



STEPPING UP?

THE CONTINUING IMPACT
OF EU CONSUMPTION ON
NATURE WORLDWIDE



CONTENTS

EXECUTIVE SUMMARY	4
I. CONTEXT AND OBJECTIVES	12
II. WHAT WE'VE LEARNT	16
III. RECOMMENDATIONS	42
IV. METHODOLOGY	48
V. LIMITATIONS OF THE STUDY	52
VI. REFERENCES	54
VII. APPENDIX	56

This report was written by WWF using data from Pendrill et al. (2020) and Trase, compiled by the Stockholm Environment Institute (SEI)/Trase – an initiative jointly led by SEI and Global Canopy.

Lead authors: Béatrice Wedeux (WWF-Belgium) and Anke Schulmeister-Oldenhove (WWF-EU)

Communications: Sophie Bauer (WWF-EU)

Editing: Barney Jeffries, www.swim2birds.co.uk

Design: Doug Dawson Creative, www.dougdawson.co.uk

Cover image: © Paralaxis / iStock

April 2021

ABOUT WWF

WWF is an independent conservation organisation, with over 30 million followers and a global network active through local leadership in nearly 100 countries. Our mission is to stop the degradation of the planet's natural environment and to build a future in which people live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

The European Policy Office contributes to the achievement of WWF's global mission by leading the WWF network to shape EU policies impacting on the European and global environment.



© Text 2021 WWF. All rights reserved. This programme is implemented with the support of the European Union. The contents of this publication are the sole responsibility of WWF and can in no way be taken to reflect the views of the European Union.

© Marizilda Cruppe / WWF-UK

EXECUTIVE SUMMARY

Around the world, forests and other natural ecosystems like grasslands, wetlands and savannahs continue to be destroyed at an alarming rate. This contributes to climate change and the loss of biodiversity and the vital services that nature provides.

The expansion of agriculture in tropical regions remains the biggest threat to forests and other natural ecosystems, leading to the conversion of around 5 million hectares of forests into agricultural land per year between 2005 and 2017. Because the agricultural commodities that drive tropical deforestation and ecosystem conversion are traded internationally, tackling the problem is not just the responsibility of producing countries: importing countries also need to take action.

The EU is taking measures to address deforestation and other environmental and human rights impacts of its consumption. This report aims to support these efforts by providing new data and insights on the EU's role in driving deforestation and conversion through the import, use and consumption of key agricultural commodities.

The data referenced in this report covers the period 2005-2017, preceding the withdrawal of the United Kingdom from the EU. As such, all data concerning EU imports includes the United Kingdom.

