

# Selection methodology

Identifying powerbrokers for the Forest 500

November 2015



Identifying, assessing and tracking the key players who can eliminate deforestation from global supply chains.

**About the Forest 500:**

The Forest 500 is the world's first rainforest rating agency. It identifies and ranks the most influential companies, investors and governments in the race towards a deforestation-free global economy.

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# Introduction

## The Forest 500: Selecting the powerbrokers of zero deforestation

The following presents the methodology developed for the Forest 500 in order to identify 500 powerbrokers globally that together have the power to virtually eradicate tropical deforestation from global supply chains.

Over the last decade, demand for internationally traded food, feed and fuel products has led to over 50% of deforestation and 60% of forest degradation in tropical and subtropical countries. The production of several 'forest risk' commodities – namely palm oil, soya, beef, leather, and timber, pulp and paper – has been a central part in this widespread land use change. These commodities therefore form the basis of this research and the identification of the most relevant powerbrokers worldwide. These powerbrokers can be divided into four broad categories: (1) jurisdictions, (2) companies, (3) investors, and (4) other powerbrokers. The Forest 500 project uses quantitative and qualitative research methods to identify who the key players are within these different sectors to highlight who can leverage a rapid and sustainable reduction in current rates of tropical deforestation and forest degradation.

The powerbrokers identified and ultimately listed in the Forest 500 have been selected based on two broad criteria: (1) their risk of being linked to tropical deforestation through their involvement in, or potential exposure to, forest risk commodity supply chains; and (2) their influence within the political economy of tropical deforestation, whether through their regulatory roles, or through other influential positions in affecting supply chain sustainability, agricultural development or tropical forest conservation.

Wherever possible, this research has followed realistic forest risk commodity supply chains to identify the most relevant powerbrokers in each category; investigating existing trade and investment relationships between countries and private sector actors. However, this research has also aimed to identify those powerbrokers expected to become increasingly important to the issue of deforestation as patterns of commodity production and trade change and markets develop.

It is important to note that the focus of this research in terms of powerbroker identification is the risk and potential exposure to forest risk commodity supply chains as well as the associated power of each of the powerbrokers highlighted. While data on supply chains, trade patterns and private sector relationships have been taken into account, ultimately it is position in the political landscape, market concentration and the associated risk of exposure to forest risk commodities that has ultimately determined a powerbroker's inclusion in the Forest 500. The Forest 500 reselects powerbrokers on a biannual basis in order to track the progress of powerbrokers across years as well as highlight whether new companies, investors, or jurisdictions are beginning to play a more important role in the deforestation economy.

The methodology presented here shows the process by which powerbrokers have been identified and included in the Forest 500; the *Selection methodology*. A separate methodology has been developed to assess the potential impacts of each of these identified powerbrokers on tropical forests in relation to forest risk commodity supply chains; the *Scoring methodology*, which can be viewed in the *Methodology* section of the Forest 500 platform.

# 1. Jurisdictions

## National forest jurisdictions

The first step in identifying the key powerbrokers with the ability to reduce tropical deforestation was to determine the most relevant tropical forest jurisdictions. This involved establishing which 25 forest countries are most important in terms of their total forest cover and risk of deforestation associated with commodity production. Jurisdictions in the (sub)tropical zone and in forest transition (FT) phases one (pre-transition), two (early transition) and three (late transition)<sup>1</sup> were selected. Countries in phase four (post-transition) were excluded from the assessment since generally they have few remaining forests, decelerating rates of deforestation and eventually demonstrate overall increases in forest cover. Furthermore, these countries often represent major bases for the processing and trade, rather than production and export, of forest risk commodities (e.g. China), in which case they have been included in the Forest 500 in the category of the most important jurisdictions in terms of forest risk commodity imports (trading jurisdictions).

The (sub)tropical forest jurisdictions in transition phases one to three were assessed using data for forest cover (2010) and forest loss (2000-2012) (UMD global tree cover 30m Landsat data<sup>2</sup> - Note: this applies to data on forest cover/loss throughout), and forest risk commodity production. Jurisdictions were also assessed to determine the extent to which past deforestation (2000-2012) has been driven by forest risk commodity production and to which future deforestation is expected to result from the expansion of production. This involved reviewing a variety of information sources, including literature on the drivers of deforestation, national policies for economic development and agricultural expansion, and evidence for increasing investment in commodity production in a country.

The top ten jurisdictions in terms of forest cover, which collectively account for 75% of the total tropical forest area globally, were automatically selected. More in depth research was conducted to identify the remaining 15 countries.

Ultimately, this research identified the 25 countries listed in Table 1 for inclusion in the Forest 500. Globally, these 25 tropical forest jurisdictions represent 88.5% of tropical forest cover (2010) and around 87% of tropical forest loss from 2000-2012. They also account for a significant proportion of global forest risk commodity production in tropical regions, including 95.93% of tropical timber<sup>3</sup>, 99.12% of soya<sup>4</sup>, 96.58% of palm oil<sup>5</sup>, and 61.63% of cattle<sup>6</sup>. The proportion of cattle production represented by the selected jurisdictions is comparatively low as in a number of countries the link between cattle production and tropical deforestation is less explicit than it is for the other forest risk commodities.

**Table 1. Tropical forest jurisdictions included in the Forest 500, ranked by forest cover.**

TROPICAL FOREST JURISDICTIONS	
1. Brazil	14. Cameroon
2. Democratic Republic of Congo	15. Zambia
3. Indonesia	16. Congo
4. Colombia	17. Gabon
5. Peru	18. Malaysia
6. Bolivia	19. Paraguay
7. Angola	20. Guyana
8. Venezuela	21. Ecuador
9. Mexico	22. Lao People's Democratic Republic
10. Central African Republic	23. Madagascar
11. Papua New Guinea	24. Nigeria
12. Myanmar	25. Liberia
13. Argentina	

While the data used is the most detailed available, it is important to recognise the limitations. For example, data on global forest cover from satellite analysis<sup>7</sup> does not discriminate between natural forests and plantations. Data on

forest area from the FAO Global Forest Resources Assessments suffers similar shortcomings and is considered less accurate due to its reliance on self-reporting<sup>8</sup>. Data on commodity production also presents some restrictions. For example, tropical timber production is only reported by members of the International Tropical Timber Organization (ITTO) and is therefore not available for all 25 forest jurisdictions. Furthermore, it is important to highlight that official timber production data fails to capture illegal timber, therefore missing the importance of illegal logging for the tropical timber market in driving deforestation in some jurisdictions.

The 25 national tropical forest jurisdictions above lay the foundations for the rest of the Forest 500 research and the identification of powerbrokers in the remaining categories. For example, trade data on the commodities produced in these 25 jurisdictions informs the identification of the most relevant jurisdictions with respect to the import and consumption of forest risk commodities, which in turn provided a geographic focus for identifying the most important companies and investors. Further to this, national forest jurisdictions have informed the identification of several relevant jurisdictions at the subnational level.

## Subnational forest jurisdictions

The extent of decentralised governance in some tropical forest countries makes it important to recognise the role that subnational governments play in addressing deforestation. In addition to the 25 national forest jurisdictions, a further ten subnational jurisdictions have therefore also been included.

