August 2018

The risk of corruption and forest loss in Belgium's timber and paper imports

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Executive Summary

Between 1990 and 2015, the world lost 129 million hectares of forest. Deforestation, in the tropics at least, is substantially driven by commercial agriculture and forestry, the production of which can also be associated with serious social issues and abuses, including appropriation of land from communities and indigenous groups, forced and child labour. A significant proportion of deforestation and degradation is embedded within global trade, and the huge international trade in illegal timber contributes appreciably to these negative environmental and social outcomes.

The European Union Timber Regulation (EUTR) aims to exclude illegally harvested timber from EU markets. However, not all timber, pulp and paper products are included within the scope of the regulation. Furthermore, legality is no guarantee of sustainability, and so even compliance with the EUTR provides no assurance that imported wood products are not associated with deforestation, forest degradation and serious social issues. There is therefore a risk that Belgium, a significant importer of timber, pulp and paper, may be importing products that have been produced at a high environmental and social cost.

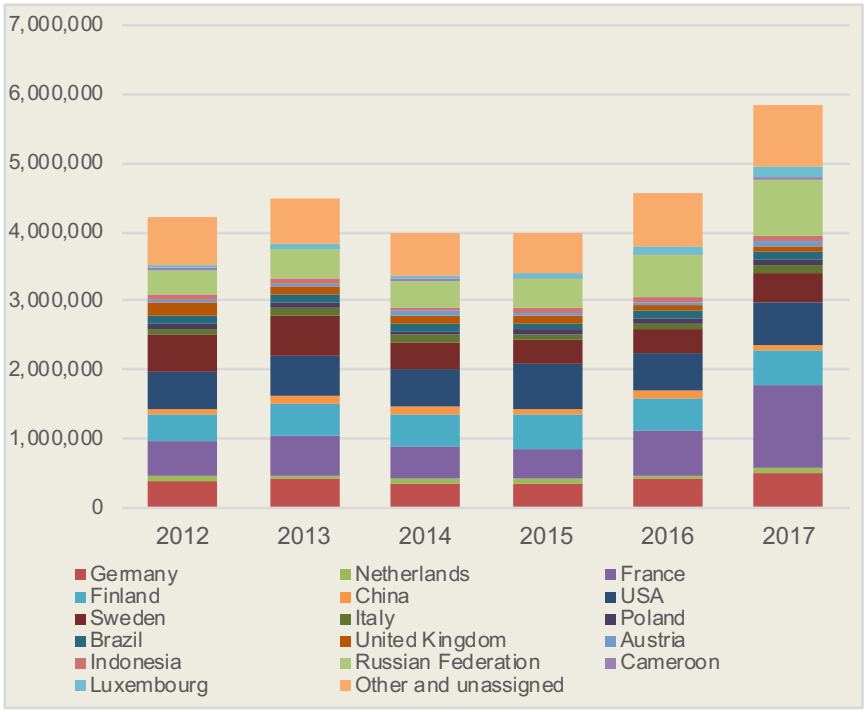
This study aims to inform ongoing efforts to improve the implementation of EUTR in Belgium and policy developments to make Belgium's timber and pulp and paper supply chains more sustainable.

The research reports the value and quantity of Belgium's imports of timber, pulp and paper products, and estimates their provenance. For each country contributing at least 1% of Belgium's imports, we further estimate the land area required to supply those imports. A risk index, that includes measures of deforestation, corruption, and labour issues is developed to indicate the likelihood of Belgium's imports being associated with serious environmental and social problems.

Belgium imported timber, pulp and paper products from over 171 countries with an average value € 8.2 billion each year between 2012-17. The value of pulp and paper products (average € 4.5 billion per year) exceeded that of timber and timber products (€ 3.6 billion per year).

The research presented here estimates that the total land area that was required to supply Belgium's imports of timber, pulp and paper was on average 4.46 million hectares per year between 2012-17 (Figure A). This is equivalent to nearly 1.5 times Belgium's total land area, or six and a half times Belgium's own forest area. This footprint increased markedly in 2017, a 28% increase from 2016. This was due to increased imports of wood in the rough, laminates, wooden packing cases and pallets, and cartons of paper and paperboard.

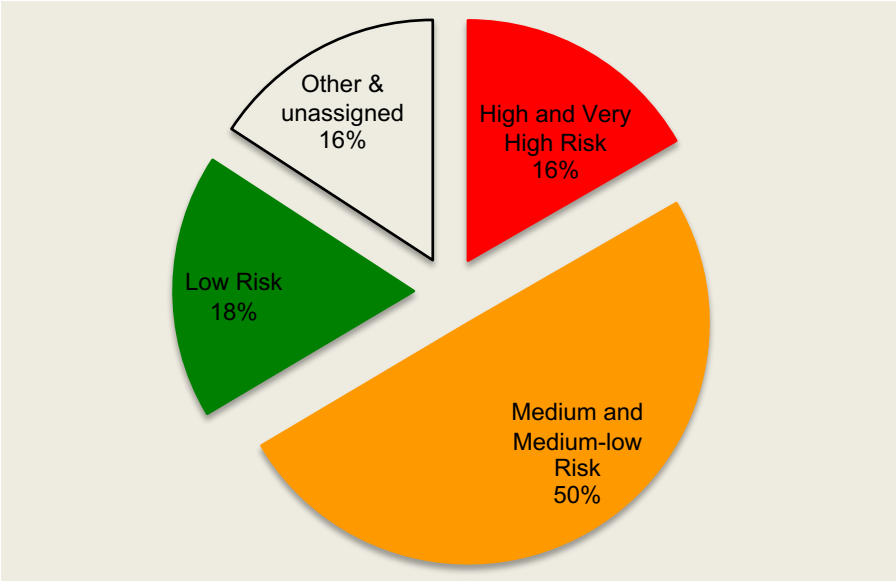
Figure A: Estimated land footprint of Belgium's imports of timber, pulp and paper 2012-2017 (hectares)



The largest footprints from Belgium's imports are in France (14% of total imported footprint, and increasing markedly in 2017), USA (13%), the Russian Federation and Finland (both 10%), and Germany and Sweden (both 8%). Amongst tropical and sub-tropical countries, Brazil contributes 2% to the total footprint, China 2%, with Indonesia and Cameroon both contributing 1%.

The footprint of Belgium's imports was assessed against deforestation and social risk. An estimated 17% (750,000 hectares) comes from countries with a high and very high risk of deforestation, corruption and poor labour standards (Figure B).

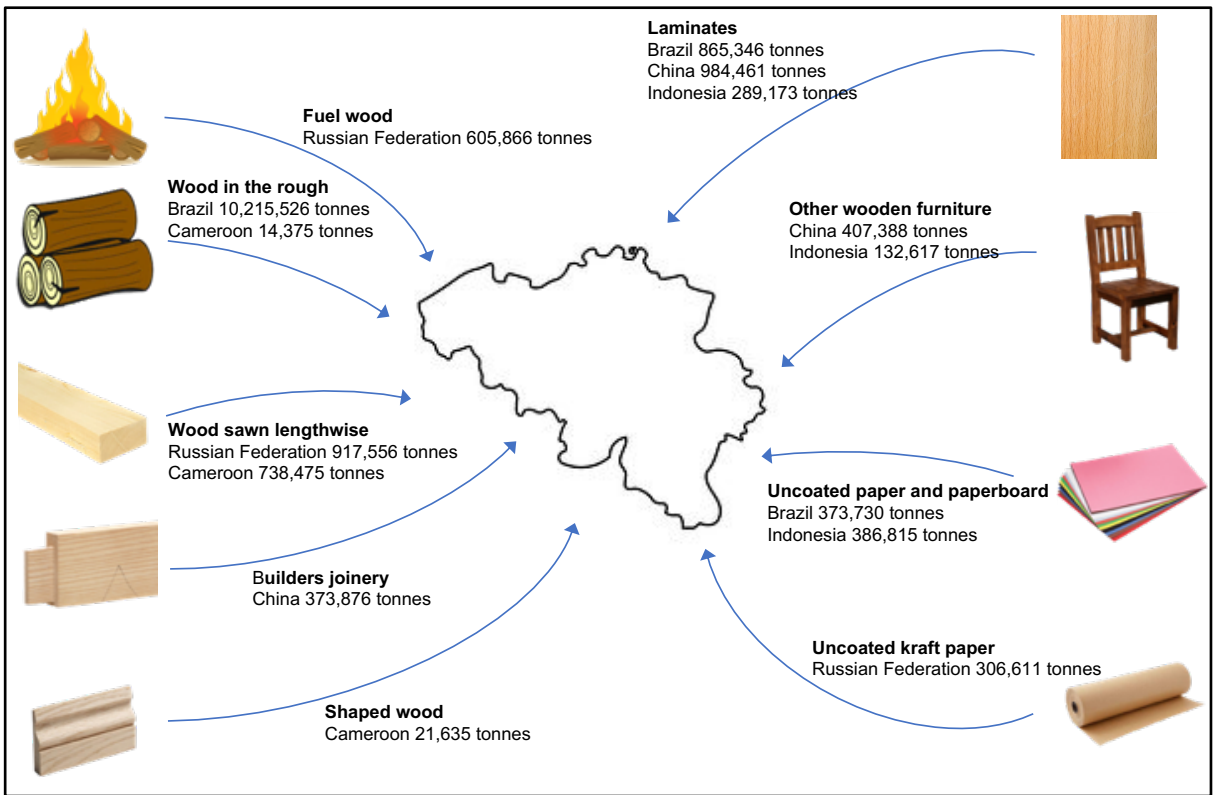
Figure B: The distribution of Belgium's land footprint for timber, pulp and paper amongst risk categories



These high risk countries include the Russian Federation, Brazil, China, Indonesia and Cameroon. The area of land required to satisfy Belgium's demands from these countries is larger than the entire extent of forest in Belgium. The products imported

from these countries are highly varied (Figure C). Even if the European Union Timber Regulation (EUTR) is successful in excluding illegal timber from these countries, there is no guarantee that production of these imports has not caused deforestation, forest degradation, or has been associated with serious social issues such as land grabs and forced labour.

Figure C: The top three products imported from high risk countries



A significant proportion of Belgium's timber, pulp and paper imports (6%, worth an average of € 490 million per year) are outside the scope of EUTR and hence companies in Belgium have no legal obligation to ensure that these products are from legal sources. These 'out of scope' imports came from 147 countries between 2012-17, including countries from which the trade in illegal timber is well documented (e.g., China, Myanmar). Further analysis of this portion of Belgium's imports reveals that only 29% comes from countries that have a low risk of corruption, with medium risk countries accounting for 63%, and high risk countries 9%.

Belgium has recently stepped up its efforts to implement the EUTR, and companies are making commitments to source sustainably produced timber, pulp and paper products. For example, certification schemes exist that can, to a greater or lesser degree, provide assurances that imported timber products have been legally and sustainably produced. There are therefore opportunities for businesses and the Belgian government to take a lead in demanding and reporting on the quantities of credibly certified timber that the country imports. Without such leadership, Belgium will almost certainly continue to import timber that has been produced at high cost to the environment and local people in some of the countries it imports from. Detailed recommendations developed for policy-makers and the private sector will be laid out in a companion report.

1 Introduction

1.1 Links between timber, pulp and paper and deforestation

Forests are home to more than 50% of all terrestrial species, provide ecosystem services such as flood protection, reduce atmospheric carbon dioxide levels, and provide a livelihood for forest-dependent communities, including the 60 million indigenous people who live in forests. Forests – both natural and plantations – are also the source of timber, which is extensively traded across the globe and is used for a myriad of wooden and pulp and paper products.

Unsustainable harvesting of timber has been cited as a major driver of deforestation,[1] forest degradation, habitat destruction, and species loss in some of the most biodiverse and ecologically important places in the world.[2] Other reported negative environmental impacts include increased vulnerability to natural disasters such as erosion, siltation, landslides, flooding and forest fires. Whilst the production of commercial timber provides a livelihood for millions of people, it has also been associated with negative social outcomes, including land grabs, forced labour, working conditions that are below international norms, and corruption, with knock-on effects for social infrastructure and human well-being in the countries concerned. The illegal timber trade was estimated to be worth between US$ 30 and US$ 100 billion, or 10–30% of global wood trade.[3] This illegal trade loses governments revenue through the non-payment of taxes, revenue that could contribute to poverty reduction, health care or education. It is estimated that 62–86% of all suspected illegal tropical wood entering the EU and US arrives in the form of paper, pulp or wood chips.[4]

Trees are a renewable resource, and there are alternatives to unsustainable and illegal timber. Responsible forest management can maintain the ecological and social benefits that forests provide, whilst achieving economically viability and contributing to the national economy of producer countries. There are two internationally recognised systems for the certification of sustainable forestry management and its supply chain – the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). FSC has 196 million hectares certified globally (of which 94.4 million hectares are in Europe), and the PEFC 304.2 million hectares (95.8 million hectares in Europe).[5]

Both the FSC and PEFC systems include similar basic components:

- Forest management and chain of custody standards that include requirements for sustainable forest management and the tracking of certified materials from forest to end product/sale.

[1] We use the FAO's definition of deforestation throughout this report: 'The conversion of forest to other land use or the permanent reduction of the tree canopy cover below the minimum 10 percent threshold.' FAO (2015). Global Forest Resource Assessment 2015: Terms and Definitions. Rome.
[2] Boucher, D., Elias, P., Lininger, K., May-Tobin, C., Roquemore, S. & Saxon, E. (2010). The root of the problem: what's driving tropical deforestation today? The Union of Concerned Scientists.
[3] Nellemann, C., INTERPOL Environmental Crime Programme (eds). 2012. Green Carbon, Black Trade: Illegal Logging, Tax Fraud and Laundering in the Worlds Tropical Forests. A Rapid Response Assessment. United Nations Environment Programme, GRIDArendal. www.grida.no ISBN: 978-82-7701-102-8
[4] Nellemann, C., Henriksen, R., Raxter, P., Ash, N., Mrema, E. (Eds). 2014. The Environmental Crime Crisis – Threats to Sustainable Development from Illegal Exploitation and Trade in Wildlife and Forest Resources. A UNEP Rapid Response Assessment. United Nations Environment Programme and GRID-Arendal, Nairobi and Arendal, www.grida.no ISBN: 978-82-7701-132-5
[5] Sources: FSC Facts & Figures: https://ic.fsc.org/en/facts-and-figures, PEFC Facts and Figures: https://www.pefc.org/about-pefc/who-we-are/facts-a-figures and PEFC – Global Statistics – SFM and CoC Certification – Data (Sept 2017): https://www.pefc.org/images/documents/PEFC_Global_Certificates_-_Sep_2017.pdf

- The use of a trademark (scheme logo) in conjunction with information on the certification process (e.g. a certificate number) at point of sale to provide assurance to buyers/consumers.
- Independent third party certification audits conducted by accredited certification bodies to ensure that the requirements of these standards are being met.
- Independent accreditation of certification bodies to ensure that they have the right systems, processes, skills, expertise and local knowledge to conduct an audit effectively.

Both schemes are working towards the implementation of sustainable forest management practices around the world, and both provide purchasers with assurance against some of the worst excesses of the timber trade, including illegality. However, they have chosen different routes and approaches to get there:

- The FSC continues to enjoy support from major environmental NGOs, including WWF.
- The limited evidence from independent, direct comparisons suggest that the FSC certification system is stronger, more transparent and more consistently applied than the PEFC system.
- The FSC standard is considered to possess stricter safeguards on aspects such as biodiversity conservation and workers' rights.

