified by the movement upstream by some Chinese companies in Cabo Delgado.

The claims that, in order to adequately carve and produce high-end antique furniture, logs are needed rather than sawn timber, were found to be true (Mackenzie and Ribeiro 2009). Given that all interviewed exporting companies in Cabo Delgado stated that their timber is used for high-end antique furniture, this would also explain the desire to export timber as logs, despite the higher labor costs in China.

The predicament of Mozambican-based timber companies in China

Mozambican timber on the Chinese market must compete with hardwood timber from all over the world, in a market where logs are preferred and are priced higher than sawn wood. Chinese companies can source wood from other countries that do not impose a ban on log exports. To be competitive and to survive in the Chinese market, companies dealing in Mozambican timber are heavily inclined toward exporting logs illegally.

The absence of Mozambican companies on the list of companies caught with illegal timber at port is explained by the fact that Mozambican companies are not exporters. Perhaps it is not so much inability that is barring Mozambican companies from directly accessing their export markets, as it is the knowledge that it is difficult to profitably engage in the export of timber legally. Domestic companies will naturally be less inclined to engage directly in the illegal activities than foreign companies who can exit the country with more ease. One Chinese company reported that their manager had fled the country when the company was charged with smuggling, an option that might be more elusive for Mozambican managers. One Mozambican concession company whose timber was found being smuggled as logs to China by a Chinese trader noted that their reputation had been severely damaged and that the company is more aware

of whom it sells its timber to since the incident. For Mozambican companies that are relatively immobile, reputation matters and the risks of being involved in illegal activity are more costly.

From this perspective, rather than being companies lacking in capacity that have to rely on a intermediary to access the market, Mozambican companies can benefit from outsourcing the export of timber. This frees them from most of the responsibility for the illegal export activity that inevitably takes place in order to survive under cut-throat competition in the Chinese market. Without a market for sawn timber, incentives will do little to stimulate downstream activity, just as criminalization does not deter the export of logs.

5.5 Hypotheses revisited

Returning to our initial research objectives, this section summarizes our findings relative to the hypotheses.

1. Business model: Chinese companies, which in the past solely provided forward finance for Mozambican SLHs to source timber, can now be observed to also acquire their own concessions, thus securing access to resources. Chinese timber companies are moving upstream, vertically integrating their activities along the value chain, and sourcing wood directly.

This hypothesis is generally confirmed.

In the 1990s the industry was dominated by South African timber traders exporting wood to the Chinese market. By the end of the 1990s, the first Chinese companies arrived in Cabo Delgado and out-competed the South African traders, and the first Chinese concession was granted in 2000. In the years that followed, more Chinese traders obtained concession licenses. The trend to move upstream seems to have stagnated due to the lack of suitable forest areas available for additional concessions. Current trading companies are ambiguous about whether it is worthwhile attempting to obtain direct access to timber. Forward financing to SLHs appears to be limited in extent and is not preferred by traders, who reported it to be too risky.

At the extraction stage, Chinese concessionaires operate in the same manner as other concessionaires. They do, however, also source timber from SLHs as well as buying timber from other concessionaires. No other concessionaires do this.

2. Market access: Chinese companies have better market access (personal network, language, culture and knowledge of the Chinese market), generating greater profits as they can cut out intermediaries.

This hypothesis is partly confirmed, but there are reservations as to whether direct market access to China is desirable for Mozambican companies given the low profits accruing to companies that operate legally.

One Mozambican concessionaire had Chinese antique-style furniture manufactured in China, once-off, using its own wood. This demonstrates the potential for Mozambican companies to move downstream and manufacture furniture in China, thereby cutting out the intermediary. It is therefore unclear whether the absence of Mozambican companies on the Chinese market is due to inability or preference.

Assuming that illegally exporting logs is necessary to survive on the Chinese market, outsourcing the illegal export operations to a Chinese company at a cost (the “intermediary cut”) could be seen as worthwhile, in order to avoid the risks entailed by illegal operations. These risks are easier for managers of foreign companies to carry, as exemplified by the Chinese manager who fled the country when charged with illegal exporting.