In order to represent a variety of jurisdictions across the tropical region, the top ten national forest jurisdictions in terms of forest cover were selected in order to identify which subnational jurisdictions to include. Subnational jurisdictions (provinces, states, departments etc.) within each of these ten national jurisdictions were assessed and ranked according to data on forest cover and what percentage forest loss (of minimum 30% canopy cover) each jurisdiction accounted for relative to the total for that country between 2000 and 2012. Priority subnational jurisdictions were then identified based on their importance relative to the sum of their ranks for forest cover and loss, with further qualitative research conducted to confirm a link between historical and future deforestation and commodity production. Where information on specific deforestation drivers at the subnational level was limited or proved that identified jurisdictions were not relevant in terms of the threat of deforestation from the production of forest risk commodities, the next highest ranking jurisdiction was assessed until a suitable one was identified. Where research failed to prove a strong link between deforestation and commodity production at the national level, the next highest ranking national jurisdiction in terms of forest cover was selected, commodity production assessed, and a subnational jurisdiction subsequently identified. The following ten subnational jurisdictions were ultimately selected for inclusion in the Forest 500.

**Table 2. Subnational tropical forest jurisdictions included.**

SUBNATIONAL TROPICAL FOREST JURISDICTIONS	
1.	Pará (Brazil)
2.	Orientale (Democratic Republic of Congo)
3.	Central Kalimantan (Indonesia)
4.	Caquetá (Colombia)
5.	Loreto (Peru)
6.	Santa Cruz (Bolivia)
7.	Bolívar (Venezuela)
8.	Campeche (Mexico)
9.	Western Province (Papua New Guinea)
10.	Shan (Myanmar)

## Trading jurisdictions

The 15 most important national jurisdictions with respect to the import and trade of forest risk commodities have been included in the Forest 500. Data on trade patterns for specific commodities from the UN Comtrade database, categorised according to commodity-specific Harmonised System (HS) codes, has been used to track chain of custody for specific commodities from the above forest jurisdictions in order to identify the most relevant trade partner countries. To account for any significant variation in trade and deforestation patterns between years, whilst ensuring the most recent information has been considered, total figures for 2007 to 2012 have been used.

Data on the trade of each of the forest risk commodities originating in each of the 25 national forest jurisdictions has been analysed, with a few exceptions. For example, as data does not discriminate whether pulp is manufactured from sources linked to tropical deforestation or from other sources, such as long established plantations, only data on pulp and paper exports from Indonesia – where plantations are known to be a significant driver of deforestation – has been analysed. Similarly, for tropical timber, data on exports and imports is only available for ITTO producer and consumer countries. Finally, it is important to point out that in some cases, countries act primarily as processing rather than consumption bases, re-exporting significant volumes of commodities as finished goods. In these cases exports of processed products have been taken into account.

The most relevant trading jurisdictions have been selected in accordance with the total value of their imports across all forest risk commodities originating in the identified tropical forest jurisdictions. Detailed HS codes were used to analyse specific product flows within each commodity category, ultimately providing percentage import values for each overall commodity (e.g. palm oil) and commodity product (e.g. crude palm oil) for each trading jurisdiction. Based on these figures, the most important trading jurisdictions could be identified. The top 13 countries account for three quarters of the total value of all forest risk commodity imports from key tropical forest regions (note: this includes Malaysia in sixth place, although this isn't included as it is listed in the 25 national forest jurisdictions due to its importance as a palm oil producer). It is important to point out that due to the ease and frequency in which products are moved between European countries, the European Economic Area (EEA), which unites the European Union (EU) member states and three European Free Trade Association (EFTA) countries (Norway, Iceland and Liechtenstein), has been considered as a single trading jurisdictions (Note: for the purpose of this research, this also includes Switzerland, part of the EFTA but not officially the EEA, although it has signed bilateral agreements with the EU). Within the European Economic Area, four countries playing particularly important roles as importers, collectively accounting for 70% of European forest risk commodity imports (2007-2012) from tropical countries, have also been included individually. However, it is important to note that the significant role these four countries play in European imports is predominantly due to their locations and the size of their sea ports and, as mentioned above, due to trade patterns within Europe, forest risk commodities tend not to be consumed within these countries at the same percentages at which they are imported.

**Table 3. Trading jurisdictions, ranked by percentage of total import value of all forest risk commodities from the 25 tropical forest jurisdictions (2007-2012).** Commodities imported representing more than 2% of the total value are shown.

TRADING JURISDICTION	% OF GLOBAL TOTAL IMPORT VALUE	KEY COMMODITIES
European Economic Area (EEA)	22.57%	beef, leather, palm oil, paper, soya, timber
China and Hong Kong	22.13%	beef, leather, palm oil, paper, soya, timber
India	8.58%	palm oil, paper, soya, timber
Netherlands	6.54%	beef, leather, palm oil, soya, timber
Japan	3.50%	palm oil, paper, timber
USA	3.13%	beef, leather, palm oil, paper, timber
Italy	2.72%	beef, leather, palm oil, soya, timber
Spain	2.53%	soya
Iran	2.31%	beef, paper, soya
Republic of Korea	2.27%	leather, paper, soya, timber
Russian Federation	2.24%	beef
Egypt	2.16%	beef, palm oil
Germany	2.07%	beef, leather, soya
Pakistan	1.98%	palm oil
Thailand	1.95%	leather, paper, soya, timber

To maintain the focus on existing commodity trade patterns between tropical forest and trading jurisdictions, trade data analysed in this section provided the basis for the identification of relevant companies across commodity supply

chains. Mapping supply chains from producer to consumer countries allowed for the identification of companies at all supply chain stages and in all relevant industries to be identified. Where national consumption within forest jurisdictions proved to occupy a significant share of total commodity consumption overall, important players in the domestic as well as export market have been analysed and included in the Forest 500.

## 2. Companies

A limited number of companies globally report on total volumes of forest risk commodities they produce, process, use or retail, while reporting on exact quantities from specific forest countries is practically non-existent<sup>9</sup>. A truly objective ranking of companies and their potential impacts on tropical forests through their direct involvement in forest risk commodity supply chains is therefore not possible using a universal methodology. Therefore, in order to identify which companies to include in the Forest 500, it was necessary to develop a methodology measuring relative risk of exposure to forest risk commodity supply chains. This combined quantitative and qualitative research; analysing trade patterns, product types and overall commodity supply chains from the countries where they originate to those where they are consumed. Specifically, it has been possible to identify which companies play the most important roles along forest risk commodity supply chains using a combination of market research data, customs data from ships' manifests, information on the major uses of forest risk commodities, and market share data for specific product segments and companies.

Market concentration in particular is an indicator of power within supply chains. Therefore only companies occupying a relatively large market share within their respective areas of operations have been included in the Forest 500. Measures of market share have been prioritised over attempts to ensure equal representation of different supply chain stages to ensure the inclusion of true supply chain powerbrokers. Furthermore, the identification of supply chain bottlenecks provides strategic focus to supply chain stages where targeted action can achieve transformational change with regards to sustainability.