One significant technical difference is that the FSC has more stringent controls on the origins of the non-certified portion of products that contain both certified and non-certified material. The requirements of the PEFC chain of custody standard mean that such 'mixed' products could contain wood from areas where traditional and civil rights are violated, or where poor forest management threatens areas of high conservation value. However, even the 'FSC mix' is open to criticism, as shown by recent Greenpeace campaign against Essity (the producer of Lotus toilet tissue).[6]

1.2 Trade and uses of timber, pulp and paper

1.2.1 Global uses and trade flows

There are two major production systems for timber: plantations and natural forest. The bulk of the world's forest is natural forest, with an estimated 3.7 billion hectares in 2015. The area of planted forest has increased by over 105 million hectares since 1990, and now there is an estimated 291 million hectares of plantations. Around 31% of the world's forests (almost 1.2 billion hectares) are designated as production forest, with a further 28% (over 1 billion hectares) designated as multiple use, i.e., serving multiple functions including timber production.[7]

The major uses of timber globally include sawnwood, plywood, particleboard, furniture, fuelwood and pulp and paper, collectively 'timber, pulp and paper'. Wood is extremely versatile and has a wide variety of end uses, including:

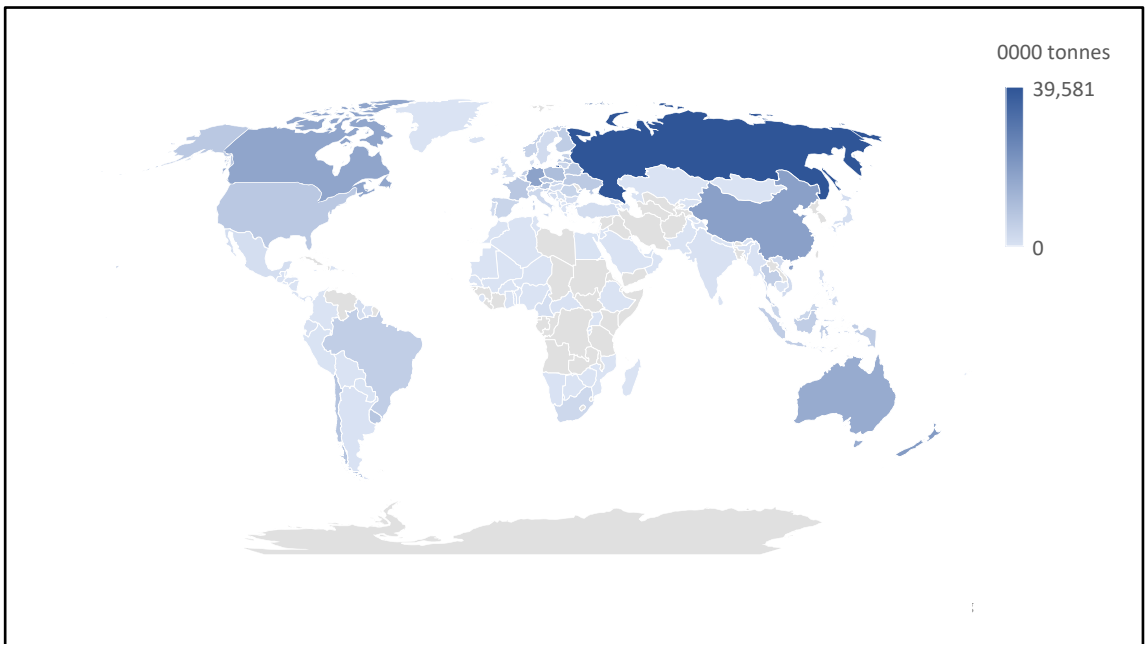
[6] https://www.greenpeace.org.uk/velvets-claim-protecting-forests-flushed-away/
[7] FAO (2016) Global Forest Resource Assessment 2015: How are the world's forests changing? Food And Agriculture Organization Of The United Nations, Rome.

- **Fuel:** Globally, 49% of harvested wood is used for fuel[8], particularly in developing countries.
- **Construction:** Timber is widely used as a construction material in house frames, flooring (solid wood; laminate or parquet blocks), window frames, doors and doorframes, skirting, decking, garden buildings, telegraph poles, fencing, boat building, railway sleepers, etc.
- **Furniture:** Varying from softwood furniture (e.g. pine) and plywood/laminate flat pack furniture to luxury hardwood (e.g., mahogany, teak).
- **Various:** Musical instruments, tool handles, decorative items, packaging (e.g. pallets), etc.
- **Industrial processes**: Wood is used in electricity generation, principally the form of wood pellets, in food processing (smoking), etc.

A total of € 351 billion of timber, pulp and paper were exported globally in 2016. Of this, timber products accounted for € 197 billion, including raw timber, manufactured products such as plywood, and finished wooden articles (e.g., wooden furniture). A further € 152 billion of pulp and paper products was exported in the same year.

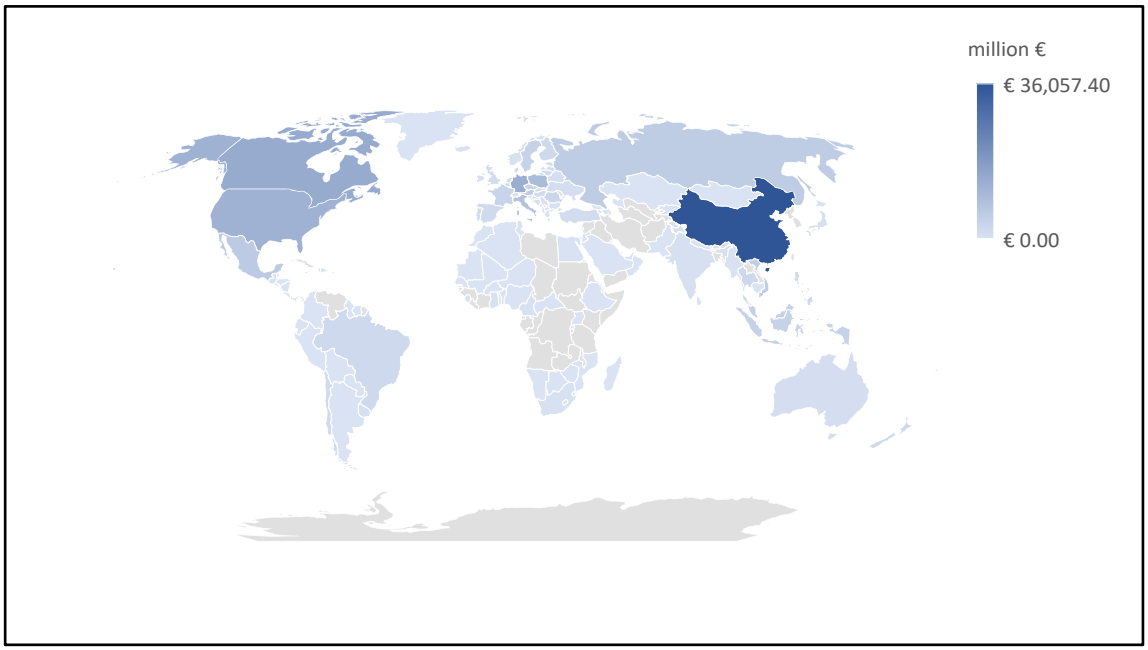
The Russian Federation has the largest share of world exports of timber by quantity, accounting for 12% of the tonnage in 2016 (Figure 1). However, by value, the Russian Federation ranked only eighth, with China (€ 36 billion,18% of global trade), Canada (€ 14 billion, 7%), Germany (€ 14 billion, 7%), USA (€ 12 billion, 6%), and Poland (€ 10 billion, 5%) the top five ranked countries (Figure 2). The disparity between China's leading position in value and its lower proportion of weight of timber exports reflects the degree of value addition that China gains on timber products.

Figure 1: Quantity of global exports of timber products in 2016 (thousand tonnes)



[8] FAO (2016) Global Forest Resource Assessment 2015: How are the world's forests changing? Food And Agriculture Organization Of The United Nations, Rome.

Figure 2: The value of global exports of timber products in 2016 (million €)



The USA is the top-ranked country in terms of both quantity (Figure 3) and value (Figure 4) of pulp and paper exports. Germany (€ 17 billion, 11%), China (€ 14 billion, 9%), Canada (€ 10 billion, 7%) and Sweden (€ 9 billion, 6%) are also major exporters.

Figure 3: Quantity of global exports of pulp and paper products in 2016 (thousand tonnes)

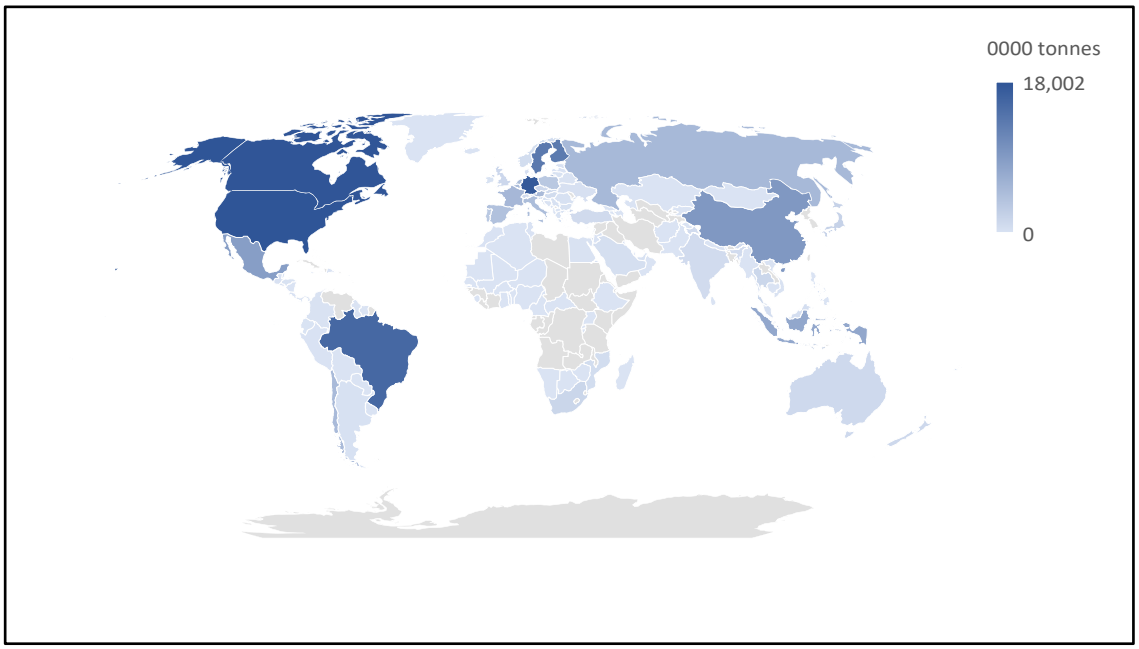
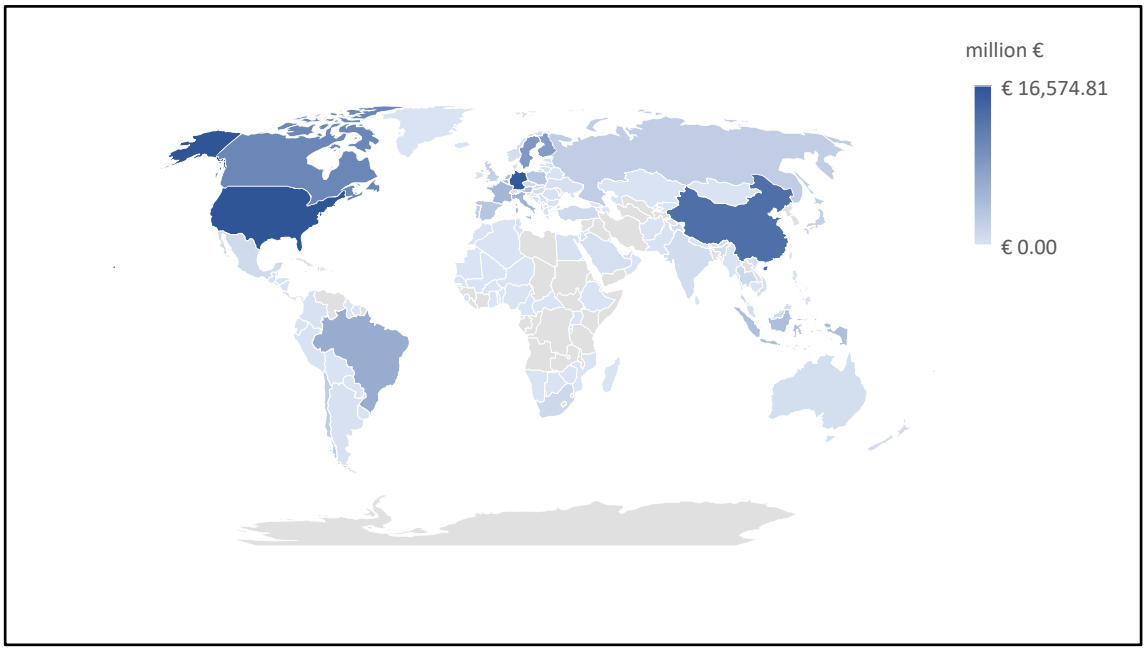


Figure 4: Value of global exports of pulp and paper products in 2016 (million €)



1.2.2 The EU and Belgium

The EU is a major producer of timber, and is also one of the world's major importers of global wood products, importing over € 29.7 billion of timber, pulp and paper in 2016.[9] In 2005, an estimated 16-19% of EU imports were from countries with a high risk of illegality.[10] A proportion of these imports drive deforestation overseas (see Box 1).

Belgium has one of the smallest annual timber harvests of any country within the EU, and is net importer of timber, pulp and paper products, with a trade deficit in excess of € 700 million per year for major wood products.[11] Certification is well advanced in the country, with 686 enterprises within Belgium holding FSC Chain of Custody certificates in 2017, with 471 having the equivalent PEFC certificates.[12]

Belgium takes on a leading trading role within the EU as the largest re-exporter of sawnwood, veneer and industrial roundwood and the second largest in plywood after France[13]. This makes Belgium an important trade point of tropical timber, re-exporting to Germany, the Netherlands, France and Italy in particular. More specifically, the Port of Antwerp handles an annual volume of 1.05 million tonnes forest products,[14] and is recognized as an important distribution hub within Europe.[15] Little information is available on

[9] Source: UN COMTRADE https://comtrade.un.org/data/
[10] European Commission (2008). *Assessment of the Impact of Potential Further Measures to Prevent the Importation or Placing on the Market of Illegally Harvested Timber or Products Derived from Such Timber* (Helsinki: European Commission – DG Environment, Indufor, European Forest Institute, Nepcon, Markku Kiikeri Ky).
[11] OEWB (2017). PanoraBois Wallonie. Édition 2017. Office économique Wallon du Bois. Marche-en-Famenne, Belgium
[12] OEWB (2017). PanoraBois Wallonie. Édition 2017. Office économique Wallon du Bois. Marche-en-Famenne, Belgium
[13] Ibid
[14] http://www.portofantwerp.com/en/forest-products
[15] Bisschop, L. (2012) Out of the woods: the illegal trade in tropical timber and a European trade hub. Global Crime, 13:3, 191-212, DOI: 10.1080/17440572.2012.701836

the balance of legal and illegal timber handled by the port, however, reports that Antwerp handles illegal timber continue to surface.[16]

With its roles as both a major trader and a significant consumer of timber, pulp and paper, Belgium has a part to play in ensuring that the future production of these commodities no longer causes degradation of forest ecosystems, deforestation or social exploitation.

Box 1: Imported deforestation and degradation

The notion of imported deforestation (or 'embodied deforestation') refers to the deforestation associated with an imported produced, traded, or consumed product, good, commodity or service. The concept is now widely accepted, and has been enshrined within high level policy commitments such as the Amsterdam Declaration Towards Eliminating Deforestation from Agricultural Commodity Chains with European Countries,[17] and global agreements such as the New York Declaration on Forests, the Sustainable Development Goals, and the global climate agreement reached at UNFCCC COP 21 (the Paris Agreement).

Consumption of all agricultural and forestry products by the EU27 was estimated to account for 732,000 hectares of deforestation in 2004, 10% of the global embodied deforestation consumption.[18] The EU 27's consumption of wood, pulp and paper products alone was estimated to account for 36,000 hectares of deforestation each year. These rates of deforestation are almost entirely due to imports, as deforestation within the EU (other than in Sweden) is negligible, and the EU trade in timber, pulp and paper is dominated by timber harvested from EU forests, with intra-EU trade accounts for 80% of the total EU trade in timber[19]. Only a relatively small proportion of the timber, pulp and paper products imported into the EU therefore originate from countries where production is associated with deforestation, forest degradation, corruption, and the other negative consequences of unsustainable forest management. EU imports of tropical timber are mostly accounted for by the UK, Belgium, the Netherlands, Germany and France[20].

Nonetheless, in many countries that Belgium imports from, the production of timber, pulp and paper can result in deforestation, forest degradation and habitat loss. Poor harvesting practices can significantly degrade natural forest. The establishment of timber plantations can replace biodiverse natural habitat, including natural forest. The timber industry can also act as a catalyst for deforestation, degrading forest and providing access via logging roads which are used by farmers to claim land convert the remaining forest into agricultural land.