WHAT WE'VE LEARNT

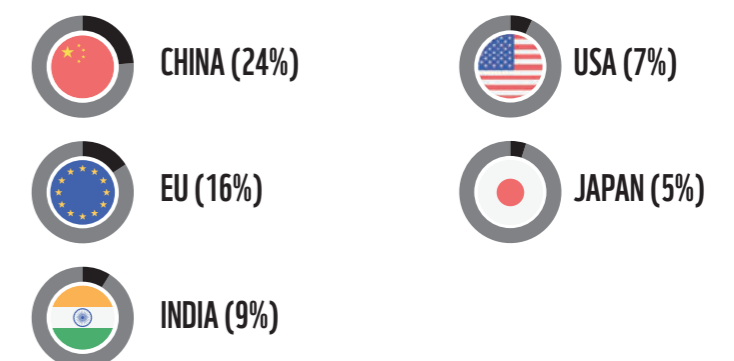
1 EU IMPORTS STILL DRIVE SIGNIFICANT DEFORESTATION AND ECOSYSTEM CONVERSION

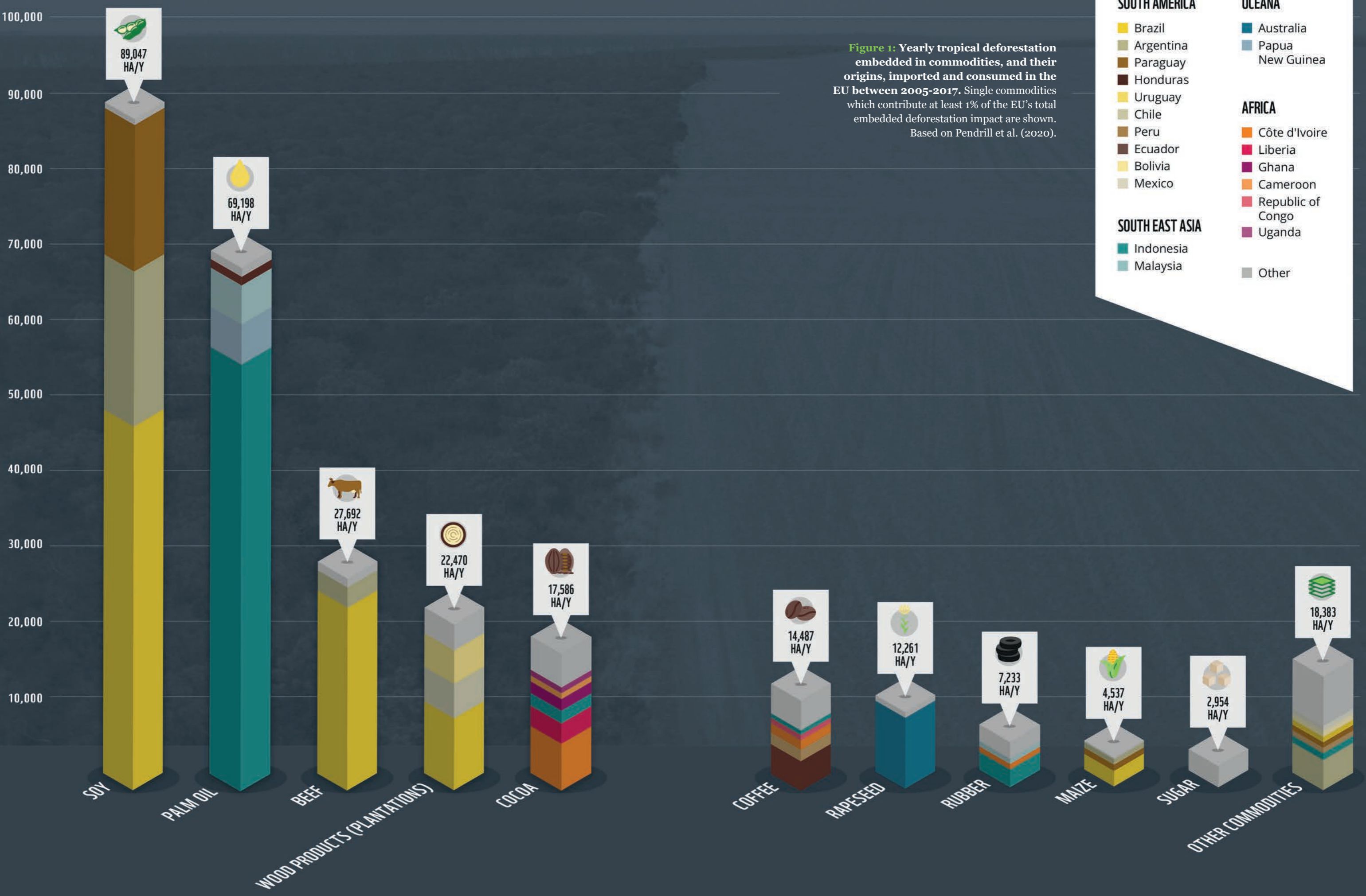
The EU is the second largest importer of tropical deforestation and associated emissions. It caused more deforestation than any other country through its imports of agricultural commodities between 2005 and 2013, before being surpassed by China in 2014. Between 2005-2017, EU imports caused 3.5 million hectares of deforestation, emitting 1,807 million tonnes of CO₂. This is equivalent to 40% of the EU's overall annual emissions.

Though deforestation associated with its imports fell steadily by around 40% between 2005 and 2017, the EU was responsible for 16% of deforestation associated with international trade in 2017, totalling 203,000 hectares and 116 million tonnes of CO₂. This puts it after China (24%) but ahead of India (9%), the USA (7%) and Japan (5%).