It is worth highlighting that the highly complex nature of supply chains, whereby many different actors are involved in transforming commodities and products or providing services along the value chain, has made it necessary to simplify supply chains into distinct segments. Furthermore, the absence of coherent reporting and the lack of definitive data in large sections of these supply chains and the jurisdictions in which they act has resulted undoubtedly in an incomplete list where additional relevant actors may exist but could not be identified or cases where the data has not allowed for a clear distinction of players.

### Supply chain segments

Forest risk commodity supply chains are complex. Some actors cover multiple stages within specific supply chains and similarly act across the supply chains of several different forest risk commodities. For example, international grain traders are involved not only in trading soya or palm oil, but in many instances also operate as initial processors of oilseeds, food ingredient producers and even manufacturers of consumer products.

Different forest risk commodity supply chains diverge and converge at different stages. For example, soya and palm oil are produced by a large number of farmers and plantation owners but are then traded internationally by just a handful of companies before diverging once more to a much larger number of processing companies, who then sell ingredients to an even larger number of food and feed product manufacturers. These manufacturers in turn usually sell their products to a smaller number of major retailers who offer a variety of products containing palm or soya products.

To identify companies active at various stages of the supply chain, five major company types corresponding to different supply chain segments were identified: (1) producers, (2) processors, (3) trader/importers, (4) manufacturers, and (5) retailers. Yet, with a general trend towards increasing vertical integration across most supply chains, many companies transcend these categories and are therefore represented in more than one segment. Ultimately, these

companies are only listed once in the Forest 500 even if they have significant stakes in more than one forest risk commodity.

### **Producers**

Producers operate at the first step of the supply chain and are defined as companies that cultivate raw materials, such as soya beans or oil palm. The 25 key tropical forest jurisdictions provided a focus for the identification of producers.

### **Processors**

Processors are defined as companies that convert raw materials into products of added value before they are manufactured into finished consumer and industrial products. For example, slaughterhouses process cattle into beef; soya crushers produce soya oil and soya meal; while soya refineries may further refine soya oil to make ingredients for food products. With a general tendency towards increased processing and value addition within tropical forest countries, commodity processing is an important step in the supply chains of forest risk commodities. Having said that, processing also often occurs within importing countries, such as is the case in the cattle and soya industries, where live cattle or whole soya beans are exported, and multiple processing stages occur before commodities are used in final products. Processors are commodity specific and have been identified using a number of sources, including industry reports and customs data. Trade data has been considered in order to prioritise the inclusion of processors located in key importing countries, although processing can occur at multiple supply chains stages and follow complicated trade paths, making it difficult to map all stages and make sure all additional processors are included. Particularly in the cases of timber and paper products, there may be more than ten stages and companies involved before a final product is retailed.

### **Traders/importers**

These supply chain actors do not transform or add value to commodities but are involved in the physical handling, such as the shipment and storage, of products. Examples include agricultural commodity traders and timber importers.

### **Manufacturers**

Manufacturers are defined as companies creating final products as sold to retailers, industrial users or consumers. The focus in the manufacturing sector has been on identifying the companies holding the largest market shares in the production of goods that are most relevant to forest risk commodities, with the largest manufacturers able to influence production by adopting policies that rule out the use of commodities from deforested land. In order to incorporate current forest risk commodity trade patterns and the inclusion of the most relevant industries, the major uses of each forest risk commodity has been analysed and priority has been given to manufacturers operating in relevant industries within the key trading jurisdictions.

### **Retailers**

Retail is the final supply chain stage linking finished manufactured products to consumers. Retailers sell products to consumers or industrial users via a large number of channels, including supermarket and convenience stores; speciality stores, for example, footwear stores and 'Do-It-Yourself' (DIY) stores; and via online retail sites. Market research has been used to identify the most important retailers worldwide and in specific consuming jurisdictions.

## **Sources**

A number of data sources have been used to prioritise specific markets for further research in order to identify the most relevant companies. It is important to note that due to a lack of available data, each supply chain segment has been researched using a combination of the sources below.

### **Production statistics**

The first step in compiling the private sector representatives to include in the Forest 500 was to identify the key companies responsible for the production of forest risk commodities (growers, ranchers etc.). Unfortunately, with few exceptions, there is limited data available when it comes to information on concessions, for example of consistent data

on areas held and managed by logging companies. Moreover, for some producers, such as soya growers or cattle ranchers, there is low market concentration due to the high number of operators involved. In these cases, actors at later supply chains stages represent the major powerbrokers.

### **Commodity movements and trade data**

With the majority of commodities traded internationally, understanding patterns of commodity movements is critically important for the Forest 500. For example, India's position as one of the two largest importers of palm oil necessitates that Indian importers, processors and retailers of palm oil products are more prominent within the Forest 500 than companies in countries that do not receive a large share of palm oil from forest countries. Similarly, since the majority of Brazilian beef is consumed domestically, the domestic market and the actors in the domestic processing and retail industry need to be prioritised over international actors. On the other hand, it is important to recognise that individual companies with very large market shares in countries with relatively low imports may be more significant than those with smaller market shares in countries with higher imports. Where possible these have been identified and included in the Forest 500.

Data from the UN Comtrade database has been used to follow commodity trade patterns using the export values associated with specific commodity HS codes (see information in section 1 on trading jurisdictions). As a general rule companies in countries importing or processing less than 5% of a commodity have not been included. For some commodities, re-exports of processed commodities are particularly relevant. For example, China imports large amounts of timber but is also a key exporter of wooden furniture, therefore the destination countries of such exports were important to consider in compiling the Forest 500.

### **Customs data**

Many different companies can be involved in the shipment of a single commodity, including, for example, producers, exporters, traders, freight forwarders, shipping companies and overseas importers. For some countries, customs data (from shipping manifests) is available and can provide information on specific supply chain actors. The quality and detail of this data, where available, varies between countries. However, where possible, it has been used to identify key players in commodity supply chains.

Aside from identifying exporters or importers, customs data can also provide information on key companies involved in the processing or manufacturing sectors. However, in some countries and supply chains, most notably in China and in the timber supply chains, importing companies are not usually the same as those involved in commodity processing, and importers act as an additional link in the supply chain.

### **Market research data**

After the main importing and processing countries for each commodity had been established and the appropriate industry sectors identified, market research data was used to identify the key actors within the different supply chain segments, with a particular focus on identifying important manufacturers. For example, since one of the key uses of palm oil is its application in the manufacture of confectionery and baking products, data from market research was used to identify the major companies within these industries. Similarly, since China is a significant importer of leather from forest countries and footwear is a key sub-sector of leather processing in the country, major Chinese footwear manufacturers identified according to market research have been included. Market shares of specific companies and the general diversity of the market in each segment have been considered when choosing companies for the Forest 500.

### **Additional sources**

The importance of individual companies to each of the forest risk commodities and specifically to their risk of driving deforestation has been assessed using the above sources and supplemented with information from industry and trade magazines, scientific literature, NGO reports and media articles, as well as from peer reviews by partner organisations.