[16] Greenpeace (2016). Importing timber from the Democratic Republic of Congo:
A high-risk business for Europe. Case study III: DRC Afrormosia from La Forestière exported to Belgium; Greenpeace Africa (2015). Trading Chaos: The impact at home and abroad of illegal logging in the DRC.
[17] https://www.euandgvc.nl/documents/publications/2015/december/7/declarations
[18] European Union (2013). The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation. Technical Report 2013-063.
[19] European Commission, (2003). Forest Law Enforcement, Governance and Trade (FLEGT) Proposal for an Action Plan. Communication from the Commission to the Council and the European Parliament, COM (2003) 251 final, Commission of the European Communities, Brussels, Belgium, pp. 1-32. [online] URL: http://www.fao.org/forestry/33093-04ee4b3cc7232ef705169b9cc20c30850.pdf
[20] Ibid

1.3 FLEGT and the EUTR

Illegality within the international trade in timber, pulp and paper trade has received significant attention within the EU.

The EU's Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan was established in 2003. The Action Plan sets out a range of measures available to the EU and its member states to tackle illegal logging in the world's forests and promote trade in legally produced timber. The measures include supporting timber-producing countries, promoting trade in legal timber, promoting environmentally and socially beneficial public procurement policies, supporting private-sector initiatives, financing and investment safeguards, using existing or new legislation, addressing the problem of conflict timber. A key aspect of the Action Plan is the creation of Voluntary Partnership Agreements (VPAs) between the EU and timber-producing countries also promote trade in legal timber products and help to close the EU market to illegal products. A VPA improves forest governance and, ultimately, guarantees that timber and timber products exported to the EU are legal. Cameroon, Central African Republic, Ghana, Indonesia, Liberia and Republic of Congo are currently listed as implementing VPAs with the EU.[21]

The EU Timber Regulation (EUTR) came into effect in all countries in the EU on 3 March 2013. The Regulation prohibits the placing of illegally harvested timber (i.e., violating the laws of the country of harvest) on the European market, and covers both imported and domestically produced timber and timber products. The scope of the regulation includes solid wood products, flooring, plywood, pulp and paper (complete list given in the Annex of EUTR[22]), but exempts some products for example those products that have completed their lifecycle and would otherwise be disposed of as waste, printed paper, seats with wooden frames, musical instruments, and wood charcoal (See Appendix 1). Timber or timber products that carry a valid FLEGT licence or Convention on Illegal Trade in Endangered Species (CITES) permit are automatically considered to comply with the requirements of the Regulation. VPA and CITES are the only licenses that are recognised in this way by the EUTR; e.g. certified timber cannot be used on its own to evidence compliance with the EUTR.

Under the EUTR, EU Member States are obliged to determine penalties for non-compliance with the EUTR, establish authorities that will be able to check for compliance of the design and implementation of an operator's (the actor placing wood products on the EU market) Due Diligence System (DDS), recognize monitoring organisation and check for their compliance with the EUTR, and provide assistance to operators in implementing the EUTR.

1.4 Belgium's policy responses to illegal and unsustainable timber

Each member state is required to implement the EUTR through national regulation, i.e. develop penalties and enforcement practices and appoint Competent Authorities responsible for the monitoring and enforcement. Belgium implemented the EUTR on 25 April 2014 by adjusting the 'Wet productnormen/Loi relative aux normes de produits' [23] and by appointing the FPS Public Health, Food Chain Safety and Environment as the Competent Authority.

The EU FLEGT Action Plan and CITES is embedded within the same regulation, with CITES implemented via the Belgian CITES law of 28 July 1981.[24]

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[21] http://www.flegtlicence.org/vpa-countries

[22] http://ec.europa.eu/environment/forests/timber_regulation.htm

[23] www.etaamb.be/nl/wet-van-25-april-2014_n2014024209.html

[24] www.health.belgium.be/en/animals-and-plants/animals/endangered-animal-species/how-does-cites-work-belgium

Belgium's monitoring and enforcement of the EUTR has received criticism[25]. In October 2017, Belgian authorities received a formal notice from the EC[26] for not enforcing the EUTR properly, i.e. having performed limited verifications with operators. This legal action followed complaints by both Greenpeace and Client Earth[27], on the insufficient number (26 checks since 2013) and quality of controls by the Belgian authorities. Since September 2017, a reinforced team of 7 inspectors has been tasked with inspections in the framework of CITES, invasive species and EUTR legislations. Between October 2017 and June 2018, 15 checks were carried out under the EUTR, leading to 7 warnings and 4 recorded infractions.

Legality is, of course, no guarantee of sustainable production. Even if EUTR is successful in excluding illegal timber, there is no guarantee that this timber has not caused deforestation, forest degradation, or has been associated with serious social issues such as land grabs and forced labour. For example, in Indonesia, a large amount of primary, secondary and peat swamp forest is legally converted to palm oil plantations each year. This process has been repeatedly shown to have impacts on biodiversity, result in enormous carbon emissions, and negatively affect the rights of many local communities.[28] The Voluntary Partnership Agreement between Indonesia and the EU, and in-country compliance with EUTR by EU member states does not stop unsustainably produced timber entering the market.

Alongside the national implementation of international policy instruments around timber, pulp and paper, Belgium has introduced national initiatives to promote the use of sustainably managed timber[29]. A public procurement policy focused on wood from sustainably harvested timbers has been in force in Belgium since 2005.[30] The Sectoral Timber Agreement[31] which came into force in March 2011, targets forest-based industries. Signatories to the Agreement commit to exclusively using timber from legal origins and to extent their supply of timber from sustainably managed forests[32]. The procurement of FSC and PEFC certified timber is approved within both policies as a means to meet their requirements. The Belgian government intends to release a report on the market penetration of certified first transformation timber products into the country, as a basis to negotiate a new Sectoral Timber Agreement to take effect in 2019.

1.5 About this report

The overarching purpose of the research presented here is to inform ongoing efforts to improve the implementation of EUTR in Belgium and policy developments to make Belgium's timber and pulp and paper supply chains more sustainable. The specific research objectives for this report are to:

- *Assess the risks of illegality in Belgium's imports of timber, pulp and paper;*
- *Generate a 'forest risk' score that illustrates the risk of deforestation and social problems that the Belgium's imports of timber, and pulp and paper may create.*

[25] www.documents.clientearth.org/wp-content/uploads/library/2016-08-30-eutr-enforcement-info-brief-in-belgium-ce-en.pdf
[26] europa.eu/rapid/press-release_MEMO-17-3494_en.htm
[27] www.clientearth.org/belgium-facing-legal-action-breaking-illegal-logging-law/
[28] Barthel, M., Jennings, S. Schreiber, W., Sheane, R. Royston, S, Fry, J., Khor, Y.L., & McGill , J. (2018). Study on the environmental impact of palm oil consumption and on existing sustainability standards. European Commission, DG Environment (Study contract No.: 07.0201/2016/743217/ETU/ENV.F3
[29] www.health.belgium.be/en/animals-and-plants/biodiversity/forests/role-authorities
[30] www.publicprocurement.be/sites/default/files/documents/circulaire_18.11.2005_omzendbrief_mb_09.02.2006_bs.pdf
[31] www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/19100177/2011_03_01_Accord_sectoriel_bois_FR.pdf
[32] www.health.belgium.be/en/sector-agreement-increase-supply-timber-products-sustainably-managed-forests

The analysis covers the major timber and paper products. It focuses on the risk of forest loss, corruption, labour rights and illegality, placing Belgium within the complex landscape of the globalised timber trade, by mapping supply chains of main timber and paper product groups. This is a technical report, and policy recommendations will be made in a further document.

2 Methods

The approach to data analysis is outlined in this section. The analysis is based on methods developed for a UK study that was commissioned by WWF UK and RSPB for the UK's imports of deforestation-risk commodities, including timber, pulp and paper.[33] The intent of that study was to develop a robust and transparent approach that could be replicated in other countries to allow comparison, and repeated progress on reducing deforestation risk, as well as providing evidence to guide action.

2.1 Quantifying the Belgium's imports

Import data from the UN COMTRADE database was used to estimate the quantity (value, in Euros and net weight, in tonnes) of imports for the period 2012-17. The UN COMTRADE database is preferred to national data as it contains comparable data for all countries, which facilitates additional calculations for export countries and cross-checking of results The economic value of imported good was converted from US$ to Euros, using historical annual conversion rates.[34]

We examined two routes by which commodities feature within Belgium's supply chains:

- As **raw materials** (e.g., sawn timber);
- As a **component** of imported manufactured goods (e.g., timber in furniture).

Timber, pulp and paper are used in thousands of different products, and so the data captured was confined to those product categories that are within the scope of the EUTR plus any additional categories cited in the literature as being major uses of the commodity (see Appendix 1 for a list of the product codes used). The estimates provided do not therefore include all possible imports of timber, pulp and paper, and are therefore conservative.

2.2 Estimating the provenance of the Belgium's imports

Timber, pulp and paper are typically imported from a large number of countries. Two general situations are found:

- A country is essentially a producer and exporter. Belgium's imports can be assigned the provenance of the exporting country without further analysis (e.g., Brazil).
- A country is a producer, importer and exporter. Where the country is a major trading partner of Belgium, the origin of its imports were analysed, and added to its national production. Exports to Belgium were then assigned in the same proportion as the total of the production and imports of that country. For example, if country A produces one million tonnes of timber, and imports the same quantity from country B, exports to Belgium from country A would be assigned equally to countries A and B.

To make this re-assignment feasible, we focused on estimating provenance for countries that are responsible for at least 1% on Belgium's imports (by value). Imports from countries that contribute less than 1% of Belgium's imports are reported as 'other'. During the provenance estimate, imports from these 'other' countries were not assigned to specific countries to reduce calculational complexity, with this fraction reported as 'unassigned'.

[33] WWF and RSPB (2017). Deforestation and Social Risks in the UK's Commodity Supply Chains. This report, and the summary report 'Risky Business', are available at https://www.wwf.org.uk/riskybusiness

[34] Historic exchange rates from Statista https://www.statista.com/statistics/412794/euro-to-u-s-dollar-annual-average-exchange-rate/

2.3 Estimating the footprint of the Belgium's imports of commodities

We estimate the area of land required to produce the timber, pulp and paper products imported by Belgium, as a way of illustrating the potential impact of Belgium's imports.

Belgium's imports were converted from tonnes of imports to wood round material equivalent (WRME). This conversion adjusts for wood content of manufactured products (e.g., plywood contains both wood and resin) and also converts the imported wood into a volume equivalent to a harvested tree. The conversion factors used were from the UK Forestry Commission,[35] and where no conversion factor is available, the closest available estimate was used (e.g., for the import category 'cartons and boxes of paper and paperboard' the conversion factor for 'other paper and paperboard' was applied).

As trees are a perennial crop, with hugely variable management systems, there is no straightforward measurement 'yield' that can be used to estimate the land required to produce a given amount of timber. The approach taken was therefore to use the annual increment, which is the increase in the volume of timber in a forest per hectare per year,[36] and which in effect accounts for the area of forest needed to produce a given amount of timber in a given year. For example, if the increment were one cubic metre per hectare per year, it would take ten hectares to produce 10 cubic metres of timber in a year (equally, one hectare would produce the same amount in ten years).[37]

The area of forest required to produce the imported volume of timber was the estimated by dividing the WRME by the exporting country's Net Annual Increment (NAI).[38]

2.4 Risk index

The land footprint of a commodity is an estimate of how much land is required to produce imports. However, the likelihood of these imports being associated with deforestation and social issues depends on the production systems in the countries in which they were produced. For example, production of a product in a country that has strong labour laws that are well implemented is less likely to be associated with labour problems than the same product produced in a country with weaker and poorly implemented regulations.

A risk-based approach is used to illustrate the potential association of Belgium's imports of timber, pulp and paper with social problems and deforestation. A risk based approach is

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[35] Conversion to WRME underbark https://www.forestry.gov.uk/website/forstats2009.nsf/0/8b4784e90b2a535480257361005015c6

[36] Technically, the increment measure used was Net Annual Increment (NAI) which is defined as the average annual volume of gross increment over the given reference period less that of natural losses on all trees, measured to minimum diameters as defined for "growing stock". Source: FAO (2012). FRA 2015 Terms and Definitions. FAO, Rome.

[37] Note that due to the large variation in NAI according to forest type and management system, the use of country level NAI could lead to significant over- or under-estimate of land footprint if Belgium's imports from a particular country are highly specific (e.g., a particular species, or from a particular plantation. However, it does provide a reasonable first order estimate.

[38] Net Annual Increment (NAI) data was obtained from FAO (2016) Global Forest Resource Assessment 2015: Desk Reference. Food And Agriculture Organization Of The United Nations, Rome. The FAO does not provide NAI for three of the major exporters. NAI for Brazil was calculated as the average of estimates given in D. Alder, J.N.M silva, JOP de Ca Carvalho, J. do C. Lopes, A.R. Ruschel (2012). The cohort-empirical modelling strategy and its application to forest management for Tapajós Forest, Pará, Brazilian Amazon. Bois et Forets Des Tropiques, 314; D. Valle, M. Schilze, E. Vidal, J. Grogan & M. Sales (2006). Identifying bias in stand-level growth and yield estimations: A case study in eastern Brazilian Amazonia. Forest Ecology and Management, Volume 236, Issues 2–3, pp 127–135 (both Amazon); and http://www.fao.org/3/a-ac121e.pdf (Brazilian pine plantations). NAI for Cameroon was estimated as the average value of the two nearest countries for which the FAO provides data (Equatorial New Guinea and Ghana), and for Luxembourg the average of Netherlands, France, Germany, Austria and Sweden was used. The average NAI of all major countries was applied to that portion of Belgium's imports that were from countries with less than 1% of imports by value.

favoured because there are two over-arching challenges when assessing the deforestation risk of the global trade in commodities:

- **Deforestation process**: Deforestation processes are varied. In some instances, natural forest may be directly converted to plantations of fast-growing trees. However, the process is often non-linear, and making attribution of conversion to a single commodity difficult. For example, deforestation may progress via degradation caused by logging, with farmers then using logging tracks to claim land and farm, consolidation of these settlements into larger landholdings (e.g., cattle ranching), and then further change into a 'final' commodity production (e.g., soybean production). Assigning deforestation to a specific commodity is thus problematic.
- **Traceability**: it is rarely possible to know which forest or plantation a particular end-product comes from, and hence whether its production has occurred directly on recently deforested land or not. Although advanced modelling and remote sensing are beginning to provide greater insight, these approaches are not available in all producer countries or for most commodities.

2.4.1 12.1.1 Overview of method

We developed a risk index by assigning a risk rating to each exporting country according to indicators of deforestation and social risk. Belgium's import footprint is then apportioned to risk categories based on which partners they trade with.

Four factors were used to indicate deforestation and social risk in producer countries:

- **Tree cover loss**. This provides an indication of the total extent of the deforestation problem in producer countries. The data used is the area of land with > 10% forest cover lost between 2012-16.[39]
- **Rate of deforestation**. This is a measure of the proportion of change in net natural forest area in each producer country between 2010-15. Use of this second deforestation indicator helps to balance out the bias towards large countries of the first indicator, whereas countries that are losing a large proportion of their small remaining forest extent score highly on rate of deforestation.[40]
- **Perception of corruption.** No single global data set is available that captures the range of social problems that have been associated with production of timber pulp and paper, which include land grabs, forced labour, child labour, and terms and conditions of labour below international norms. Transparency International's Corruption Perception Index is used as a proxy for the likelihood of the range of social and governance issues within an exporting country.[41]
- **Labour standards.** The International Trade Union Confederation (ITUC) documents violations of internationally recognised labour rights by governments and employers and uses these records to score countries, providing a measure of the incidence of serious workers' rights violations, including forced labour, violence and the denial of the right to free association.[42] Note that Luxembourg was not assessed by the ITUC and so was not scored for this indicator.

[39] Global Forest Watch. http://data.globalforestwatch.org/
[40] FAO FLUDE data: http://www.fao.org/forest-resources-assessment/explore-data/en/ 83
[41] Transparency International (2017). Corruption Perceptions Index 2017. https://www.transparency.org/news/feature/corruption_perceptions_index_2017
[42] ITUC (2016). Global rights index: the world's worst countries for workers. International Trade Union Confederation, https://www.ituc-csi.org/IMG/pdf/survey_ra_2016_eng.pdf

The focus of the environmental indicators is deforestation, as there is no straightforward global data on forest degradation, or on the loss of other natural habitats, that could be used to assess the risk of timber, pulp and paper imports contributing to habitat degradation.