Soy, palm oil and beef were the commodities with the largest embedded tropical deforestation imported into the EU, followed by wood products, cocoa and coffee. Embedded deforestation was greatest for imports from Brazil, Indonesia, Argentina and Paraguay.

DEFORESTATION ASSOCIATED WITH INTERNATIONAL TRADE





- SOUTH AMERICA**
 - Brazil
 - Argentina
 - Paraguay
 - Honduras
 - Uruguay
 - Chile
 - Peru
 - Ecuador
 - Bolivia
 - Mexico
- SOUTH EAST ASIA**
 - Indonesia
 - Malaysia
- OCEANIA**
 - Australia
 - Papua New Guinea
- AFRICA**
 - Côte d'Ivoire
 - Liberia
 - Ghana
 - Cameroon
 - Republic of Congo
 - Uganda
- Other**

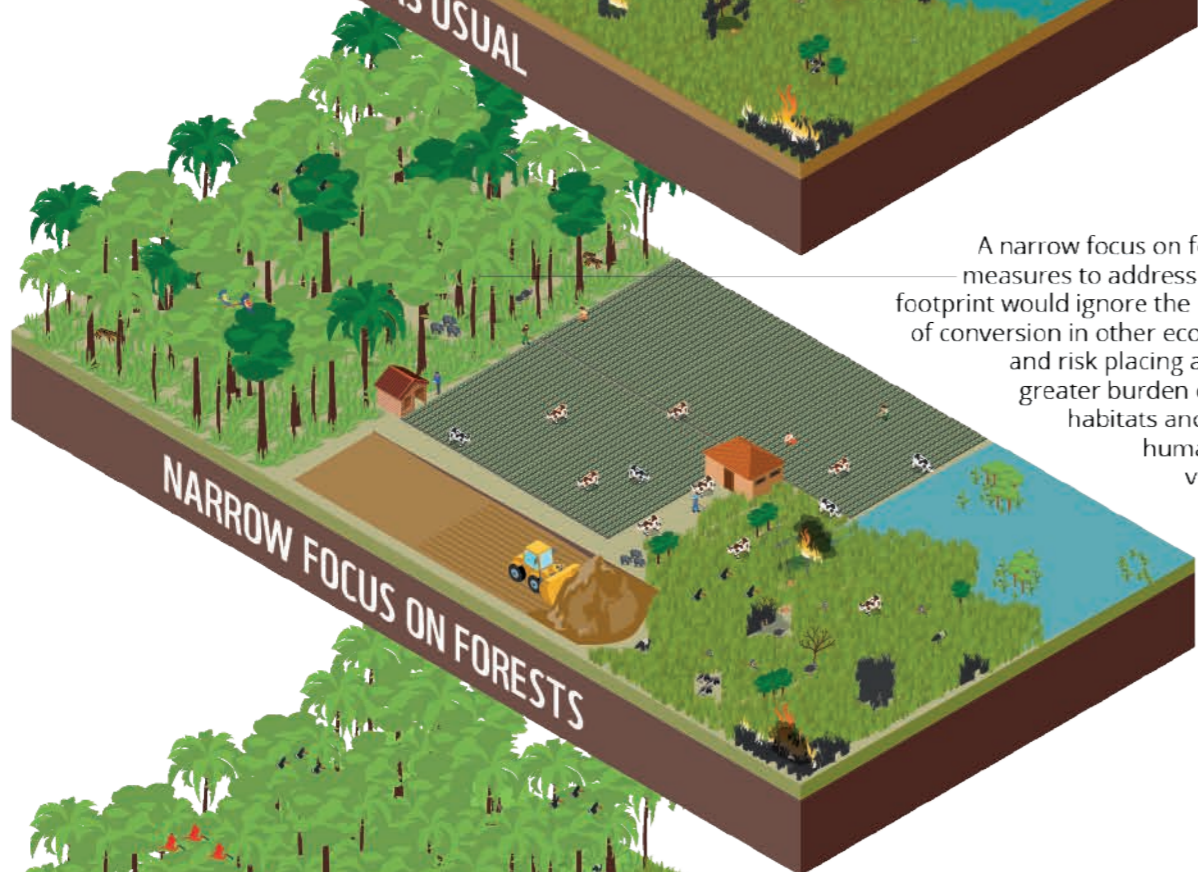
WHY THE EU LEGISLATION SHOULD INCLUDE FOREST AND NON-FOREST ECOSYSTEMS