## Palm oil

### Producers

Compared to the soya and beef industries, there is a much higher concentration of players in the production of oil palm. A relatively small number of large producers, defined as plantation owners, in addition to tens of thousands of smallholders, make up a large share of total oil palm production in both Indonesia and Malaysia. An analysis of members of the Roundtable on Sustainable Palm Oil (RSPO) carried out by WWF and based on Annual Communication of Progress (ACOP) reports submitted by each member have been used to identify the major oil palm growers in Indonesia and Malaysia. However, since not all companies are RSPO members or detail specific figures in their ACOP reports, additional research has been carried out and further data provided by other NGOs to identify key oil palm plantation companies. Finally, only those companies shown to have oil palm planted on 100,000 hectares or more at the time of research were shortlisted for inclusion.

### Processors

For the purpose of this research, the processing sector refers to the transformation of crude palm oil (CPO) to refined palm oil (RPO), as well as the manufacturing of ingredients for various industries. The first step in processing palm oil is the milling of fresh fruit bunches (FFBs) in palm oil mills to obtain CPO. However, there are a large number of mills in operation, and most of these are linked to specific plantations and are commonly owned by larger companies also operating plantation estates. It is therefore the same companies that often mill FFBs from surrounding plantations and from smallholders. Major palm oil producer IOI, for example, has large plantation holdings in Malaysia and to a lesser extent in Indonesia, and operates 80 mills but only four refineries<sup>10</sup>. Similarly, in the whole of Malaysia there are over 400 mills compared to around just 50 refineries<sup>11</sup>. Due to the large number of mills and the overlap with producers and additional processors, palm oil mills for CPO have not been assessed separately in this study. Especially since all large plantation holders (and mill operators) have been included in the section on oil palm producers.

In light of this, the focus in identifying the major players in the palm oil processing industry is on palm oil refiners and oleochemical producers. Various sources have been used to identify the main processors (refiners) of palm oil in forest and importing countries, with many refiners of palm oil in importing countries also operating as manufacturers of consumer products, such as cooking oil and margarines. In addition to these, the world's largest food ingredient producers have also been included, with these actors also being of relevance to several other forest risk commodity supply chains.

### Traders/importers

Responsible for moving products from suppliers to buyers internationally, commodity traders play a unique role in forest risk commodity supply chains. However, with increasing private sector concentration, the largest of these companies are not just active in the physical trade of agricultural commodities, but also operate in other capacities; as input suppliers, landowners, cattle and poultry producers, food processors, financiers and investors, transportation providers, and grain elevator operators<sup>12</sup>. Moreover, traders can also be involved in commodity processing and in the manufacture of consumer goods. As such it is not possible to use a strict definition for the companies in this supply chain segment.

Of the commodities included in this research, it is predominantly palm oil and soya where a concentration of companies is responsible for the majority of trading. The companies Archer Daniels Midland (ADM), Bunge, Cargill, and Louis Dreyfus – collectively known as ‘the ABCD companies’ because of the coincidence of their initials – are considered to be the largest commodity traders globally and are responsible for a significant proportion of the international grain trade. ADM and Bunge are publicly listed while Louis Dreyfus and Cargill are privately owned and essentially remain as family businesses.

No detailed figures are available to assess the specific market shares of each of the companies in the trading of soya or palm oil<sup>13</sup>, although some companies do report volumes of palm oil traded via the RSPO. Although the ABCDs are all involved in the palm oil trade, in this case it is Singapore-based Wilmar that is the most significant player; it is

argued that up to 45% of all palm oil globally is traded by the company<sup>14</sup>. In addition to Wilmar, a small number of other companies have been included as palm oil traders. In China, for example, the vast majority of palm oil is imported by only a handful of companies, with COFCO being a particularly significant company. COFCO is not only China’s biggest grain trader but is also involved in many other aspects of food production. Specifically, it is one of the country’s largest meat and dairy companies<sup>15</sup> and is therefore also of relevance to other forest risk commodities. Similarly, Ruchi Soya Industries is a key palm oil trader in India that has also diversified into the manufacture of finished products. In addition to market research, reports and public sources, and RSPO and customs data have been used to identify further relevant companies in the palm oil sector. It should be noted that a number of large producers also operate as traders.

**Manufacturers**

As two of the most important oil seeds traded globally, there is significant overlap in the uses of palm oil and soya in food products. Both palm oil and soya bean oil are used as cooking oils, especially in some of the key exporting countries. Their derivatives are also important for food products, used as emulsifiers, and as ingredients in confectionery and baking products, spreads, ice creams, and snacks. It has been argued that around up to half of all packaged food in supermarkets contains palm oil and soya products<sup>16</sup>, with most companies manufacturing products containing palm oil also using significant amounts of soya and vice versa. The majority of palm oil produced globally is used in food products while a large percentage of soya is also used in animal feed.

A variety of sources have been used to identify key companies involved in the manufacturing sector. This includes trade data, which has been used to prioritise companies operating in key trading partner countries of forest jurisdictions; market share data for various food production industries, allowing for the identification of key manufacturers in each country; and other sources on market leaders, such as from industry magazines and other literature. The resulting shortlisted companies have been cross-checked against lists of the largest food manufacturers globally and expanded where sources have supported the inclusion of companies not already listed.

Palm oil is also a significant ingredient in the cosmetics and detergent industries. The key players in the personal and home care industries have therefore been included in the Forest 500. In addition, as palm oil and soya are major biofuel ingredients in some regions, a small number of biofuel producers have also been identified. Although both commodities are also used as ingredients in industrial products, they are to a much lesser extent and no clear market concentration of specific companies has been determined.

Available data (such as on specific quantities of palm oil used in each industry) do not allow for a purely statistical approach to choosing the companies with the largest power within each sector. Therefore manufacturers have been chosen according to a number of criteria using market research data.

The top ten manufacturers of the product categories known to often contain palm oil have been identified. A breakdown of these sectors can be seen in Table 4. The identified companies in each of these industries have been included providing their global sales value exceeds US\$2 billion. Specifically, the top five manufacturers in each of the key importing and producing countries have been included where their sales exceed this value and where they have a market share of 5% or greater.

**Table 4. Information on global and national market shares has been obtained for the following industry sectors.**

RELEVANT INDUSTRY SECTORS	
PACKAGED FOOD	Spreads
Bakery	Sweet and savoury snack
Chilled processed food	BEAUTY and PERSONAL CARE
Confectionery	Skin care
Dairy	Sun care

Dried processed food	Hair care
Frozen processed food	Cosmetics
Ice cream	Bath and shower
Noodles	HOME CARE
Oils and fats	Dishwashing
Pasta	Laundry care
Ready meals	Surface care
Sauces, dressings and condiments	Toilet care
Soup	

## Retailers

Forest risk commodities are commonly found in finished consumer food products, such as those sold in supermarkets. Retailers therefore have significant leverage over forest risk commodity supply chains, especially in cases where they sell their own private label product lines and subsequently are directly involved in manufacturing.