The value of each indicator in each country was scored on a three-point scale (high = 3 to low =1) according to the thresholds described in (Table 1). These thresholds were selected according to the data range of producer countries that export to the Belgium to clearly distinguish between high and low impact. For example, Brazil lost over 15 million hectares of forest with >10% tree cover between 2012-16 compared with the Netherland's 4,760 hectares, and these countries score 'high' and 'low' respectively.[43]

Table 1: Indicators and scoring used to indicate risk of deforestation and social issues with Belgium's imports of timber, pulp and paper

Indicator	Description	Scoring		
		High risk	**Medium risk**	**Low risk**
Tree cover loss	Global Forest Watch assessment of the area of forest cover loss 2012-16	≥1M ha	500K to 1 M ha,	<500K ha
Deforestation rate	Percentage change in natural forest 2010-15 (FAO)	≥1%	0% to 1%	<0%
Rule of Law	IUTC Labour Standards score based on reported violations of labour rights	≤5	3 to 4	≥2
Corruption Perception	Index of the perceived levels of public sector corruption (Transparency International)	≤36	37-72	>72

Finally, an overall country risk score was calculated by summing the scores for the individual indicators. This score was used to develop five risk categories, which are colour coded to aid visual inspection of the results (see Table 4).

2.5 Data challenges

There are significant challenges and constraints inherent in assessing commodity data and the link between production and deforestation. Our analysis focuses on capturing the majority of the trade in timber, pulp and paper, not the whole, and makes conservative assumptions throughout. If anything, the results are likely to be underestimates.

Specific challenges within the constraints of this study are:

- **The diversity of products**. Timber, pulp and paper has thousands of end uses, from construction, to electricity generation, furniture, and stationery. The approach taken was to focus only on the major uses of each commodity, therefore the estimated imports and land footprints are likely to be conservative.
- **Poor data on typical commodity use in products**. Wood is combined with other components in many imported items. For example, plywood contains wood and resin (glue). The proportions vary depending on the specific product. The conversion

[43] The same method was used for the recent WWF UK, with the exception of the Corruption Perception Index which was not used for that assessment: WWF and RSPB (2017). Deforestation and Social Risks in the UK's Commodity Supply Chains. This report, and the summary report 'Risky Business', are available at https://www.wwf.org.uk/riskybusiness

factors used to estimate the commodity content of manufactured goods are therefore only first order approximations.

- **Complex/long supply chains**. Most countries both produce, import and export timber, pulp and paper products. There are often multiple stages of processing and manufacturing, export can occur after any of these. This means that there – at the level of individual items – there is little traceability on which country, let alone forest, a particular product has come from. The estimation of provenance (see above) is for some products no more than a first order estimate.
- **Need to cover multiple jurisdictions**. Sub-national patterns in production, export and deforestation are not detected in this analysis because of the need to cover multiple jurisdictions, which in turn means that the analysis of provenance is only practical at a national level. This could lead to overestimations of risk if, for example, deforestation and production of timber are occurring in different parts of the same country. Equally, risk could be underestimated if a production of particular timber species or product was more tightly associated with deforestation than the national average land use change.
- **Variability in productivity**. As described above, we have used national productivity assumptions (NAI), however it is conceivable that some of Belgium's imports are sourced from a niche system with a productivity different from the country average.
- **Limited availability of data on Belgium's imports of certified commodities**. Credible certification is one of the major ways of reducing the risk that an imported item has been associated with deforestation, poor social practices, or illegality. However, there is limited data available on the proportion of Belgium's imports in different product categories that are certified. Certified primary wood products (wood cut lengthwise, panels) accounted for an estimated 40,5% of the total market in 2012[44]. A new assessment is expected in 2018.

This report provides a guide on the overall need for action, relative levels of risk for timber, pulp and paper coming from different countries, and an indication of where the Belgian government, businesses and civil society might target its effort in order to have most impact in reducing the forest footprint overseas. There are uncertainties in the specific figures calculated using this methodology but the index approach allows for an interpretation of the figures that is intended to be simple, useful and adequate to drive action.

[44] Probos (2014) Aantoonbaar duurzaam geproduceerd hout op de Belgische markt in 2012

3 Belgium's imports of timber, pulp and paper

3.1 Belgium's imports of wood products

Belgium imported an average of € 8.2 billion of timber, pulp and paper products each year between 2012-17. The value of pulp and paper products (average € 4.5 billion per year) exceeded that of timber and timber products (€ 3.6 billion per year).

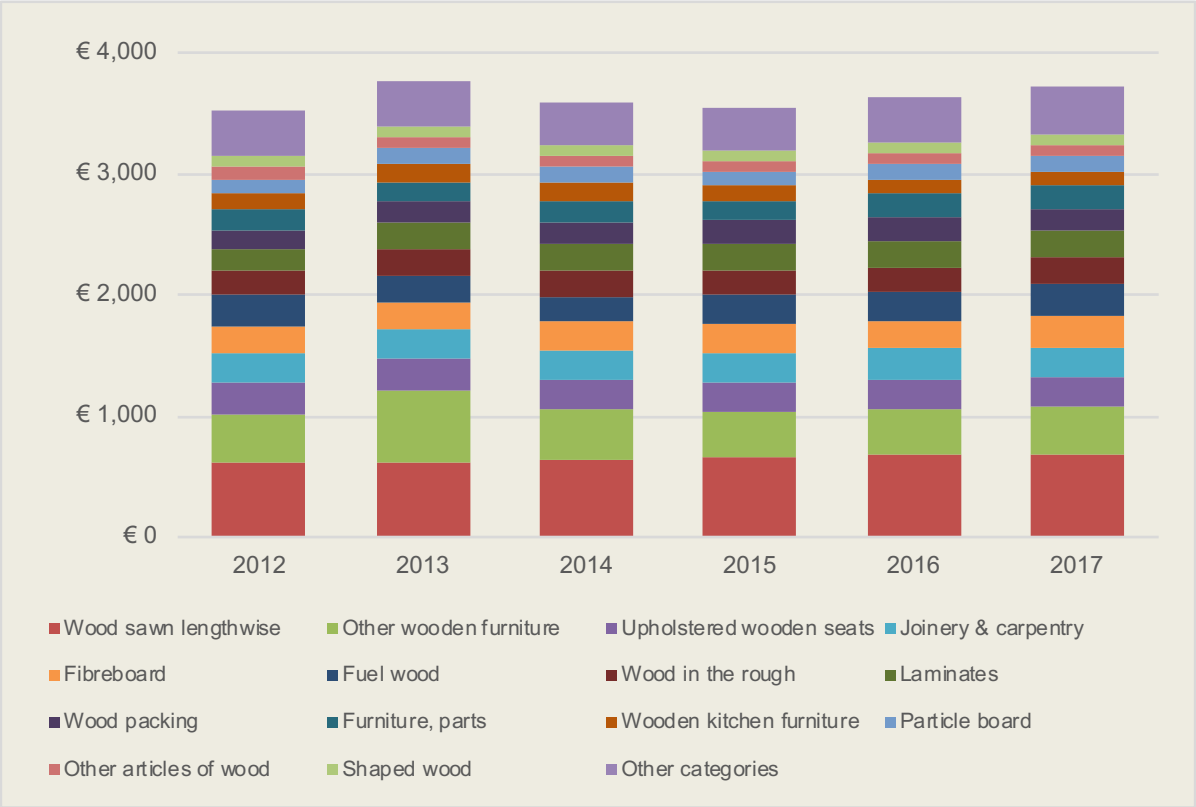
The majority of the timber, pulp and paper products assessed are within the scope of EUTR (Table 2), with the main import categories outside the scope of the regulation being upholstered seats of wood and 'other articles of wood' (see Appendix 1 for details of the HS codes used).

Table 2: Proportion of the value of Belgium's timber, pulp and paper that are within the scope of EUTR (€ billion)

	Year							
EUTR coverage	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Average**	**%**
In scope	7.65	8.02	7.61	7.39	7.60	7.97	**7.71**	**94%**
Out of scope	0.49	0.49	0.48	0.47	0.50	0.51	**0.49**	**6%**

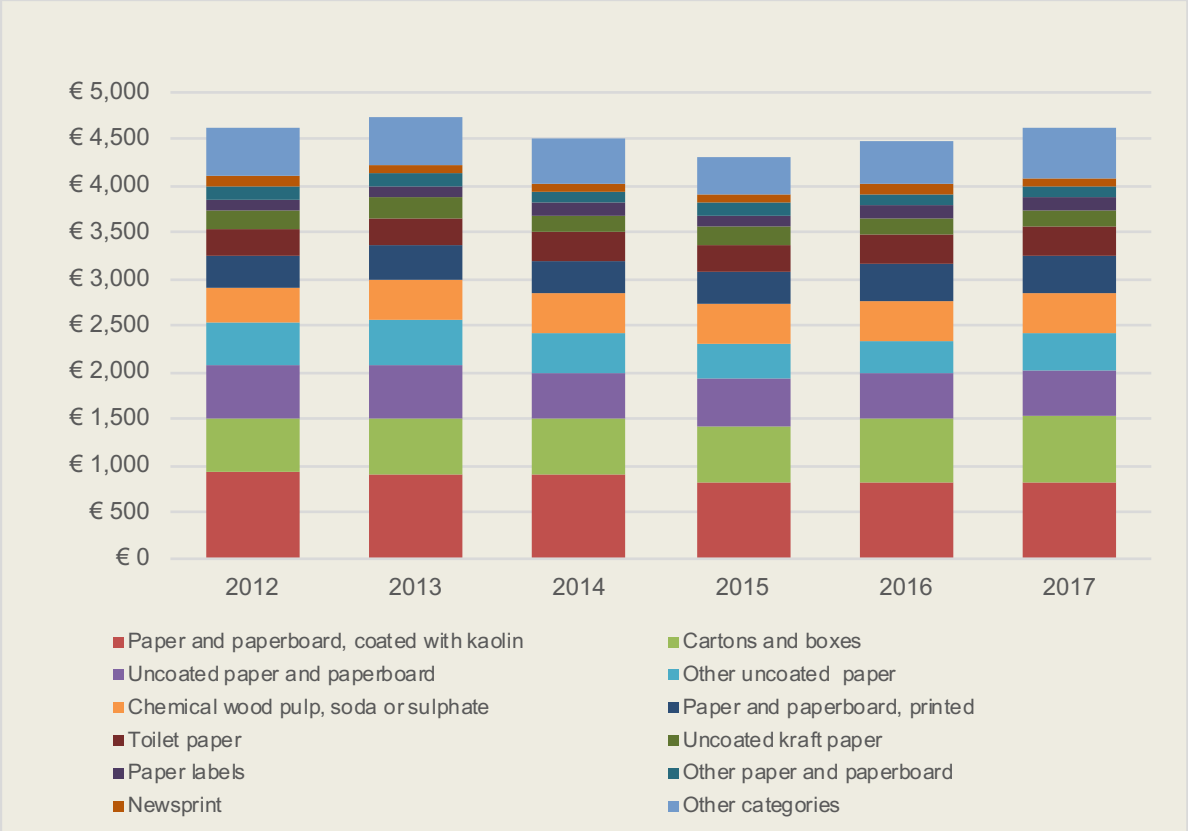
There was little evidence of an overall trend in the value of timber imports over the period assessed over the period (Figure 5). The three largest categories of timber products by value were wood sawn lengthwise, which accounted for 8% of the value of all timber, pulp and paper imports, wooden furniture (5%) and upholstered wooden seats (3%). In addition, joinery and carpentry products, fibreboard, fuel wood, wood in the rough and laminates all had values of imports at around 3% of the total value of timber, pulp and paper products.

Figure 5: Timber and timber product imports from 2012-17 (million Euros)



There was little evidence of a trend in pulp and paper products imports between 2012-17, with the value ranging between €4.3 in 2015 billion to €4.7 billion in 2013 (Figure 6). The most important categories were paper and paperboard, coated with kaolin, which accounted for 11% of the value of all timber, pulp and paper imports, cartons and boxes (8%), and uncoated paper and paperboard (6%).

Figure 6: Pulp and paper imports from 2012-17 (million Euros)



When manufactured products are adjusted for the quantity of wood in them, Belgium imported and average of over 24 million cubic metres of wood per year between 2012-17 (Table 3). Over the whole period, the largest share of volume is in chemical wood pulp – soda or sulphate (15%), fuel wood (13%), paper and paperboard coated with kaolin (12%) and 'other uncoated paper' (10%, Figure 7). Wood in the rough showed a large increase in 2016 and again in 2017, with laminates, wooden packing cases and pallets, and cartons of paper and paperboard also increasing.

Figure 7: Imports of timber, pulp and paper by volume, adjusted for wood content (MRWE, in m³). Average of 2012-17.

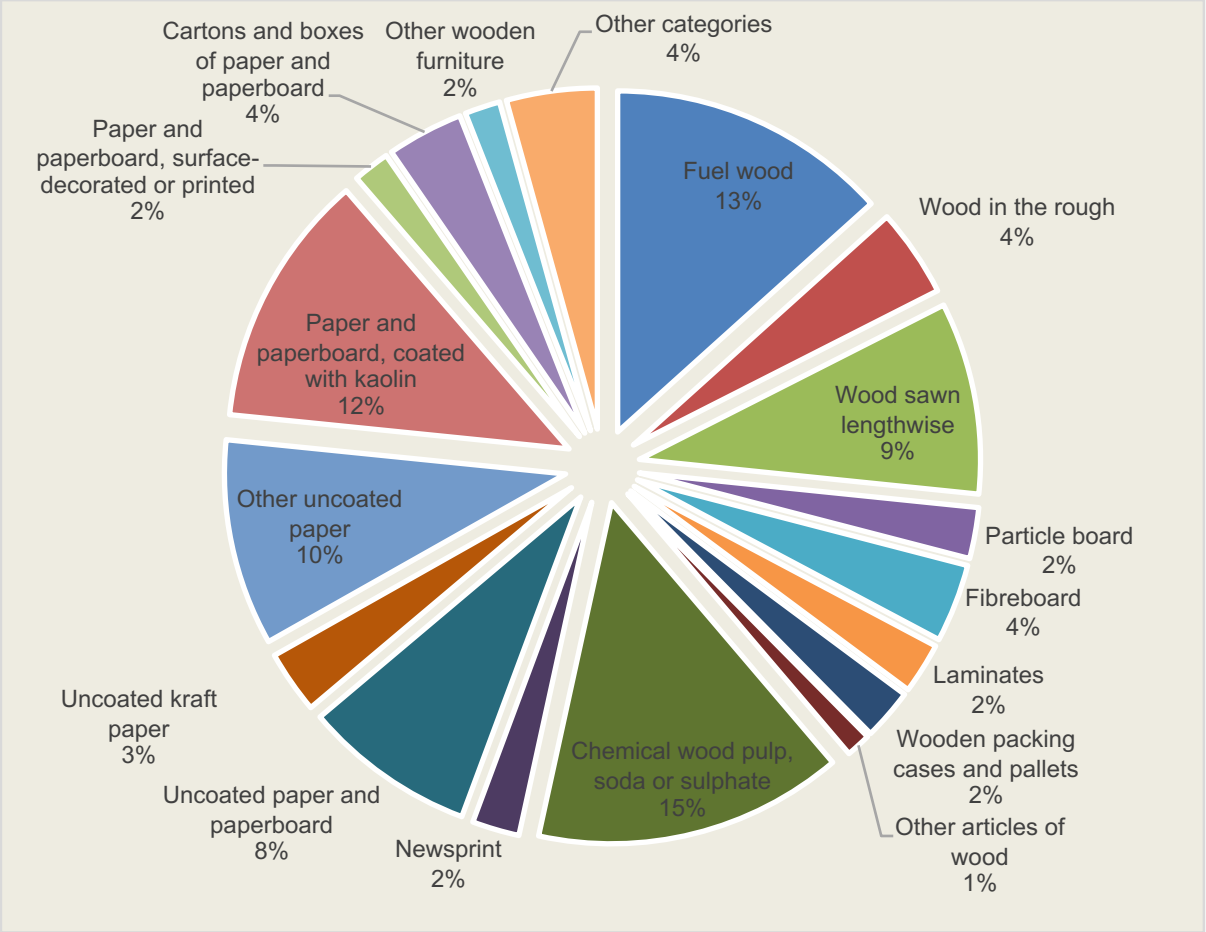


Table 3: Estimated wood raw material equivalent content of Belgium's timber, pulp and paper imports 2012-17 (m^3)