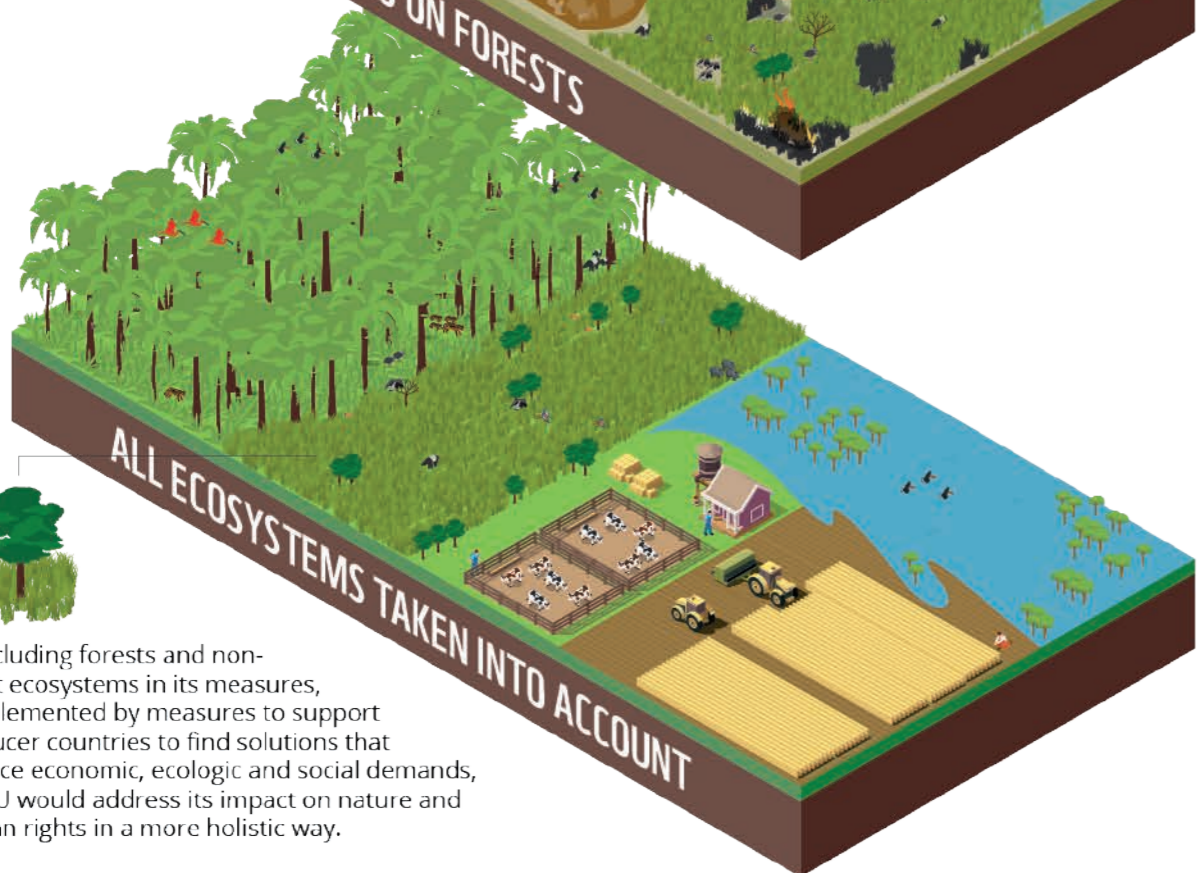
EU consumption of agricultural commodities is contributing to the destruction of forests and other natural ecosystems, including grasslands and wetlands, as well as human rights violations



A narrow focus on forests in measures to address the EU's footprint would ignore the problem of conversion in other ecosystems and risk placing an even greater burden on these habitats and related human rights violations



By including forests and non-forest ecosystems in its measures, complemented by measures to support producer countries to find solutions that balance economic, ecologic and social demands, the EU would address its impact on nature and human rights in a more holistic way.