Due to supply chain complexities, a lack of reporting, and the fact that most retailers sell products manufactured by other companies, it is not possible to calculate exactly how much of each commodity each retailer sells globally. However, it is clear that the majority of palm oil produced is used in food products and that around half of packaged supermarket food contains soya and/or palm oil. In countries where supermarkets dominate food retail channels, such as in most European and North American countries, market concentration is much greater than in countries where organised retail channels are still emerging and where most food is sold by small independent stores, such as in India. This variation in market concentration and fragmentation has been taken into account in shortlisting retailers for inclusion in the Forest 500.

As retailers have little control over the supply chains of some of the largest food manufacturers globally whose products they stock, retailers have only been included if they have significant sales of their own branded products. In these cases they have been presumed to control production and have the ability to influence the ingredients used, through their contracts with product manufacturers.

Other highly relevant types of retailers include quick serve restaurants, which use significant amounts of forest risk commodities; such as palm oil, soya, and beef in food products, and paper in packaging. The largest relevant chains have been included, once again, with an emphasis on those chains operating in the main producing and importing countries. As in all other cases, retailers have only been listed once in the Forest 500 even when they prove to be significant players in the supply chains of multiple forest risk commodities.

## Soya

### Producers

Soya farming in forest jurisdictions is diverse and farm sizes vary greatly. Even though a large proportion of soya production comes from numerous individual farmers with relatively small land banks, a handful of companies operate large areas. Those companies owning and operating areas of more than 200,000 hectares across South America have been included as producers in the Forest 500.

### Processors

Processors in the soya industry include soya bean crushers - producing soya oil and soya meal – as well as edible oil refiners and ingredient manufacturers, independent of whether they are located in either the main forest or importing countries. In some cases crushing facilities also have their own refineries attached. Sources for the identification of these players include lists of crushing facilities in forest and importing countries as well as refiners of soya bean oil.

Soya processing in forest countries is dominated by the same companies that also control the trade of these commodities (see *Traders/importers* below). However, there are a number of other players involved. These have been identified for the Brazilian and Argentinian industries, with research showing that in Brazil alone there are 87 soya bean crushing facilities operated by around 50 companies<sup>17</sup>.

Unprocessed soya beans are also exported from forest countries to a number of trade partner jurisdictions, most notably to China where a number of companies have been shortlisted for the Forest 500 based on their share of the total Chinese soya bean crushing capacity.

### **Traders/importers**

Brazilian customs data over a four month period has been assessed and shows that the majority of soya exports are traded by the ABCD commodity traders, despite the data being of insufficient quality to carry out detailed calculations. An additional soya trader, the André Maggi Group has also been found to command a significant share of the market and has therefore also been included<sup>18</sup>. Customs data has also been used to calculate the role of traders in soya exports from both Argentina and Paraguay, where the ABCDs also play key roles in soya trading<sup>19</sup>. In addition, specific commodity traders from processing countries (most notably from China) have also been included due to their increasingly important role in the sector.

### **Manufacturers**

Given the overlap in many of the products most relevant to the supply chains of palm oil and soya, research to identify the key manufacturers in the soya industry follows that described in the previous section for palm oil. In addition to the industries detailed above, as palm kernel cake and, to a much larger extent, soya meal and cake are also used for animal feed, the largest animal feed manufacturers in key importing jurisdictions, such as in the EU, China, Thailand and Indonesia have been added to the shortlisted companies due their high potential exposure to forest risk commodities. The world's largest poultry companies; the sector being a major user of soya in animal feed, have also been included (note: dairy and beef companies have also been included for this reason but are covered through research into the processed food sector, described above, and into the beef commodity supply chain, described below).

### **Retailers**

Retailers included for the soya commodity supply chain are the same as those that have been described above in the methodology for palm oil.

## **Beef and leather**

### **Producers**

The cattle rearing industry in tropical forest countries is less organised than the soya industry. An important factor to recognise is that in the Amazon, ranchers historically have been on the cutting edge of forest conversion while soya has tended to be a post-frontier crop that follows after initial land conversion for ranching, and other drivers of land use change. Cattle ranching operations in the Amazon are also extremely diverse with regards to size, productivity and organisation, with a significant number existing in the informal sector<sup>20 21</sup>. Beef supply chains are complex and vary greatly over time. Due to a lack of organisation in the sector and an associated lack of power by single players in global supply chains, no individual cattle ranchers have been included in the Forest 500.

### **Processors**

In the context of this research, slaughterhouses (some of which also have tanning facilities for leather) comprise the initial step in cattle processing. In the last ten years there has been increasing consolidation in the beef processing sector with three companies, namely JBS, Marfrig and Minerva, rapidly expanding, financed by BNDES – Brazil's national development bank. As a result, although the beef sector continues to have more complicated and fragmented supply chains compared to the soya industry, complexity has decreased in recent years. Together, these three companies dominate beef production in Brazil<sup>22</sup>, while JBS and Marfrig also have considerable production capacities in other countries, including other forest countries in South America. JBS, for example, although dominated by the company's presence in Brazil, also reports that it holds the leading position in the production and export of beef in Argentina<sup>23</sup>. As is the case with soya, most beef processing companies also act as exporters. However, as some live

cattle are also exported from the Amazon, the dominant slaughterhouses and meat processing companies in importing countries have also been included.

Leather is a by-product of the beef industry and represents approximately 5-15% of the total cattle market value<sup>24</sup>. Tanneries represent the key processors in the industry and are included in the Forest 500. Both local tanneries in forest countries and tanneries and leather processing facilities in key importing countries have been accounted for. The industry can be highly dispersed. Brazil, for example, which accounts for the highest proportion of production, contains around 800 tanneries. Having said this, there are a number of major industry players, which are largely the same as those operating in beef production<sup>25</sup>. To identify the major leather producers (tanneries), data from leather industry lobby groups has been analysed alongside customs data, and data from market research reports and public sources. Since many slaughterhouses have tanneries attached, there is significant overlap between leather producers and beef manufacturers in the key producer countries. This, along with the lack of concentration seen in the leather processing and manufacturing industries in key importing countries, means fewer powerbrokers for the leather supply chain are included in the Forest 500 than for other forest risk commodities.

### **Traders/importers**

Commodity traders play a much smaller role in the beef and leather trade than for other commodities and usually, but not in all cases, overlap with those companies owning slaughterhouses and tanneries. No companies specifically focusing on trading beef and leather have been included.

### **Manufacturers**

Major beef and leather product manufacturers and manufacturers of ready meals not already identified in the previous commodity sections or in the beef/leather processing section have been identified and included. These have been identified using industry data, market research and customs data, where available.

Within the beef supply chain, many importers of beef sourced from Amazonian cattle also act as processors and manufacturers. However, it is important to point out that the beef supply chain differs from soya and palm oil insofar that beef is often used as a final product in itself rather than as an ingredient. Due to this and the fact that there is a lack of concentration in the market, fewer players have been identified in this supply chain segment for beef and leather compared to for the other commodities.

The most significant amounts of leather are used in the production of footwear, as well as in the manufacture of bags, suitcases and leather accessories and in the upholstery of furniture, including seating and other products for the automobile industry<sup>26</sup>. For example, in Brazil 71% of leather is used for footwear, followed by the luggage, handbags and saddler industry with a 6% share and the automotive industry with a 4% share<sup>27</sup>. However, as mentioned above, the market is often highly fragmented. In China, for example, the four largest companies in the production of luggage were estimated to account collectively for less than 2% of total industry revenue in 2013<sup>28</sup>.