3. Access to factors affecting production (machinery, capital and labor): Chinese companies have better access to more efficient machinery and capital than their Mozambican counterparts.

This hypothesis is not confirmed.

Most companies interviewed use Chinese machinery, and this equipment was reported by some Mozambican companies to be of better quality than South African machinery. That Chinese machinery is widely used and not confined to Chinese sawmillers indicates that access to such machinery is fairly attainable for all national groups of sawmillers/concessionaires.

On the other hand, Chinese machinery was found to be of poorer quality than European machinery, which was used by other foreign and some Mozambican companies. The Chinese machinery needs to be replaced every 1–2 years,

whereas the Swedish and Portuguese machinery inspected had been in use for approximately 3 years and was reported to still work well without any major problems.

Chinese companies reported that they were investing their own savings, and only a few were forward financed by manufacturing companies in China. Several companies, regardless of nationality, reported that bank loans were prohibitively expensive and therefore could not be considered a viable source of funds for investments in the timber industry.

4. Value chain activity: Chinese companies operate higher up the value chain (further downstream) than other companies.

This hypothesis is generally confirmed.

Processing activity in Mozambique is more correlated with company size than with a company’s national origin. Both the Chinese and Mozambican large companies produce products such as flooring and fittings (including windows and door frames) for housing construction for the local Mozambican market. These companies have the ambition to expand production of basic finished timber products for sale on the local market. Smaller companies seem to only do basic processing as required by the law in Mozambique in order to export timber to China.

Chinese companies are generally more vertically integrated along the value chain, with one company being fully integrated from extraction to retail in China. Most companies operate along one-half of the value chain, from extraction to export or from export to retail. Trading companies without concessions expressed a desire to further vertically integrate but were uncertain of the quality of the remaining forests and whether it was worthwhile to do so.

Incentives provided by the Mozambican government to stimulate further processing in Mozambique were found to be irrelevant to the companies interviewed. Even those that do engage in deeper processing do not bother to take advantage of the incentives that they may be entitled to, due to the bureaucratic barriers to obtaining them.

6. Conclusion

6.1 Main findings

The Mozambican timber industry is characterized by fierce competition among and within Mozambican, Chinese and foreign companies that experience squeezed profit margins, especially under the current log-export ban. Sellers of Mozambican timber have little or no control over prices on the Chinese market where Mozambican timber competes with timber from other countries. As China is currently the only viable market due to companies' inability to meet standards set for import to Western markets, Mozambican-based companies will continue to receive lower prices for processed timber than for logs. The small profit margins incentivize the companies to survive by increasing the quantities sold, adding pressure on the already strained forest resources.

The research findings reveal strong incentives for exporting timber illegally as logs, as processing is virtually unprofitable. Combining this fact with the large discrepancy between Mozambican and Chinese roundwood export/import statistics makes it reasonable to assume that the quantity of illegally exported timber is of significant proportions.

Mozambican and foreign companies are all active at the extraction and sawmilling stages, whereas export/import and trading on the Chinese market and higher processing are by and large conducted by companies of Chinese origin. As exporting timber to China can only be profitable if done illegally as logs, it is unclear whether the use of Chinese intermediaries by Mozambican timber companies is due to inability or unwillingness to access the Chinese market directly. The use of intermediaries could be seen as a convenient arrangement whereby Mozambican companies outsource the risks associated with illegal trading to Chinese trading companies whose managers can more easily evade the consequences of getting caught, as they possess greater geographical mobility.

The lack of enforcement and high levels of corruption allow easy entry to the industry. Several actors extract and export logs in a largely uncontrolled fashion. Given the significance of the timber industry to the Mozambican economy, the current status quo is alarming.

6.2 Potential next steps

Below are four alternative pathways that Mozambique could choose to follow in order to improve the domestic timber industry.