	in m^3								
Import category description	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Average**	**%**	**Conversion factors[45]**
Fuel wood	3,847,863	3,248,158	3,044,057	2,985,551	3,152,537	3,146,407	**3,237,429**	**13%**	Conversion factor 1.2
Wood in the rough	35,190	55,889	56,660	27,284	1,592,224	4,348,433	**1,019,280**	**4%**	Average of softwood and hardwood
Wood sawn lengthwise	2,294,961	2,513,314	1,063,534	1,940,101	2,124,422	3,323,690	**2,210,004**	**9%**	Average of softwood and hardwood
Particle board	563,554	643,065	552,199	436,024	637,251	691,612	**587,284**	**2%**	Conversion factor 2.5
Fibreboard	780,837	821,671	809,008	668,941	742,808	1,593,293	**902,760**	**4%**	Conversion factor 2.5
Laminates	538,230	600,686	560,679	473,435	518,647	826,367	**586,341**	**2%**	Conversion factor 2.5
Wooden packing cases and pallets	425,416	481,300	462,482	562,496	346,444	1,260,350	**589,748**	**2%**	Conversion factor 2
Other articles of wood	240,334	247,171	209,102	212,614	242,815	559,242	**285,213**	**1%**	Average of softwood and hardwood
Chemical wood pulp, soda or sulphate	3,165,156	3,538,503	3,706,542	3,510,065	3,755,859	3,680,960	**3,559,514**	**15%**	Conversion factor 4.5
Newsprint	611,382	546,245	524,682	491,587	573,859	517,846	**544,267**	**2%**	Conversion factor 2.8
Uncoated paper and paperboard	2,121,441	2,120,155	1,907,269	1,989,756	1,900,719	1,876,506	**1,985,975**	**8%**	Conversion factor 2.8
Uncoated kraft paper	813,476	844,091	700,681	674,236	661,441	641,359	**722,548**	**3%**	Conversion factor 2.5
Other uncoated paper	2,724,453	2,919,818	2,538,540	1,991,775	1,977,514	2,106,747	**2,376,475**	**10%**	Conversion factor 2.5
Paper and paperboard, coated with kaolin	3,062,727	3,006,315	2,930,845	2,827,136	2,851,976	2,911,030	**2,931,672**	**12%**	Conversion factor 2.5
Paper and paperboard, decorated or printed	394,649	434,725	414,900	405,930	431,267	455,112	**422,764**	**2%**	Conversion factor 2.5
Cartons and boxes of paper and paperboard	326,856	885,795	880,613	912,431	1,028,783	1,236,116	**878,432**	**4%**	Conversion factor 2.5
Other wooden furniture	416,791	423,092	422,009	380,504	385,364	412,393	**406,692**	**2%**	Average of softwood and hardwood[46]
Other categories	1,025,560	1,028,927	986,041	905,435	1,030,273	1,283,749	**1,043,331**	**4%**	No estimate possible (no conversion)
Total	**23,388,877**	**24,358,921**	**21,769,844**	**21,395,302**	**23,954,206**	**30,871,213**	**24,289,727**	**100%**	

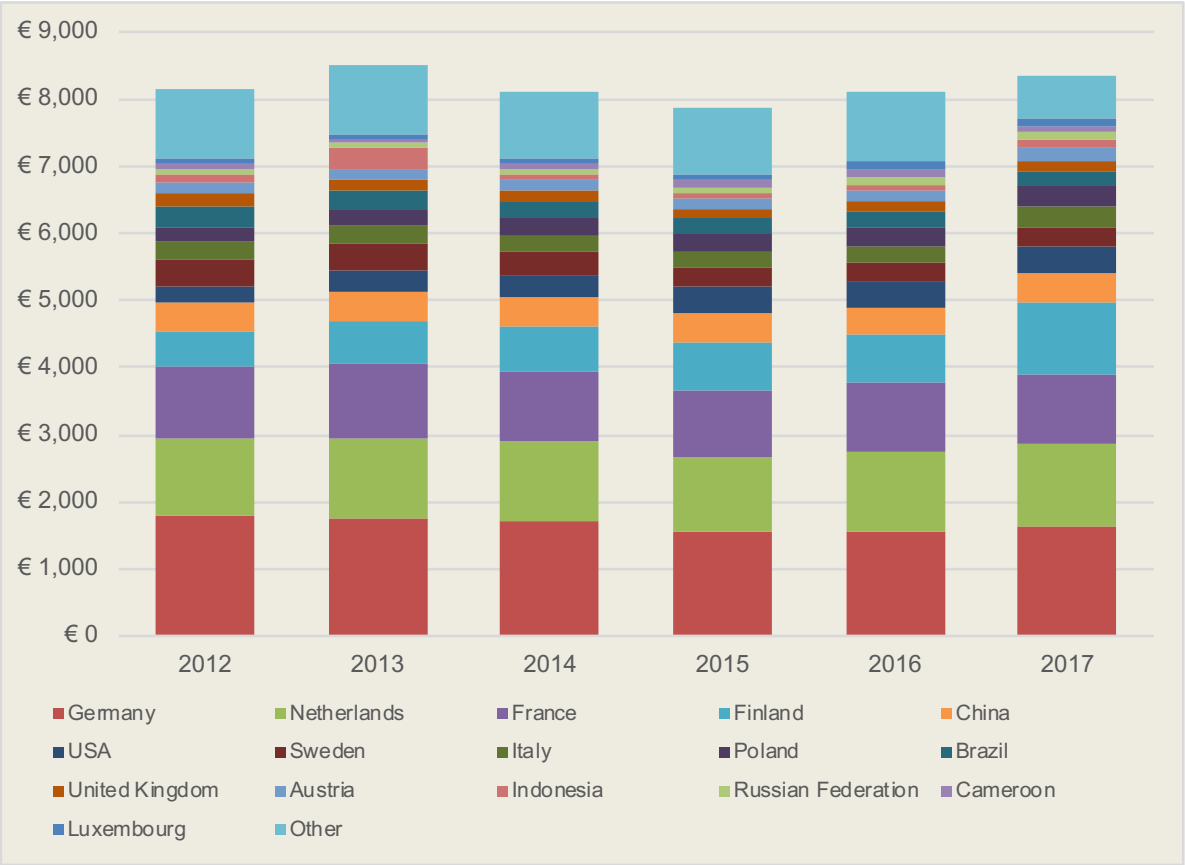
[45] Unless otherwise stated, conversion factors to WRME underbark are from https://www.forestry.gov.uk/website/forstats2009.nsf/0/8b4784e90b2a535480257361005015c6. The reported imports (in tonnes) are multiplied by the relevant conversion factor.

[46] Wooden furniture can be made out of different products (e.g., solid wood or plywood) and will contain other components (e.g., glue, metal). This conversion is may slightly over-estimate the WRME.

3.2 Provenance of Belgium imports of wood products

Between 2012 and 2017, Belgium imported timber from 171 countries. During that period, 16 countries contributed at least 1% of the value of timber, pulp and paper imports (Figure 8). EU countries dominate Belgium's imports, with the main exporting countries being Germany (23% of total value of timber, pulp and paper imports), the Netherlands (16%), France (15%), Finland (10%) and China (6%). In addition to China, other sub-tropical and tropical countries that contribute at least 1% by value to Belgium's imports of timber, pulp and paper are Brazil (4%), Indonesia (2%), and Cameroon (1%).

Figure 8: The trade value of Belgium's imports of timber, pulp and paper between 2012-17 (million Euro)



Germany, France and the Netherlands accounted for a combined 42% of Belgium's imports, with a significant increase in imports from these countries in 2017 being largely responsible for the dramatic increase in the quantity of wood that Belgium imported in that year (Figure 9). However, as discussed in Section 2.2 (above), most major countries produce and import timber, pulp and paper products, as well as exporting.

The country from which Belgium imports is therefore not necessarily the country in which the timber was harvested. Adjusting for this, the estimated provenance of Belgium's timber by shows significant differences from the 'raw' import data (Figure 10). Countries that import large quantities of timber themselves (e.g., China, the Netherlands, the UK) decline in importance, whereas countries that import relatively small amounts but export significant quantities globally (e.g., USA, Sweden) increase their share of Belgium's imports.

Figure 9: Reported exporter countries of timber, pulp and paper products to Belgium (not adjusted for wood content) from 2012-17 (tonnes)

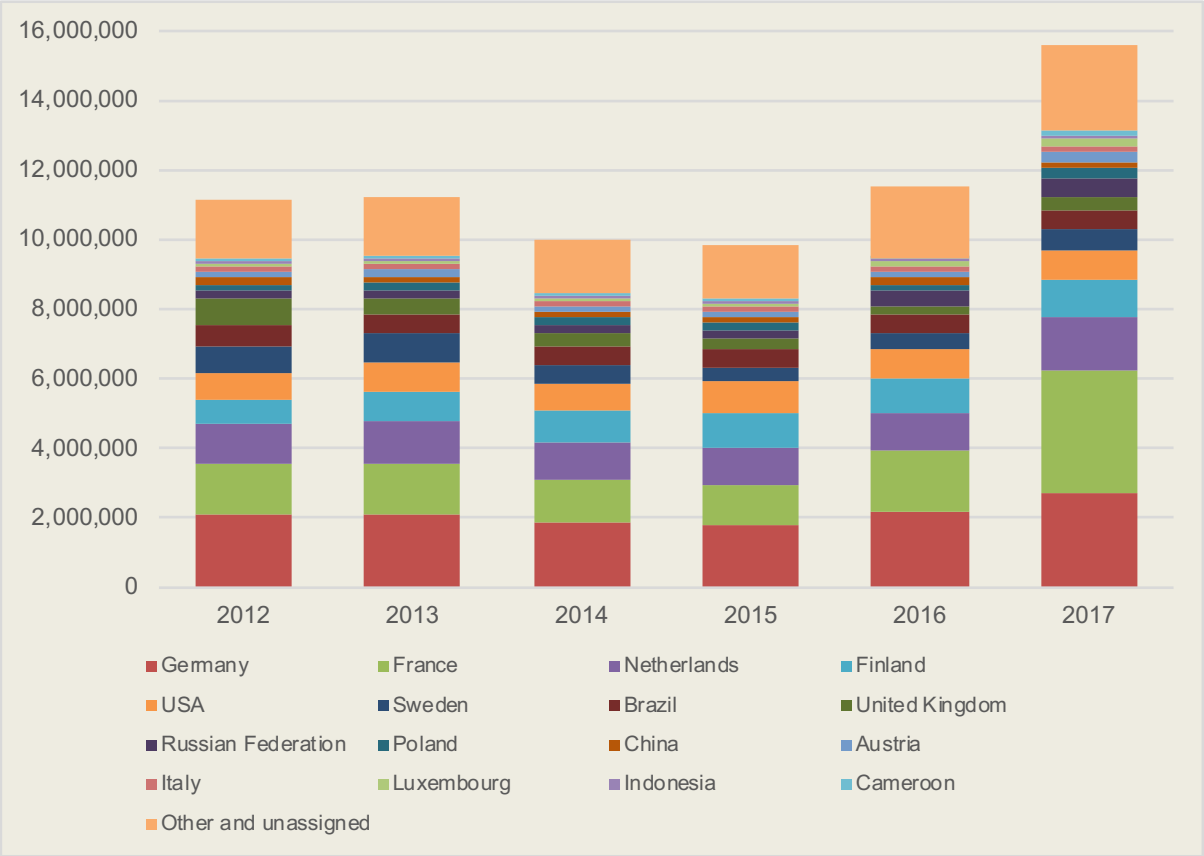
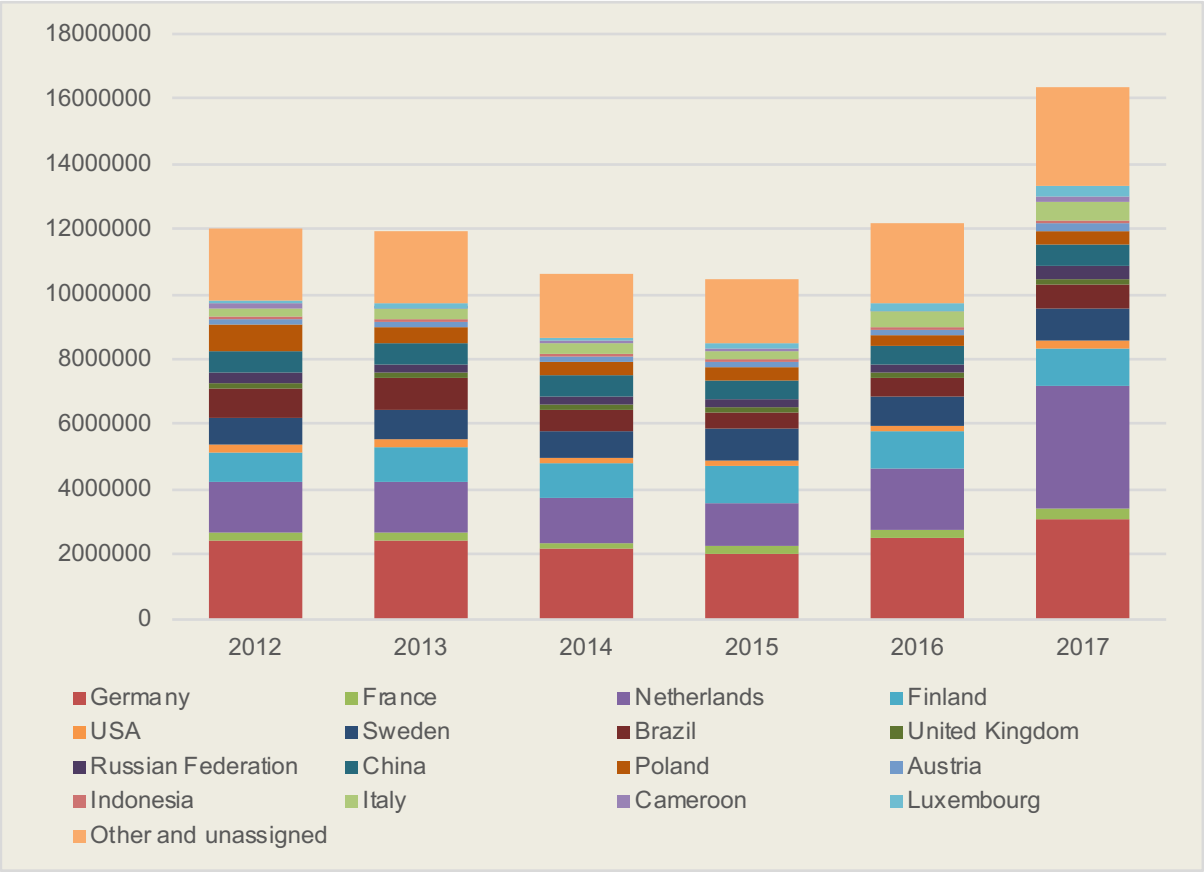


Figure 10: The estimated provenance of Belgium's timber, pulp and paper imports (not adjusted for wood content) from 2012-17 (tonnes)



3.3 Belgium's timber footprint

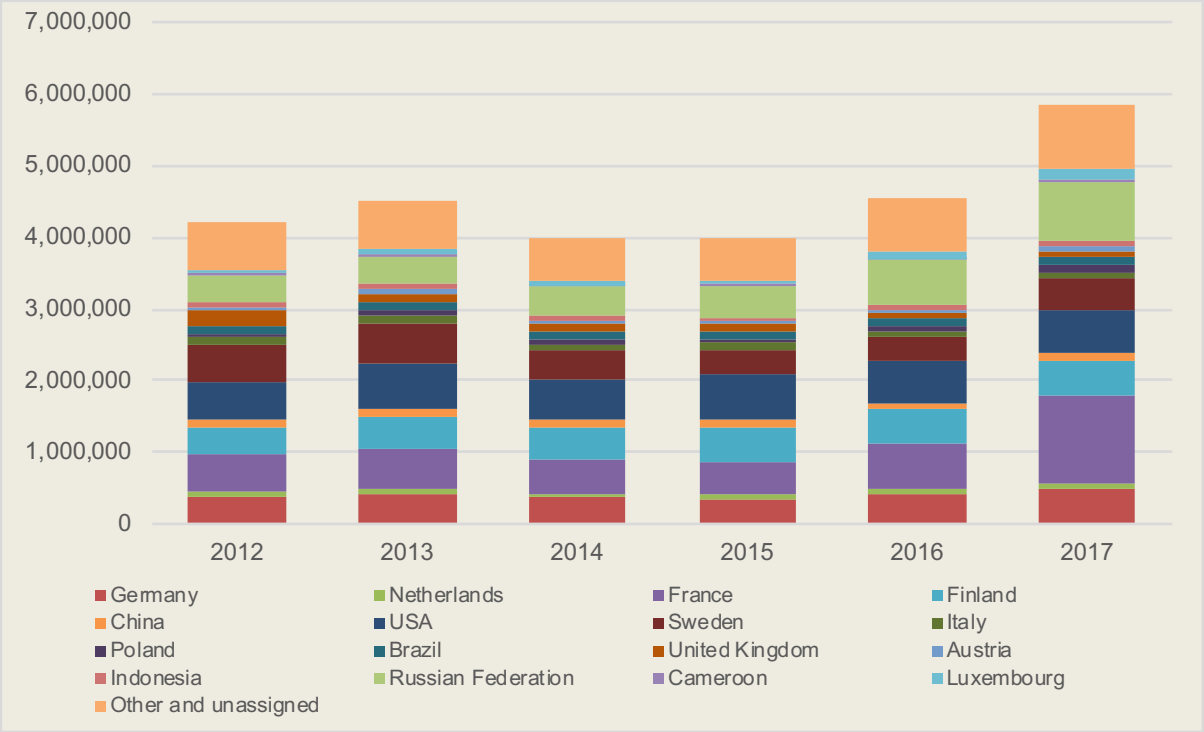
Belgium's imports of timber were converted from tonnes into wood raw material equivalent (WRME), which, indicates the volume of wood (in m^3) needed to produce one unit of a final product.[47] The area of forest required to produce this timber was then divided by the Net Annual Increment (NAI)[48] to produce an estimate of the area of forest required in each country to supply the Belgium's imports.