To shortlist companies for the Forest 500, markets shares for footwear (both brand owners and actual manufacturers) and for bag and luggage manufacturers in leather producing forest countries and leather importing countries have been analysed. In addition, customs data from relevant countries has been used to highlight additional companies with important roles in the industry. Market share data was also obtained for apparel and footwear companies.

### **Retailers**

As is the case in the soya and palm oil supply chains, organised retail channels play an important role in the sale of beef products to consumers. The retail of leather products, such as footwear, bags and accessories often occurs at specialist stores or department stores and the largest of these stores globally as well as in the most relevant countries have been included.

## **Timber, pulp and paper**

The supply chains of tropical timber and timber products generally comprise more operators and are more complex than those of the other forest risk commodities<sup>29</sup>. The industry is highly fragmented and often dominated by a large

number of small and medium enterprises with relatively minor market shares, making it difficult to identify the true powerbrokers.

Furthermore, tropical timber forms only a small share of the global timber market overall, with many of the major forest and forestry product companies based in, and sourcing raw materials from, non-tropical regions<sup>30</sup>. Although many of the companies involved in the manufacture and retail of timber products are likely to source timber and timber products from non-tropical regions only, the major players acting towards the consumer end of the supply chain are nonetheless exposed to the risk of using timber products linked to deforestation in tropical regions and have therefore been identified and included.

It is also important to note that a high proportion of timber extraction in tropical regions is illegal; with it estimated that illegal logging constitutes between 15% and 30% of forestry in the tropics and is worth around US\$30-100 billion globally<sup>31</sup>. A significant amount of timber on the global market is therefore unlikely to be captured in production data. However, further down the supply chain once timber of illegal and legal origin may have been mixed, the same actors are exposed to the risk of sourcing both legal and illegal timber and are captured in supply chain assessments.

Although the timber industry is highly fragmented, the pulp and paper sector is more consolidated. This is evidenced by the fact that many of the companies in a ranking of the top 100 forestry, paper and packaging companies globally are paper and packaging companies, rather than companies involved in the production of other timber products<sup>32</sup>.

### **Producers**

The most comprehensive data on the trade in tropical timber is from the International Tropical Timber Organization (ITTO). According to the ITTO, its members collectively represent around 80% of all tropical forests and 90% of the trade in tropical timber globally<sup>33</sup>. ITTO data can therefore be used to identify the most important jurisdictions in terms of the production and trade in tropical timber. Of the 25 forest jurisdictions included in the Forest 500, 19 are ITTO producer countries and therefore provide data to the ITTO on the production and export of tropical timber products<sup>34</sup>. When ranked by tropical industrial roundwood production, the top ten of these 19 countries accounted for over 71% of total tropical industrial roundwood production from all ITTO producer countries between 2007 and 2012. These countries are therefore the focus for identifying the most important actors at the producer level.

Within each of the ITTO Forest 500 jurisdictions, the major forestry companies have been identified. Up to date and accurate information on forestry companies and their respective areas under concessions is often not available<sup>35</sup>. However, where possible, the largest forestry companies in terms of area under management have been identified and included. As definitions of forestry concessions and data sources vary, rather than attempting to rank forestry companies across all jurisdictions to highlight the major players, the largest enterprises in individual countries relative to one another have been selected. Although research has attempted to be as objective as possible, figures have been supported by further research. Generally, the two largest companies at the producer level have been included. Although, whether companies also have operations in different supply chain segments or in several tropical forest countries, making them more likely to represent major powerbrokers has also been taken into account.

With regards to the pulp and paper industry, as the majority of tropical deforestation driven by conversion to monoculture plantations for pulp and paper production is occurring in Indonesia<sup>36</sup>, this is the focal jurisdiction for identifying the most important producers in this sector. Indonesia is the largest producer of pulp and paper in the tropical forest zone and the global leader in pulp and paper exports<sup>37</sup>. In contrast to the fragmentation apparent in the tropical timber industry, the pulp and paper sector is far more concentrated. In Indonesia, just two companies, Asia Pulp and Paper (APP) and Asia Pacific Resources International (APRIL), dominate production; collectively accounting for 80% of the total<sup>38</sup>. These have therefore been included in the Forest 500.

### **Processors**

For the purpose of this research, processors refer to companies involved in the conversion of raw timber products, such as logs, into materials, such as tropical sawnwood, veneer and paper products, used in the manufacturing of final goods.

Comparing production and export volumes of tropical industrial roundwood versus other primary processed products indicates whether processing occurs predominantly in country or after export and so reveals in which countries the processing sectors should be investigated. Similarly, for importing jurisdictions, high imports of tropical industrial roundwood are suggestive of high processing capacities. Tropical industrial roundwood comprises saw logs (sawn lengthways to produce sawnwood or railway sleepers); veneer logs (peeled or sliced to produce veneer); round and split pulpwood (for the production of pulp, particleboard and fibreboard); and other industrial roundwood, which includes roundwood for other uses, such as poles and posts etc.<sup>39</sup>. A country importing high amounts of industrial roundwood is therefore likely to be involved in the primary processing of products such as in the production of sawnwood and veneer.

Exports of whole logs are becoming less common as tropical forest countries are increasingly taking measures to boost downstream processing and value addition within country<sup>40</sup>. Many forestry companies in tropical forest jurisdictions are therefore increasingly integrated in the supply chain, with many involved in processing as well as harvesting logs. To highlight the importance of the processing sector and to identify major processors, the context in each country and the level of industry concentration has been assessed. Where applicable the largest processing enterprises have been identified.

For example, Brazil is the clear leader in the production of tropical sawnwood, responsible for over 37% of the total from all ITTO producer countries between 2007 and 2012<sup>41</sup>. Brazil's sawmill industry is therefore important to assess, with research revealing that the industry is highly fragmented<sup>42</sup>. Therefore in this case, only companies active in the sawmilling sector but also proving to be significant players at other supply chain levels or in other tropical forest regions have been included. Malaysia and Indonesia are the top tropical veneer producers, accounting for over 40% of production from all ITTO producer countries between 2007 and 2012<sup>43</sup>. However, the market is equally fragmented and therefore important companies are captured either due to their role at the producer level or in manufacturing, particularly of plywood.

In terms of important trading jurisdictions, China and India are the main importers of tropical industrial roundwood, accounting for over 51% and over 30% of the total value of tropical industrial roundwood imports respectively. The processing industries, including sawmills and veneer mills, in these countries are therefore also important to assess.

With regards to the pulp and paper sector, processing companies include those operating pulp and paper mills. There is often significant vertical integration in the paper supply chain, with many processors also active at the producer level. The largest processors in the pulp and paper supply chain are therefore captured with the inclusion of the largest integrated paper companies.

### **Traders/importers**

There is limited information available on the largest traders of tropical timber globally. However, many timber product companies import and export their products around the world and have either headquarters or distribution offices outside of the tropical forest countries in which they operate. The largest integrated timber companies therefore often have trading operations and are captured within assessments of the other supply chain segments. For example, several of the largest logging companies in West Africa are headquartered in Europe and China and are therefore directly engaged in exporting products to these regions.