1. **Expand market access:** Given the Chinese preference for logs, attempts to expand Mozambican timber operations up the value chain and to stimulate deeper processing activities must also entail expanding market access and diversifying the customer base. Without a market to sell processed wood products to, incentives to produce such products will be ineffective. Current incentives to further processing are unsuccessful, because they only address half of the equation. The EU is a large market for timber from other African countries and could present an alternative market for Mozambican timber (Canby et al. 2008). However, given the increasingly stringent EU regulations, Mozambican companies need assistance to obtain the certification that would enable them to access the EU market. There is a clear lack of knowledge among Mozambican timber operators on what is needed from them in order to access the EU market and how to meet such criteria. There is room for the government to become more active in this area. Local small-scale carpenters already have the skills needed to manufacture furniture of good standards with limited investments and in the absence of advanced machinery. If Mozambique can access markets without the specific aesthetic requirements of the Chinese market, valuable skills needed to manufacture final products already exist in Mozambique. These local small-scale enterprises need to be assisted and brought into the formal sector to take advantage of potential future markets.
2. **Develop local labor skills to meet Chinese preferences:** Mackenzie and Ribeiro (2009, 40) argue that it should be possible for Mozambican labor to attain the skills needed to produce semiprocessed components for the antique-style furniture market in China. Although this path would create desired increases in the value and productivity of Mozambican human capital, it is doubtful whether Mozambican labor would ever be able to gain skills making them competitive with Chinese carpenters who have a more direct

knowledge of Chinese aesthetics. Is this a niche in which Mozambican companies can become competitive?

It also raises the question of how such training of Mozambican labor should be conducted, and who will provide the funds for the needed human capital investments. The issue of trust will also remain one that is difficult to overcome.

3. **Legalize the export of first-class logs:** Although this will not create the desired expansion of employment originally hoped for by the government, it would allow timber companies to generate higher values on the Chinese market than those accrued by a company that currently operates legally. Allowing the export of logs would also bring more of the trade into the formal economy where it can be taxed appropriately. As long as the tax is lower than the established costs for bribery, companies will prefer to pay taxes over bribes. A tax rate of 15% on log exports would imply a tax of USD 450 per container, which is lower than the USD 520 cost of bribes.

The current tax rate on log exports of non-first-class timber lies at 15–25%. Assuming that the discrepancy between Chinese import data and Mozambican export data represents illegal exports of logs, this would mean that timber worth approximately USD 40 million leaves Mozambique untaxed each year. If this was brought into the formal economy and subjected to a 15% tax, USD 6 million in additional government revenues would be collected. While this would not create substantially higher profits for companies (who would replace the bribery cost with the cost of a tax), it would bring current illegal revenues into the formal economy as income to the national economy.

In addition to the above, the origin of timber is much more easily identified when in the form of logs than sawn timber. From an environmental perspective, the illegal logging of timber and unsustainable deforestation is a much more pressing issue than the issue of value creation (in the case of the Chinese market, sawn timber represents value destruction). Legalizing the export of logs would allow for greater control over illegal logging and make identification of the timber's origin easier.

4. **Ban new entrants by limiting the number of licenses:** Increasing profitability is a double-edged sword. It has the positive effect of enabling higher earnings without necessarily

increasing the quantity of timber cut. However, increased profits will also generate greater interest in the industry, and without proper controls and enforced legislation, this could lead to even greater activity and extraction of timber as more companies enter the industry. The trick is to create higher profits based on more advanced processing, while avoiding the fast-cash style of trading in timber that currently prevails.

Quotas need to be set not only for the volume of timber cut each year, but also for the number of actors engaged in the industry. The timber industry currently exemplifies a perfectly competitive market, with many producers supplying a homogeneous product, a situation that is more beneficial for buyers than for sellers, as they are the price-setters. Granting significantly fewer licenses would reduce the number of actors and allow profits to be created, while barring new entrants from sharing in diminishing profits. At the moment, there is little point in all these small companies investing in expensive, albeit efficient, machinery with high capacity. The Mozambican timber market is currently a fragmented one where companies employ suboptimal machinery.