The estimated land area required to satisfy Belgium's demand for imported timber, pulp and paper averaged 4.46 million hectares per year between 2012-17. This is equivalent to nearly 1.5 times Belgium's total land area of 3,027,800 hectares, six and a half times Belgium's own forest area (683,400 hectares in 2015), or over fifteen times the area of natural forest in Belgium (289,200 hectares in 2015)[49].

The footprint of Belgium's imported timber, pulp and paper increased significantly in 2017, a 28% increase from 2016 (Figure 11). As described in Section 3.2 above, this is a result of increased imports from France and the Russian Federation in particular.

The largest footprints from Belgium's imports fall in France (14% of total imported footprint), USA (13%), the Russian Federation and Finland (both 10%), and Germany and Sweden (both 8%). Amongst tropical and sub-tropical countries, Brazil contributes 2% to the total footprint, China 2%, and Indonesia and Cameroon both 1%.

Figure 11: Estimated land footprint of Belgium's imports of timber, pulp and paper 2012-2017 (hectares)



[47] Conversion factors to Wood Raw Material Equivalent underbark were obtained from the UK Forestry Commission https://www.forestry.gov.uk/website/forstats2009.nsf/0/8b4784e90b2a535480257361005015c6

[48] Net Annual Increment (NAI) data was obtained from FAO (2016). Global Forest Resource Assessment 2015: Desk Reference. Food And Agriculture Organization Of The United Nations, Rome. The FAO does not provide NAI for all countries. NAI for Brazil was calculated as the average of estimates given in D. Alder, J.N.M Silva, JOP de Ca Carvalho, J. do C. Lopes, A.R. Ruschel (2012). The cohort-empirical modelling strategy and its application to forest management for Tapajós Forest, Pará, Brazilian Amazon. Bois et Forets Des Tropiques, 314; D. Valle, M. Schilze, E. Vidal, J. Grogan & M. Sales (2006). Identifying bias in stand-level growth and yield estimations: A case study in eastern Brazilian Amazonia. Forest Ecology and Management, Volume 236, Issues 2–3, pp 127–135 (both Amazon); and http://www.fao.org/3/a-ac121e.pdf (Brazilian pine plantations). NAI for Cameroon was estimated as the average of FAO data for two nearby countries (Ghana and Equatorial Guinea), and the NAI for the 'Other and Unassigned category was the average of all other NAIs.

[49] Belgium's forest area data is from FAO STAT

4 Analysis of deforestation and social risks

4.1 Links between production and deforestation

The trade in timber and timber products has long been linked with deforestation and forest degradation.[50] The most obvious direct impact of the timber industry is when natural and semi-natural forest is replaced by tree plantation monocultures. The FSC Principles and Criteria exclude certification of plantations established on areas converted from natural forest after November 1994, unless the plantation is a small part of the certified area, or if the management organisation was not responsible for the conversion.[51] The PEFC standard is broadly similar, with a cut-off date of 2010.[52]

However, timber harvesting also plays an indirect role in deforestation. One well-documented example is the illegal harvesting of mahogany (*Swietenia macrophylla*) in the Brazilian Amazon. Illegal loggers create earth roads to access high value mahogany trees in inaccessible areas. The logging roads are then used by smallholder colonisers who deforest small patches for agriculture. These holdings are then consolidated with further deforestation by cattle ranchers.[53]

Beyond conversion, forest management for timber production plays a significant role in environmental degradation. In tropical rainforests – where a typically small proportion of trees are harvested – the impacts of harvesting are debated. One meta-analysis of other studies showed that on average 54% (albeit with variation around this average) of the timber volume extracted during the first harvest from primary forest will be available for the second and third cuts, with 76% of the aboveground carbon retained soon after harvesting.[54] The impact of harvesting primary tropical forest on biodiversity is mixed, with selectively logged forests supporting on average 84% of the bird species richness of unlogged forest, but with little impact on plants, mammals, and invertebrates,[55] even after more intensive selective logging.[56] Logging in temperate and boreal forests has been found to have no[57] or a negative[58] impact on bat diversity and behaviour compared with unlogged forest and reduce

[50] N. Dudley, J.P. Jeanrenaud, F. Sullivan (2014). Bad Harvest: The Timber Trade and the Degradation of Global Forests. Taylor & Francis.
[51] Forest Stewardship Council (2015). FSC International Standard: Principles And Criteria For Forest Stewardship FSC-Std-01-001 V5-2 En.
[52] PEFC International Standard (2010). Requirements For Certification Schemes. PEFC ST 1003:2010.
[53] Fearnside, P. (1997) Protection of mahogany: a catalytic species in the destruction of rain forests in the American tropics. Environmental Conservation, 24, 303-306; and Verissimo, A., Barreto, P., Tarifa, R. Uhl, C. (1995) Extraction of a high-value natural resource in Amazonia: the case of mahogany. Forest Ecology & Management, 72, 39-60.
[54] Putz, F.E., Zuidema, P.A., Synnott, T., Peña-Claros, M., Pinard, M.A., Sheil, D., Vanclay, J.K., Sist, P., Gourlet-Fleury, S., Griscom, B., Palmer, J. and R. Zagt (2012). Sustaining conservation values in selectively logged tropical forests: the attained and the attainable. Conservation Letters, 5, pp 296-303.
[55] Putz *et al.* (2012). *Ibid*.
[56] Edwards, D.P., Larsen, T.H., Docherty, T.D.S., Ansell, F.A., Hsu, W.W., Derhé, M.A., Hamer, K.C., & Wilcove, D.S. (2011). Degraded lands worth protecting: the biological importance of Southeast Asia's repeatedly logged forests. Proc. Biol. Sci., 278, 82–90
[57] Menzel M.A., Carter T.C., Menzel J.M., Mark F.W. & Chapman B.R. (2002) Effects of group selection silviculture in bottomland hardwoods on the spatial activity patterns of bats. *Forest Ecology and Management*, 162, 209-218
[58] Russo D., Cistrone L., Garonna A. & Jones G. (2010) Reconsidering the importance of harvested forests for the conservation of tree-dwelling bats. Biodiversity and Conservation, 19, 2501-2515.

the number of forest specialist beetle species,[59] fungi,[60] and other species groups.[61] Other environmental impacts that have been associated with some plantations and clear felling operations include pollution of watercourses, and soil compaction and degradation.

4.2 Social issues associated with production

The US Department of Labor lists timber from Brazil, North Korea and Peru as being associated with forced labour, and timber from Cambodia and Vietnam as being associated with child labour.[62] Of these countries, only Brazil exports to Belgium in significant quantities (Figure 11), although timber and timber products from Vietnam (€ 4 million per year, or 0.3% of the total value of Belgium's imports) and Peru (€ 0.3 million, 0.02%) are exported to Belgium. Imports from North Korea and Cambodia are minimal. In addition, timber originating from Cambodia and Vietnam may illegally enter China before being exported elsewhere.[63]

4.3 Risk index of Belgium's imports of timber, pulp and paper

4.3.1 12.2 Country risk rating

As described in Section 2.4, four indicators have been used to characterise the deforestation and social risks of Belgium's imports of timber, pulp and paper:

- **Tree cover loss**. Global Forest Watch data provides an indication of the total extent of deforestation in producer countries.
- **Rate of deforestation**. FAO measures of the proportional change in net natural forest area is each producer country.
- **Perception of corruption.** Transparency International's Corruption Perception Index scores countries by their perceived levels of public sector corruption according to experts and businesspeople.
- **Labour standards.** The International Trade Union Confederation (ITUC) documents violations of internationally recognised labour rights by governments and employers and uses these records to score countries, providing a measure of the likelihood of serious workers' rights violations, including forced labour, violence and the denial of the right to free association.

Each country was categorised as being of high, medium or low risk for each indicator (Table 1). The four risk indicator scores are also combined into an overall risk rating for each major exporting country (Table 4). Amongst major exporters to Belgium, five countries (Austria, France, Germany, Luxembourg and the Netherlands) had the lowest possible overall risk. Five countries were rated with 'very high risk' (Brazil, Indonesia) or 'high risk' (Cameroon, China and the Russian Federation). A further six countries were rated as either medium risk (Sweden, USA) or medium-low risk (Finland, Italy, Poland, and the UK).

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[59] Niemela, J., Langor, D., and Spence, J.R. (1993). Impacts of Clear-cut Harvesting on Ground-Beetle Assemblages (Coleoptera: Carabidae) in Western Canada. Conservation Biology, 7, 551-561.
[60] Abrego, N. and Salcedo, L. (2013). Variety of woody debris as the factor influencing wood inhabiting fungal richness and assemblages: Is it a question of quantity or quality? Forest Ecology and Management, 291, 377–385.
[61] Woodcock, P., Halme, P., and Edwards, D.P. (2015). Ecological Effects Of Logging And Approaches To Mitigating Impacts. Pp. 422-435 in Kelvin S.-H. Peh; Richard T. Corlett; Yves Bergeron (eds.). Routledge Handbook of Forest Ecology. Taylor & Francis, UK.
[62] https://www.dol.gov/ilab/reports/child-labor/list-of-goods/
[63] Greenpeace (2008). Alternatives to unsustainable plywood in the UK construction industry, Greenpeace, London, UK; and https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/402325/Chinese_Plywood_Research_Report.pdf

Table 4: Risk ratings for major importers of timber, pulp and paper to Belgium

Country	Tree cover change (ha) Global Forest Watch	Deforestation Rate (%) FAO	Corruption Perception Index Transparency International	Labour standards IUTC	Overall score
Austria	54,123	-0.6%	76	1	4
Brazil	15,824,576	1.2%	37	4	11
Cameroon	555,403	5.6%	25	4	10
China	3,044,724	-1.4%	41	5	9
Finland	914,057	0.0%	85	1	5
France	247,789	-4.8%	70	1	4
Germany	103,902	-0.1%	81	1	4
Indonesia	9,592,635	4.0%	37	5	12
Italy	100,952	-3.0%	50	1	5
Luxembourg	1,557	0.0%	81	0	4
Netherlands	4,760	0.0%	82	1	4
Poland	279,372	-5.8%	60	3	5
Russian Federation	24,527,329	0.1%	29	3	10
Sweden	1,208,648	7.6%	84	1	8
United Kingdom	149,770	0.0%	82	4	5
USA	10,504,496	-0.2%	75	4	7

Key to Overall Risk rating

Risk category	Score
Very High Risk	≥11
High Risk	9-10
Medium Risk	7-8
Medium-low Risk	5-6
Low Risk	4

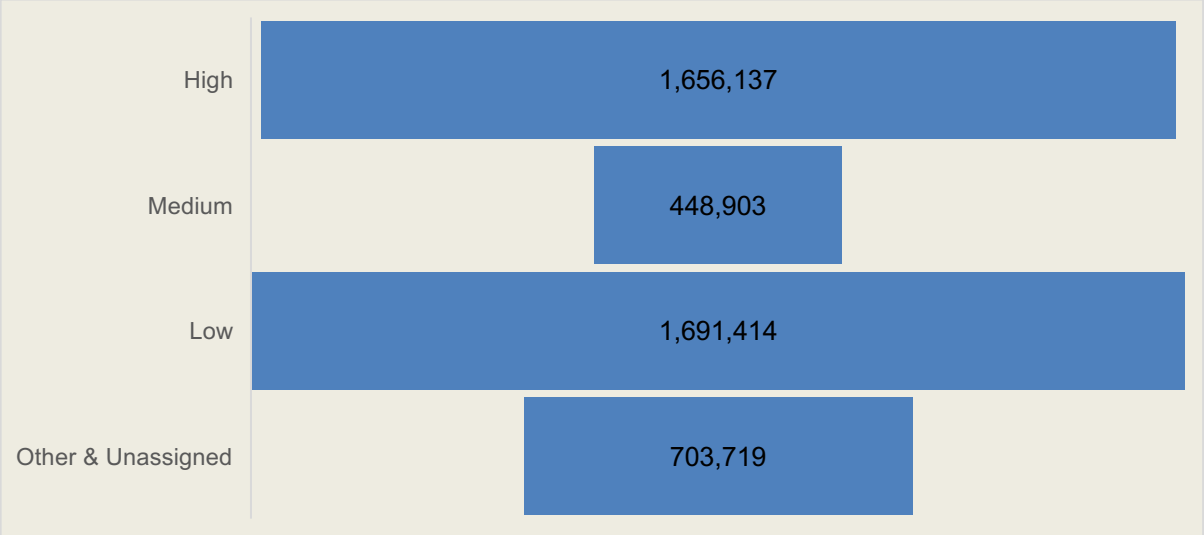
4.3.2 How Belgium's imports rate against individual risk indicators

The land footprint of Belgium's imports of timber, pulp and paper were summed for each risk category.

Tree cover loss

More than one third (37%, or 1.7 million hectares) of the footprint of Belgium's timber, pulp and paper imports comes from countries rated as high risk for tree cover loss. These are countries that have lost more than one million hectares of tree cover between 2012-16 (Figure 12). This is a conservative estimate as other high risk countries that export less than 1% of the total value of Belgium's imported timber, pulp and paper products are present within the 'other and unassigned' category. The main countries contributing to this are Brazil, China, Indonesia, the Russian Federation, Sweden and the USA.