Research into the timber industries in each of the identified important jurisdictions reveals that in Japan, the timber trade is dominated by the country's largest general trading companies. For example, these are reportedly trading partners for the biggest logging companies operating in Sarawak, Malaysia<sup>44</sup>. Japan's largest trading companies, in particular those known to be involved in other parts of the timber, pulp and paper supply chains, have been included.

### **Manufacturers**

Research into the most important sectors in producing and trading jurisdictions in terms of the consumption of tropical timber and pulp and paper has highlighted which manufacturers should be included. For the purpose of this research, manufacturing is classified as the operations prior to retailing, during which processed products are made into finished products. For example, for tropical timber, this may include plywood manufacturers, furniture manufacturers, building material providers and the construction industry. For pulp and paper, this may include tissue manufacturers, paper

manufacturers, book, magazine and newspaper publishers, and the packaging industry, which is the main end user of paper and paperboard<sup>45</sup>.

As with assessments of the other supply chain segments, research into the context in each country has informed the focus for further research. For example, Malaysia and Indonesia are the top tropical plywood producers, collectively accounting for over 64% of total tropical plywood production from ITTO producer countries within identified important forest jurisdictions<sup>46</sup>. The plywood industries in these countries have therefore been assessed to gauge the level of fragmentation and the importance of including individual companies. The timber products industries in these countries are relatively fragmented and therefore only enterprises with significant operations throughout the supply chain have been included. Market data on furniture manufacturers is only available for brand-owning companies. This has therefore been supplemented with further research to identify significant manufacturers and exporters of furniture products made from tropical hardwoods.

Due to the high level of fragmentation in the industry, the largest companies globally involved in the manufacture of products at risk of involving tropical timber or pulp and paper from tropical forest jurisdictions have been included.

### **Retailers**

As with research into manufacturers, assessments of the most important industry sectors in terms of use of tropical timber and pulp and paper products has formed the basis for identifying the most important retailers. The main retailers assessed are furniture and home improvement/DIY retailers for tropical timber, and office supply retailers for pulp and paper. Investigations into the relative importance of the domestic versus export market demonstrate which countries' retail sectors are most important to analyse.

Due to the fragmentation in the industry, the largest retailers of products at risk of including tropical timber or pulp and paper from tropical forest regions globally and in identified consumer countries, such as DIY, furniture and office supplies retailers, have been included.

On the whole for the timber, pulp and paper supply chains, the most important companies have been identified guided by research into the specific timber and pulp and paper industries in the identified tropical forest and trading jurisdictions. This research has revealed the importance of the various industry segments and sectors, the different levels of market concentration, the dominance of the domestic or export market and an indication of the relevant import and export patterns. This research indicated which sectors are most important in terms of consumption and which have sufficiently high levels of market concentration to warrant the inclusion of specific industry actors. The variation in the level of market concentration at each stage of the supply chain means that there is not an even distribution of companies included from all supply chain levels. Generally, only where there is a higher level of market concentration has a sector been assessed. Further to this, above producer level, only companies with annual sales of over US\$2 billion or a sufficiently high market share have been included.

### **Mergers and Acquisitions**

Between 2015 and 2020, a small number of the companies present in the original Forest 500 selection will merge or be acquired. In order to annually include 250 companies, reselection is undertaken each year to replace companies that no longer exist as independent entities. Powerbrokers are again identified by: (1) their risk of being linked to tropical deforestation through their involvement in, or potential exposure to, forest risk commodity supply chains; and (2) their influence within the political economy of tropical deforestation, for example through their influential positions in affecting supply chain sustainability, agricultural development or tropical forest conservation.

## **3. Investors**

The investors' category of the Forest 500 includes the major powerbrokers in the financial sector that can influence the sustainability of forest risk commodity supply chains through their shareholder, financing and lending activities. This includes those investors directly investing in, or at risk of investing in, the supply chains of forest risk commodities

The majority of investors in the Forest 500 are those identified as investing directly in the publicly-listed companies included in the Forest 500, with financial databases used to identify all shareholders of these publicly-listed companies. Shareholdings can change relatively quickly and it has therefore only been possible to include a snapshot of holdings at the time of research (July 2014). However, since most of these investors have shares in a variety of the Forest 500 companies, it is likely that they would be identified as key investors even with the use of more recent data. To give an indication of the power these investors have over the companies listed in the Forest 500, they have been ranked according to the total monetary value of their shares in the listed companies. In total, the shareholdings of more than 9,000 investors worth more than US\$ 2.5 trillion were assessed, with the investors ultimately included collectively holding shares in the publicly traded Forest 500 companies worth around US\$ 1.7 trillion. Further research was carried out on those investors that appeared to have significant investments (i.e. they were identified among the top investors in the Forest 500 public companies) but were found to only have shareholdings for one company. These were not included where additional research confirmed that these were not in fact investment companies but, for example, founding individuals or families of specific companies.

To incorporate potential investment and lending power and future trends in investment, the world's largest banks, asset managers, pension funds and sovereign wealth funds have also been identified and included - where they do not already appear as key shareholders of the listed companies. Furthermore, banks in key countries that are focusing on rural development lending or lending for forest risk commodity related activities, either in their own regions (Brazil, Indonesia for example) or through overseas activities, have also been included.

## 4. Other powerbrokers

In addition to those key players included in the jurisdictions, companies and investors categories, a variety of other powerbrokers have the potential to influence significantly the tropical deforestation landscape. These diverse powerbrokers, which include existing interventions as well those that provide potential avenues for improving the sustainability of forest risk commodity supply chains, are important to recognise and are therefore represented within this final category of the Forest 500.

This category covers the impacts of activities outside of those associated with, and determined individually by, singular public or private sector actors. These are capable of influencing the behaviour of different actors with respect to commodity production and supply chains, and tropical forest conservation. The majority involve multiple stakeholders; either they are based on multi-stakeholder processes involving diverse actor types (e.g. public-private partnerships, commodity roundtables and certification schemes) or involve multiple stakeholders of one actor type. The latter may be comprised of multiple market actors, such as is the case with the voluntary sustainability commitments of associations of companies or investors, or of state actors, such as is the case with intergovernmental initiatives. This section encompasses a wide variety of powerbrokers, aiming to ensure full representation of the commodity supply chain and tropical forest landscape in the Forest 500. However, unlike the powerbrokers identified in the previous sections, those included in this final category have not been subsequently assessed against forest risk commodity policy indicators and given overall scores (as detailed in the *Scoring methodology*) for their potential impacts on tropical forests, and have been included on the Forest 500 platform along with profiles indicating their importance.