Reducing the number of licenses and rewarding the few remaining actors with greater access to forests would help increase the average productivity of the companies. Increased profitability for the few that are licensed would allow them to invest in more advanced and expensive machinery. A small number of companies operating on a large scale would mean that each company would face higher sunk costs (costs that cannot easily be redeemed if the company decides to exit the industry or move operations elsewhere). Such costs will create incentives for the businesses to maintain the profitability of the industry by operating in a sustainable manner, even if only for the sake of their own profits.

6.3 Further research

1. Evaluate the barriers to and potential for Mozambican companies to achieve the level of sustainable extraction required by the EU market and to obtaining certification such as that granted by the FSC. To identify the barriers to obtaining the certification needed to enter the EU market, and learn from companies that have met the

requirements would be of great use to assist companies in expanding their market access beyond the Chinese market. If Mozambique is to build a manufacturing industry, finding markets and learning how to penetrate them will be essential.

2. Identify the processing and manufacturing process in China.
Although Mozambique has a clear labor cost advantage, processing in China is still deemed more beneficial. The current processing methods do nothing but diminish the value of the timber in the Chinese market. Identifying exactly what skills and equipment are used, as well as the process of how the logs are transformed into subcomponents and into the final high-end products, would allow an evaluation of how and to what extent these methods can be applied in Mozambique. Sawn timber produced in Mozambique may then meet the demands of the Chinese market and fetch a higher price than logs.
3. Pinpoint how to restructure the industry to more directly align companies' interests with

the sustainability of the forests. This would ensure that cutting occurs in a responsible manner. Identifying measures that would induce companies to take a long-term view and commitment to operating in the industry would ensure that companies take a greater interest in the future of the forests.

4. Analyze in detail the financial costs to the state should the forests disappear.
As timber is the sixth-largest export, the loss of the forests would have a significant impact on government revenues and foreign exchange earnings. One of the major obstacles for the Mozambican timber industry is the lack of enforcement and implementation of existing well-developed regulation. Corruption and the lack of political will to deal with the situation in the provinces can only be overcome if the government at its highest levels prioritizes and takes genuine action against the illegal activity in the industry. One first step could be to increase transparency by publicizing all industry data freely, from both the Customs and the DNTE, making irregularities easier to identify.

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China's demand for timber has increased dramatically over the past 20 years; today more than 90% of Mozambican timber exports are destined for China. Demand for forest products present both opportunities and challenges for Mozambique. As the country's sixth largest export, timber represents one of the most important industries and sources of income, yet the intensified search for resources puts pressure on the sustainable management of the forests.

In an attempt to generate greater domestic value-added and employment through local processing of roundwood an export ban on first-class timber in the form of logs has been put in place. The effect of this ban on processing activity is however debatable.

The share of illegal activity in the timber industry is estimated to be large. Integrating these illegal activities into the formal economy could generate significant revenues for the government in the form of taxation, as well as greater control and oversight of logging activities than what is currently possible.

Through the research project titled "Chinese Trade and Investment in Africa: Assessing and Governing Trade-Offs to National Economies, Local Livelihoods and Forest Ecosystems" CIFOR wishes to gain a better understanding of the impact increased demand and investment from China have on the Miombo forests. This report forms part of the case study on Mozambique, and is intended to give an overview of the domestic value chain and the companies operating in the timber industry, based on data collected through field research on the timber activities in the province of Cabo Delgado in northern Mozambique.



RESEARCH
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This research was carried out by CIFOR as part of the CGIAR Research Program on Forests, Trees and Agroforestry (CRP-FTA). This collaborative program aims to enhance the management and use of forests, agroforestry and tree genetic resources across the landscape from forests to farms. CIFOR leads CRP-FTA in partnership with Bioversity International, CIRAD, the International Center for Tropical Agriculture and the World Agroforestry Centre.

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