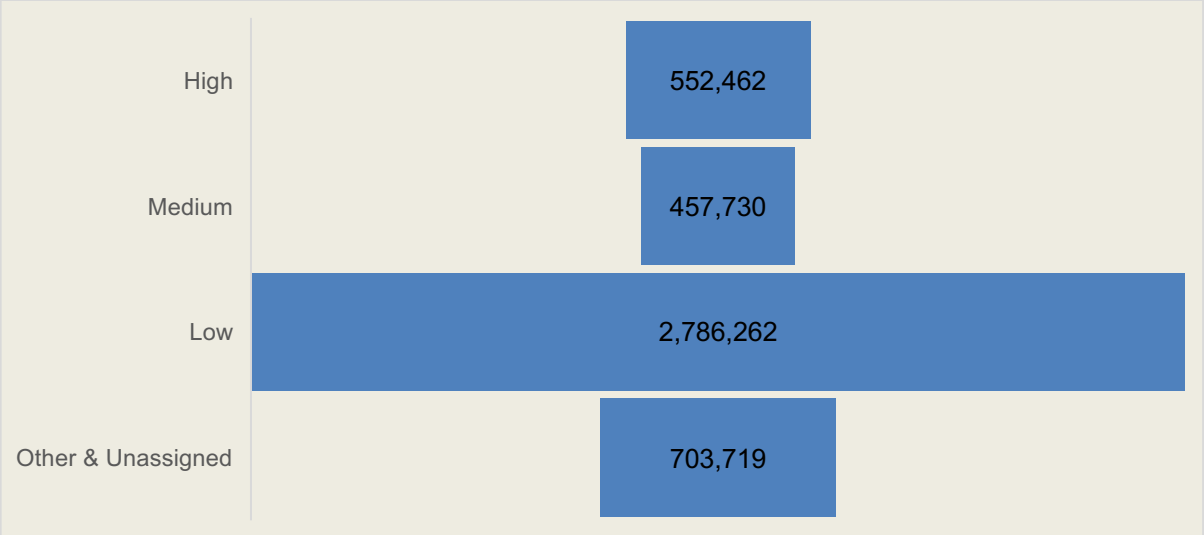
Figure 12: The land area of Belgium's imports from countries with a high, medium or low risk for tree cover change (hectares)[64]



Rate of deforestation

A much smaller proportion (12%, 0.55 million hectares) of Belgium's footprint is assigned to countries with a high rate of loss of natural forest (Figure 13). The majority of Belgium's imports are derived from countries with a low rate of deforestation of natural forest (i.e., those countries that have not lost, or have gained, natural forest between 2010-2015).

Figure 13: The land area of Belgium's imports from countries with a high, medium or low rate of deforestation (hectares)

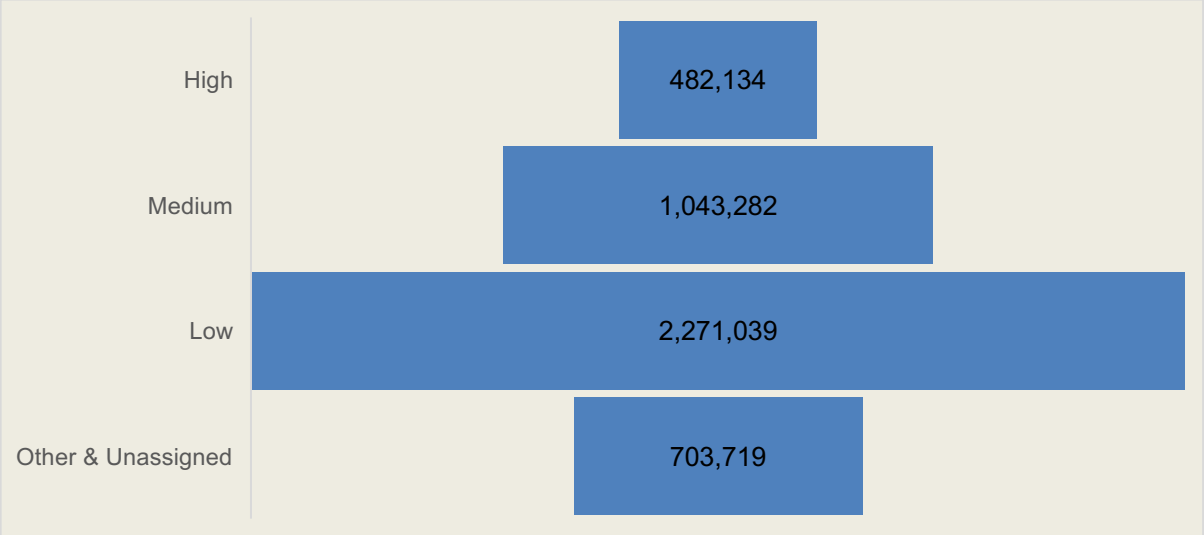


Corruption

Eleven per cent (0.48 million hectares) of Belgium's footprint is in countries with a high risk of corruption (Figure 14). These are countries that are in the top tercile of Transparency International's Corruption Perception index. Only Cameroon and the Russian Federation amongst Belgium's major suppliers of timber, pulp and paper were in the highest risk category, but some of the countries rated as medium risk. such as China and Indonesia, were only marginally outside the top tercile.

[64] The 'Other and unassigned' category includes all those countries that contribute less than 1% of imports to Belgium ('other'), and the proportion of imports from these minor countries to the major exporters, which were not assigned to specific countries 'unassigned') to make the provenance calculation feasible.

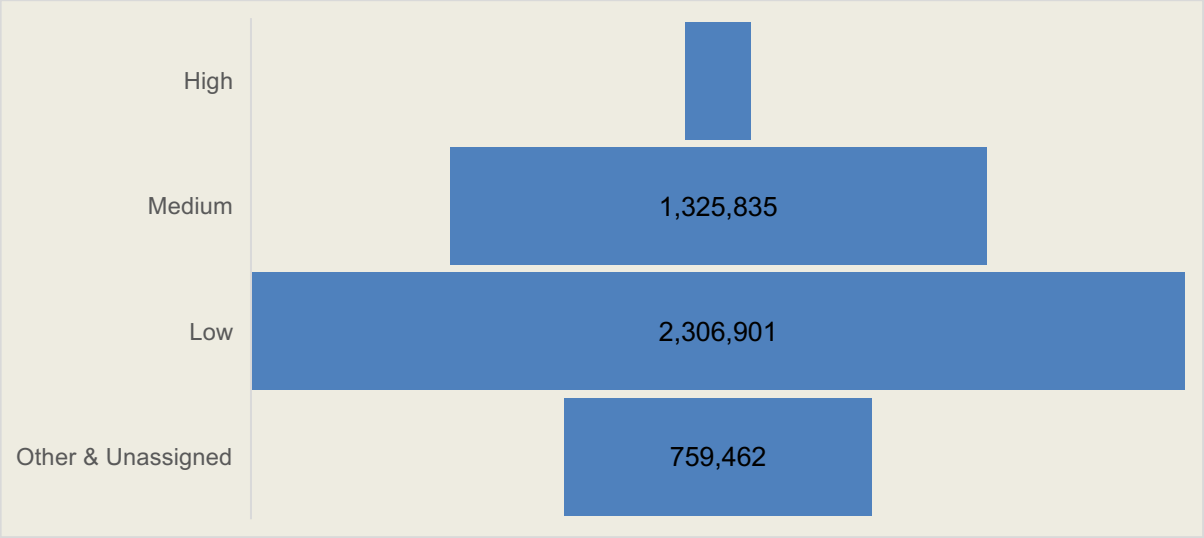
Figure 14: The land area of Belgium's imports from countries with high, medium or low corruption perception scores (hectares)



Labour rights

Only four per cent (0.16 million hectares) of Belgium's footprint originates from major suppliers with a high risk of labour rights violations, with over half (51%, 2.3 million hectares) coming from low risk countries (Figure 15). The two countries rating as high risk were China and Indonesia.

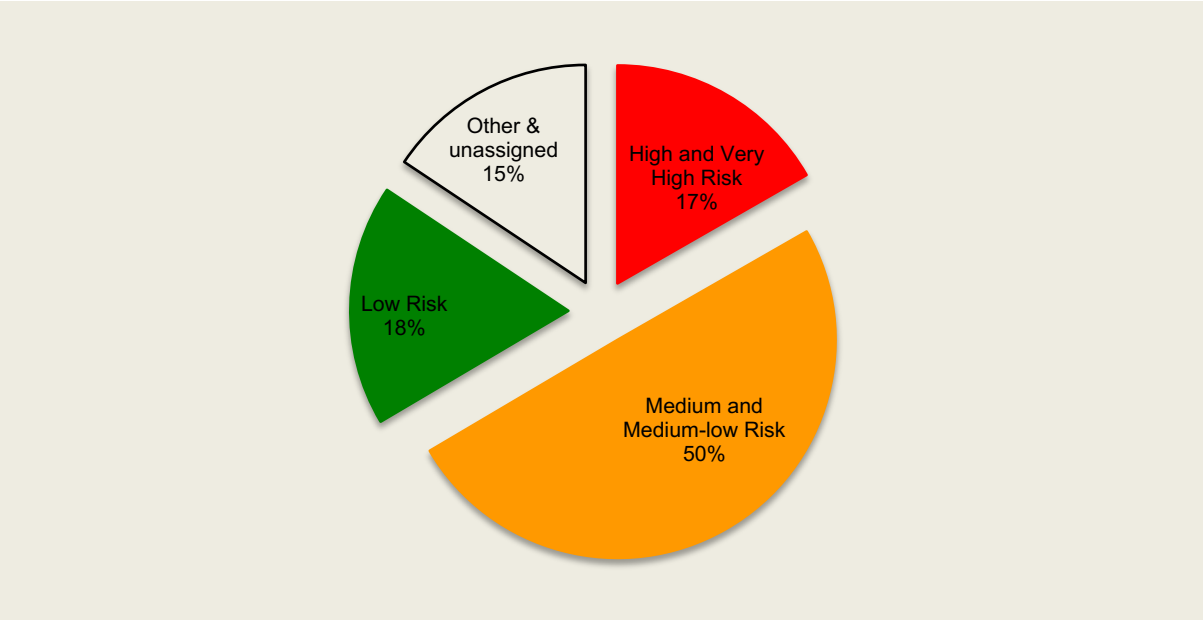
Figure 15: The land area of Belgium's imports from countries with high, medium or low scores for labour rights violations (hectares)



4.3.3 Overall risk rating of Belgium's timber, pulp and paper imports

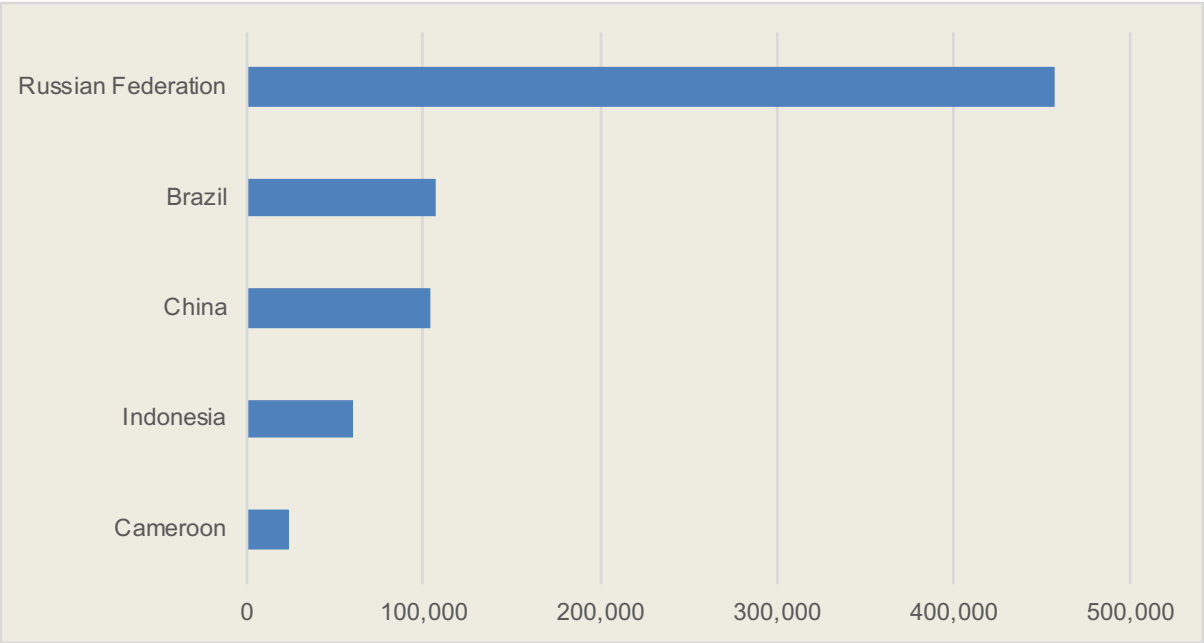
The overall risk profile of the Belgium's footprint for timber, pulp and paper between 2012-17 is given in Figure 16. Seventeen percent of the land area (0.75 million hectares) is in high and very high risk countries, with a further 50% (2.2 million hectares) in medium risk countries. Just 18% (0.8 million hectares) came from countries with low and medium-low risk ratings. The portion that is 'other and unassigned' is either imports from countries that contributed less than 1% of the value Belgium's total imports of timber, pulp and paper, or imports that it was not possible to allocate to a country within the limitations of this study (see Section 2, above). This portion is likely to come from countries with a range of risk profiles.

Figure 16: The distribution of Belgium's land footprint for timber, pulp and paper amongst risk categories



The total footprint from high and very high risk countries alone is more than 750,000 hectares, which is larger than the entire extent of forest in Belgium (683,400 hectares).[65] The majority of this footprint is from the Russian Federation (0.45 million hectares). Brazil and China both contribute just over 100,000 hectares, with Indonesia contributing 60,000 hectares and Cameroon over 20,000 hectares (Figure 17).

Figure 17: The land footprint of Belgium's imports of timber, pulp and paper from high and very high risk countries (hectares)

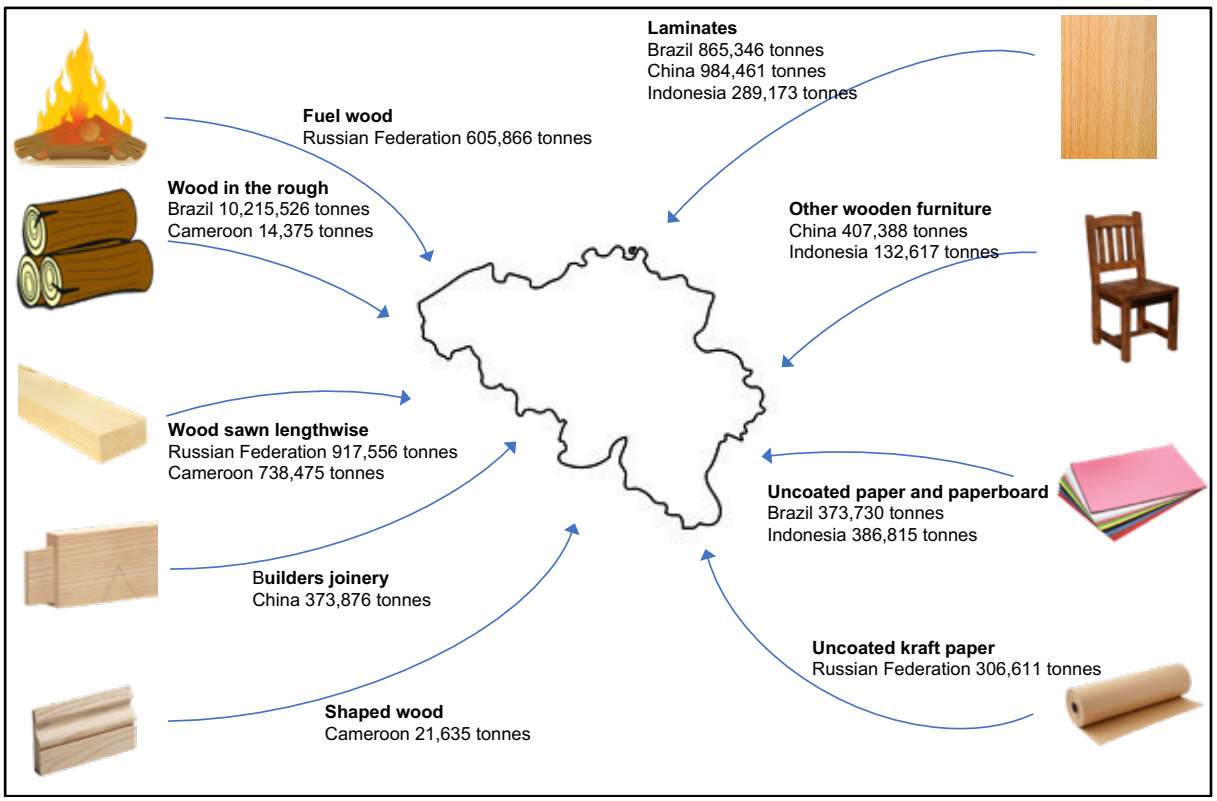


The three largest product categories (by weight in tonnes) imported from each of these high risk countries are illustrated in Figure 18. They include unprocessed wood (e.g. 'wood in the rough' from Brazil and Cameroon, and fuel wood from the Russian Federation), processed

[65] FAO (2016) Global Forest Resource Assessment 2015: Desk Reference. Food And Agriculture Organization Of The United Nations, Rome.

wooden products (e.g., laminates from Brazil, China and Indonesia) and manufactured goods (e.g., wooden furniture from China and Indonesia, and kraft paper from the Russian Federation). This illustrates that the risk of importing wood products that may be associated with deforestation and social problems is associated with a broad range of products.