### **Multilateral financial institutions**

Multilateral financial institutions have been included due to their involvement in financing agricultural development projects as well as those aimed at tropical forest conservation. The largest and most relevant multilateral and sub-regional development banks have been identified and included. The Multilateral Development Banks (MDBs) are generally identified as the World Bank Group (including the International Bank for Reconstruction and Development,

the International Finance Corporation and its other facilities), and the five regional development banks: the African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank, and Inter-American Development Bank. As well as these, the most relevant sub-regional development banks have also been shortlisted. For example, Corporacion Andina de Fomento (Andean Development Corporation; CAF), which is funded by 16 Latin American countries, Portugal and Spain and whose lending exceeds that of the World Bank in Latin America<sup>47</sup>. Further research was conducted in order to identify which of these to include in terms of those that are of most relevance to the Forest 500 tropical forest jurisdictions. As well as these geographically-focused agencies, as the most relevant programme-focused fund and the key financing instrument for several relevant international policy instruments, the Global Environmental Facility has also been included.

### **International policy institutions**

This subcategory of 'other powerbrokers' encompasses the agencies responsible for various intergovernmental initiatives, such as multilateral environmental agreements (MEAs) and multilateral trade agreements. These include those that establish requirements or mechanisms for the protection of tropical forests and for reducing tropical deforestation, and also those that regulate the international trade in forest risk commodities.

The most relevant MEAs have been identified and included; the United Nations Framework Convention on Climate Change (UNFCCC), which has established mechanisms for reducing greenhouse gas emissions associated with tropical deforestation; and the Convention on Biological Diversity (CBD). In addition and of particular relevance to the tropical timber trade, the International Tropical Timber Organization (ITTO) and the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) have also been included. Regarding multilateral trade agreements, the World Trade Organization (WTO) has been included given that it is the sole international organisation responsible for establishing the rules regarding international trade<sup>48</sup>.

Finally, as well as the above regulatory intergovernmental initiatives, several relevant non-regulatory institutions are included, for example the Food and Agricultural Organization of the United Nations and the UN-REDD Programme.

### **Commodity roundtables and certification schemes**

Commodity roundtables are voluntary systems aiming to incentivise companies to meet sustainability standards<sup>49</sup> and provide a forum to convene different stakeholders operating throughout the supply chain together with civil society organisations<sup>50 51</sup>. These initiatives have varying goals, with some aiming for the establishment of third party certification schemes and others the development of best practice guidelines to influence business operations. Some initiatives operating certification programmes have a wide reaching impact on commodity production, with the Forest Stewardship Council (FSC), for example, having certified a total of almost 15 million hectares of tropical forests in the 25 key tropical forest jurisdictions identified for this research (data as of April 2014)<sup>52</sup>. Similarly, the Roundtable on Sustainable Palm Oil (RSPO) was found to have certified almost 2.5 million hectares of oil palm plantations, over 4 million metric tonnes of palm oil and over 10 million tonnes of palm kernel (data as of December 2013)<sup>53</sup>, also in the key tropical forest countries identified.

Sustainability standards continue to demonstrate significant growth; with increases in standard-compliant production outpacing concurrent growth of the corresponding conventional commodity markets<sup>54</sup>. These are therefore extremely important in determining the current and future impacts of forest risk commodities on tropical forests. The major roundtables and certification schemes for each of the forest risk commodities have therefore been identified and included.

### **Voluntary sustainability initiatives**

These are voluntary initiatives through which private sector actors and governments commit to increasing the sustainability of their business operations, investments, procurement policies and development activities. These collective commitments, if met, can contribute significantly to reducing tropical deforestation.

Some of these are multi-stakeholder in nature, including public-private partnerships such as the Tropical Forest Alliance 2020, which includes representatives from companies, governments and civil society, or other corporate sustainability commitments supported by civil society, such as the Palm Oil Innovation Group. Other initiatives have purely corporate representation, such as the Consumer Goods Forum – a coalition of around 400 companies and

other stakeholders in 70 countries, collectively employing around 10 million people and selling goods and services worth more than US\$3 trillion – or purely public sector representation, such as the Rio Branco Declaration – a commitment between members of the Governors’ Climate and Forests Task Force. The most relevant sustainability initiatives have been identified and included.

### **Donor government programmes**

As well as those governments included in the jurisdictions category of the Forest 500, several others, as well as specific funding institutions in the previously identified jurisdictions, play important roles in addressing tropical deforestation as donor governments.

Funds supporting countries in their ‘REDD+<sup>a</sup> readiness’ activities (i.e. in preparation for the implementation of an incentive mechanism rewarding reductions in deforestation or forest degradation) or results-based payments for verified emissions reductions form a substantial component of donor government funding directed at tropical forest conservation. This has therefore been used as a proxy for assessing the involvement of different governments in funding for tropical forests, with the understanding however that there may be important donor governments not captured using this approach. The key donor governments have been identified according to data from the Voluntary REDD+ Database, with the UK, the US, Germany, Norway and Australia identified as the five main donor countries (historically/current) for REDD+, pledging around US\$3 billion in total<sup>55</sup>.

### **Consumers, civil society, industry associations, etc.**

In addition to those above, various other actors have important roles to play in addressing tropical deforestation. These do not involve multiple stakeholders, but are individuals or groups of individual organisations that each has potentially significant impacts in the context of commodity supply chains and tropical forests. A subset of these are detailed below.

Firstly, it is important to recognise the key role civil society can play towards increasing the sustainability of commodity supply chains. For example, NGOs are often involved in the development of certification schemes and in initiating the collective voluntary sustainability commitments of associations of companies. They have also proved important in driving consumer campaigns which can influence business practices by companies changing their policies in response to the reputational risks of being associated with deforestation<sup>56</sup>. Research led by NGOs and other academic institutions can also contribute to increased understanding of the links between commodity production and deforestation as well as best practices for production. To ensure the influence of civil society is captured in the Forest 500, but to avoid subjective assessments of relative power, NGOs and indigenous peoples’ groups have been included in the Forest 500. Secondly, so that actors along the full length of the supply chain are represented and to recognise the influence that consumer behaviour and choice can have, consumers have also been included.

Industry associations are also important to recognise in the Forest 500. These are associations of private sector actors from different stages of the supply chain, including producers, processors, traders, and retailers. There are numerous international, regional and national industry associations that speak on behalf of the industries they represent and have the potential to influence the sustainability of the practices of different supply chain actors. For example, in Brazil two industry associations: ABIOVE and ANEC, which together are responsible for over 90% of the Brazilian soya trade<sup>57</sup>, initiated the Soy Moratorium, a pledge by the associations and their respective members not to trade or finance soya originating in deforested areas in the Amazon<sup>58</sup>. Identifying the most important individual industry associations for inclusion is problematic due to the high number of associations across tropical forest and trading jurisdictions, as well as those with members in multiple countries. However, their importance should be highlighted nonetheless and they have been included as a group in the Forest 500.

Finally, it is important for the Forest 500 to incorporate recent scientific advances, such as advances in monitoring land use change in order to address deforestation. Accurate and up-to-date data is a prerequisite to understanding and addressing tropical deforestation and new initiatives are making use of a variety of information sources to monitor global patterns of deforestation. For example, Global Forest Watch incorporates data from numerous sources,

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<sup>a</sup> REDD+ stands for Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries

including crowd-sourced data, satellite technology, and open access data. To capture the importance of this and related initiatives, the scientific community has been included collectively in the Forest 500.

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