Figure 18: The top three products imported from high risk countries



4.3.4 Belgium's share of exports from high risk countries

Estimating Belgium's share of the total exports from high and very high risk countries provides a measure of the influence of the Belgian market for those countries. The total exports of timber, pulp and paper products from China, Brazil, Indonesia, the Russian Federation and Cameroon were extracted from the UN COMTRADE database for the same HS codes that have been used for the rest of this study (see Appendix 1). Data was not available for all of these countries for 2017, so the period 2012-16 was used. These were assessed against Belgium's reported imports for the same period (see Section 3.1).

Belgium imports from China are highest in value (over € 2 billion in total over 2012-16, an average of €425 million per year). However, this represents only 1% of China's global exports of timber, pulp and paper products (Table 5). By value, Brazil ranks second by value, with €1.3 billion, and this represents approximately 3% of that country's exports. Indonesia and the Russian had similar global exports to Brazil, but Belgium imports a smaller proportion of them (2% and 1% respectively). Cameroon is the anomaly, with relatively modest global exports for which as estimated 23% are imported by Belgium (equivalent to € 90 million per year). Estimating Belgium's share of Cameroon's exports by using Cameroon's declared exports to Belgium rather than Belgium's declared imports from Cameroon gives a more modest 13%. This difference reflects the inconsistencies present within trade data, and in practice the 'true' value may fall somewhere between these two estimates. Nonetheless, Belgium imports a large proportion of Cameroon's exports whichever of these two estimates is used, indicating that Belgium is likely to have significant influence on Cameroon's export market.

Table 5: Belgium's share of all exports of timber, pulp and paper products from high and very high risk countries between 2012 and 2016 (million Euro)

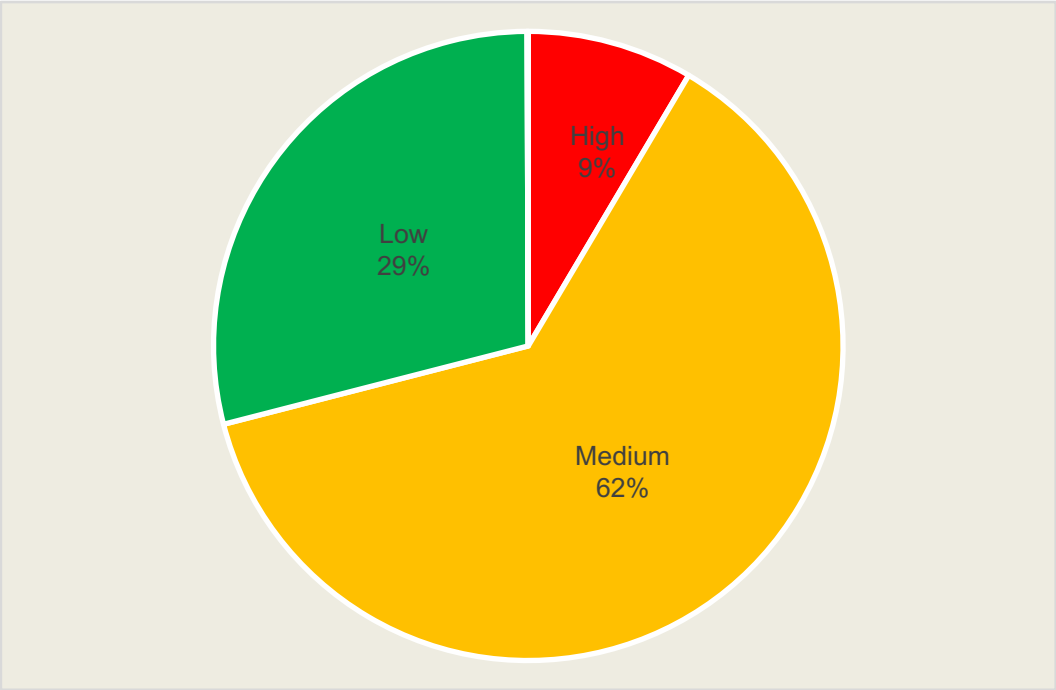
Country	Total exports	Belgium imports	%
China	€193,961	€2,127	**1%**
Brazil	€40,260	€1,310	**3%**
Indonesia	€41,603	€692	**2%**
Russian Federation	€41,476	€433	**1%**
Cameroon	€2,000	€451	**23%**

4.3.5 Risks from out of EUTR scope imports

As mentioned in Section 3.1 above, approximately 6% of the value of the import categories assessed fall outside the scope of EUTR. Although a modest proportion of the total, this represents an average value € 490 million per year. The main categories making up these imports are upholstered seats of wood and 'other articles of wood' (see Appendix 1 for details of import categories). Imports of these out of scope products comes from a total of 147 countries.

Further analysis of this part of Belgium's imports reveals that only 29% comes from countries that have a low risk of corruption, with medium risk countries accounting for 63% and high risk countries 9% (Figure 19).

Figure 19: Corruption perception rating of imports that fall outside the scope of EUTR (by value in Euro)



Countries that have a high risk of corruption and which export out of scope products to Belgium include some of the major exporters to Belgium (e.g., China, Cameroon and the Russian Federation, see Table 4, above) as well as countries which export smaller value of products to Belgium, but about which there should be serious concerns about the legality,

environmental and social issues connected with production. These include Cambodia, Central African Republic, Gabon, Laos, and Myanmar (see Box 2), amongst others.

Box 2: Belgium's imports from Myanmar

Belgium imported 27.3 million of timber products from Myanmar between 2012 and 2017, an average of €1.2 million per year. Of this, € 1.8 million of timber products were out of the scope of EUTR. The majority of this 'out of scope' total, nearly € 1.6 million, was non-upholstered seats with wooden frames.

Despite recent political reforms, forced labour, child labour and human trafficking are considered to be widespread in Myanmar. Myanmar is one of the worst countries in the world for labour rights,[66] and ranks 150 out of 180 in terms of corruption perception.[67] According to FAO statistics, Myanmar lost an enormous 3.2 million hectares of its forest cover between 2010 and 2015, 10.8% of its total. Illegal loggers have been cited as one of the main drivers of this deforestation.

A year-long nationwide ban on logging that aimed to reverse this situation was lifted at the end of March 2017. However, the ban does not appear to have halted illegal logging, with over 50,000 tonnes of illegally harvested timber having been intercepted by authorities.[68]

In November 2016, a Swedish court found timber company Almtra Nordic guilty of violating the EU Timber Regulation by importing teak from Myanmar without sufficiently mitigating the risk of illegality. Danish authorities followed up the Swedish ruling by prohibiting Danish companies from selling Myanmar teak on European Union markets. However, significant quantities of illegally logged timber is shipped overland from Myanmar to China, at which point it is effectively 'legalised' by Chinese companies.[69]

It is certainly possible that Belgium is importing timber products that have been illegally logged in Myanmar, either directly because they are outside the scope of EUTR, or because they have been 'legalised' via the illegal trade across the Chinese border. Beyond issues of legality, it seems likely that some of these imports have been associated with deforestation and with violations of internationally recognised labour rights.

[66] ITUC (2017). Global rights index: the world's worst countries for workers. International Trade Union Confederation, https://www.ituc-csi.org/IMG/pdf/survey_ra_2017_eng-1.pdf
[67] Transparency International (2017). Corruption Perceptions Index 2017. https://www.transparency.org/news/feature/corruption_perceptions_index_2017
[68] Jacob Goldberg (28 April, 2017). With logging ban lifted, Myanmar timber policy falls flat https://coconuts.co/yangon/features/with-logging-ban-lifted-major-markets-shun-myanmar-timber/
[69] Environmental Investigation Agency (2015). Organised Chaos: The illicit overland timber trade between Myanmar and China. EIA, London.

5 Discussion and conclusions

According to the FAO, 6.5 million hectares of natural forest were lost each year between 2010 and 2015,[70] an area nearly half the size of Belgium. This deforestation has resulted in a loss of biodiversity, often violates the rights of local communities and indigenous peoples, and contributes to climate change. A significant proportion of this deforestation is embedded within the global trade in commodities, including timber, pulp and paper,[71] and the huge international trade in illegal timber contributes appreciably to these negative environmental and social outcomes.

Belgium is a significant importer of timber, pulp and paper products from the global market, importing from over 171 countries with an average value € 8.2 billion each year between 2012-17. The value of pulp and paper products (average € 4.5 billion per year) exceeded that of timber and timber products (€ 3.6 billion per year). There was little discernible trend in the value of Belgium's imports over the study period. The most important categories of timber products by value were wood sawn lengthwise, which accounted for 8% of the value of all imports, wooden furniture (5%) and upholstered wooden seats (3%). The most important categories were paper and paperboard, coated with kaolin, which accounted for 11% of the value of all timber, pulp and paper imports, cartons and boxes (8%), and uncoated paper and paperboard (6%). By volume (Wood Raw Material Equivalent), the largest share was accounted for by chemical wood pulp - soda or sulphate (15%), fuel wood (13%), paper and paperboard coated with kaolin (12%) and 'other uncoated paper' (10%, Figure 7. Wood in the rough showed a large increased in the volume of imports in 2016 and again in 2017, with laminates, wooden packing cases and pallets, and cartons of paper and paperboard also increasing.

Over the whole period, the largest share of volume is in chemical wood pulp – soda or sulphate (15%), fuel wood (13%) and paper and paperboard coated with kaolin (12%) and 'other uncoated paper' (10%, Figure 7). The majority of Belgium's imports pf timber, pulp and paper are from other countries within the EU, especially Germany (23% of total value of pulp and paper imports), the Netherlands (16%), and France (15%). Major exporters from outside the EU include Finland (10%), China (6%), Brazil (4%), the USA (4%), Indonesia (2%), the Russian Federation (1%), and Cameroon (1%).

Six per cent of the wood products, worth an average of € 490 million per year, are outside the scope of EUTR and hence companies have no legal obligation to ensure that the products they are buying and selling is from legal sources. These imports came from 147 countries between 2012-17, including countries from which the trade in illegal timber is well documented (e.g., China, Myanmar). Further analysis of this part of Belgium's imports reveals that only 29% comes from countries that have a low risk of corruption, with medium risk countries accounting for 63% and high risk countries 9%. The main categories making up these imports are upholstered seats of wood and 'other articles of wood' (see Appendix 1 for details of import categories).

[70] FAO (2016). Global Forest Resource Assessment 2015: How are the World's Forests Changing? Rome: Food and Agriculture Organization of the United Nations.
[71] Boucher, D., Elias, P., Lininger, K., May-Tobin, C., Roquemore, S. and Saxon E. (2010). The Root of the Problem: What's Driving Tropical Deforestation Today? The Union of Concerned Scientists.

Companies are legally obliged to ensure that they are not placing illegal timber, pulp and paper that falls within the scope of EUTR on the market, but there are questions over how well this regulation is being enforced in Belgium.[72]

Even for products that fall within the scope of EUTR, there is no legal obligation to ensure that their production has not resulted in deforestation, the degradation of forests and ecosystem services, or with poor labour practices. In other words, legal or not, there is no requirement to ensure that the timber, pulp and paper imported by Belgium has been sustainably produced.

Belgium's imports of timber, pulp and paper create a global large footprint: the area required to supply Belgium's imports is estimated at 4.46 million hectares per year between 2012-17. This is equivalent to nearly 1.5 times Belgium's total land area, or six and a half times Belgium's own forest area. This footprint increased notably in 2017, a 40% increase from 2016 (Figure 11), a result of increased imports of wood in the rough, laminates, wooden packing cases and pallets, and cartons of paper and paperboard.
The largest footprints from Belgium's imports fall in France (14% of total imported footprint, and increasing markedly in 2017), USA (13%), the Russian Federation and Finland (both 10%), and Germany and Sweden (both 8%). Amongst tropical and sub-tropical countries, Brazil contributes 2% to the total footprint, China 2%, with Indonesia and Cameroon both contributing 1%.

The footprint of Belgium's imports was assessed against deforestation and social risk. Different indicators give different risk profiles to Belgium's imports, a result that suggests that using a single metric of risk is unlikely to capture the suite of risks associated with the production of Belgium's imports of timber, pulp and paper.

When the risk indicators are combined, an estimated 17% (more than 750,000 hectares) comes from high and very high risk countries, including the Russian Federation, Brazil, China, Indonesia and Cameroon. This area is larger than the entire extent of forest in Belgium (683,400 hectares). Even if EUTR is being successful in excluding illegal timber from these countries, for example through the use of Voluntary Partnership Agreements, there is no guarantee that this timber has not caused deforestation, forest degradation, or has been associated with serious social issues such as land grabs and forced labour.

Belgium might be regarded as having a certain amount of leverage over the timber industries in some of these countries. For example, it imports a large proportion of Cameroon's imports of timber, and whilst only importing small fractions of the timber, pulp and paper from China and Brazil, these amount to an average of over € 2 billion per year from China and more than € 1 billion from Brazil.

Certification schemes exist within the timber sector that can, to a greater or lesser degree, provide assurances that imported timber products have been legally and sustainably produced. There are therefore opportunities for businesses and the Belgian government to take a lead in demanding and reporting on the quantities of credibly certified timber that the country imports. Without such leadership, Belgium will almost certainly continue to import timber that has been produced at high cost to the environment and local people in some of the countries it imports from.

[72] www.documents.clientearth.org/wp-content/uploads/library/2016-08-30-eutr-enforcement-info-brief-in-belgium-ce-en.pdf

Appendix 1: HS codes used in this study

HS Code	Short description	In EUTR scope
4401	Fuel wood	Yes
4402	Charcoal	No
4403	Wood in the rough	Yes
4404	Hoopwood & poles	No
4405	Wood wool	No
4406	Railway sleepers	Yes
4407	Wood sawn lengthwise	Yes
4408	Veneer and ply	Yes
4409	Shaped wood	Yes
4410	Particle board	Yes
4411	Fibreboard	Yes
4412	Laminates	Yes
4413 00 00	Densified wood	Yes
4414 00	Wooden frames	Yes
4415	Wood packing	Yes
4416 00 00	Casks	Yes
4417	Wooden tools	No
4418	Joinery & carpentry	Yes
4419	Wooden kitchenware	No
4420	Wood marquetry and inlay	No
4421	Other articles of wood	No
4701	Mechanical wood pulp	Yes
4702	Chemical wood pulp, dissolving grades	Yes
4703	Chemical wood pulp, soda or sulphate	Yes
4704	Chemical wood pulp, sulphite	Yes
4705	Combined mechanical and chemical pulp	Yes
4801	Newsprint	Yes
4802	Uncoated paper and paperboard	Yes
4803	Tissues and napkins	Yes
4804	Uncoated kraft paper	Yes
4805	Other uncoated paper	Yes
4806	Glazed, transparent or translucent paper	Yes
4807	Composite paper and paperboard	Yes
4808	Corrugated paper and paperboard	Yes
4809	Carbon paper	Yes
4810	Paper and paperboard, coated with kaolin	Yes
4811	Paper and paperboard, surface-decorated or printed	Yes
4812	Filter blocks of paper pulp	Yes
4813	Cigarette paper	Yes
4814	Wallpaper	Yes

4816	Other carbon papers	Yes
4817	Envelopes and letter cards	Yes
4818	Toilet paper	Yes
4819	Cartons and boxes of paper and paperboard	Yes
4820	Note books	Yes
4821	Paper labels	Yes
4822	Bobbins and spools of paper	Yes
4823	Other paper and paperboard	Yes
9401 61 00	Upholstered wooden seats	No
9401 69 00	Seats with wooden frames, not upholstered	No
9403 30	Wooden office furniture	Yes
9403 40	Wooden kitchen furniture	Yes
9403 50	Wooden bedroom furniture	Yes
9403 60	Other wooden furniture	Yes
9403 90	Furniture parts	Yes
9406 10 00	Prefabricated wooden buildings	No[73]

[73] Note: HS code 9403 90 30 is specified under EUTR but not reported on UN COMTRADE. HS Code 9406 00 20, specified within EUTR does not exist. The description given of this code by them is prefabricated buildings; so code 9406 10 00 is used instead (description Prefabricated buildings; Of wood).