2 EU DEMAND DRIVES CONVERSION IN DEFORESTATION FRONTS

EU imports are associated with production located in agricultural frontiers, where farmland, plantations and pastures are expanding into sensitive natural ecosystems. Detailed analysis shows clear links between EU consumption, particularly of soy and beef, and several of the deforestation hotspots identified in WWF's recent *Deforestation Fronts* report – the Cerrado and Amazon in Brazil and the Chaco in Argentina and Paraguay. EU imports are also likely associated with deforestation fronts in other regions, notably cocoa from West Africa, Central Africa and Indonesia and palm oil from Indonesia, Malaysia and Papua New Guinea.

Advances in supply chain transparency and traceability enable us to identify specific production locations. This can improve understanding of local drivers of deforestation and conversion and help design more effective responses. In South America, the greatest impacts of EU consumption are concentrated in the Cerrado, where imports of both soy and beef have driven large-scale conversion.

3 ZERO-DEFORESTATION COMMITMENTS AND CERTIFICATION SCHEMES HAVE NOT ALWAYS DELIVERED CLEAR IMPACT

Despite numerous commitments by companies and governments, efforts to eliminate deforestation from commodity supply chains by 2020 have not succeeded.

Private sector commitments are highly variable and patchy in their coverage among commodities and biomes. In 2018, 62% of EU imports of soy from South America were covered by an exporter's zero-deforestation commitment or supply-side initiative, compared to just 19% of imports of South American beef in 2017.

The zero-deforestation commitments that do exist have not always delivered the desired impact. The Amazon Soy Moratorium – an agreement by grain traders not to purchase soy grown on recently deforested land –, adopted

in 2006, contributed to a dramatic reduction in deforestation directly related to soy conversion in the Brazilian Amazon. In the Cerrado and other biomes where soy is produced, however, recent zero-deforestation/conversion commitments do not yet appear to have reduced deforestation/conversion.

While some third-party certification schemes for palm oil, soy, cocoa, coffee and other commodities seek to prevent deforestation, market uptake is limited and uneven and results are inconclusive. In some cases, certification resulted in lower forest cover loss, but there is no evidence on whether voluntary standards have wider effects on deforestation outside the boundaries of certified areas.

4 TO REDUCE THE PRESSURE ON NATURE, SOLUTIONS NEED TO GO BEYOND FORESTS

A narrow focus on deforestation ignores the problem of conversion in other ecosystems. While tropical forests receive most attention, non-forest ecosystems such as grasslands, savannahs and wetlands also have extremely rich biodiversity and provide vital services to local people.

Some of the most significant impacts of EU consumption are already concentrated in landscapes that do not classify as forests, as in parts of the Cerrado and Chaco. EU demand may also be driving conversion of other less scrutinized ecosystems.

Integrated approaches across regions and sectors are needed to prevent displacement or potential leakage into other ecosystems. Legislation and market policies and commitments should avoid focusing exclusively on a single biome or commodity but consider all major landscapes affected by commodities that risk driving habitat conversion. Integrated approaches can help to optimize production on already degraded lands and reduce the overall land footprint, rather than expanding into natural ecosystems.

IN 2018
23%
OF EU SOY IMPORTS FROM SOUTH AMERICA CAME FROM THE CERRADO AND
70%
OF THE EU'S CONVERSION FOOTPRINT LINKED TO SOY PRODUCTION WAS CONCENTRATED IN THIS BIOME

5 URGENT ACTION IS NEEDED AS AGRICULTURE EXPANDS INTO NEW FRONTIERS

Global markets are putting increasing pressure on remaining intact areas of tropical forest and other ecosystems around the world, creating new conversion frontiers. Measures to address the EU's overseas footprint need to take account of these emerging frontiers, in addition to those where most deforestation and ecosystem conversion has occurred to date.

Large-scale commercial agriculture is a primary and increasing driver of forest and ecosystem conversion in the Chaco in South America, in Cameroon and in the Mekong region in South-East Asia. Small-scale agriculture, including for cash crops destined in part for export markets, is increasingly driving deforestation and conversion in frontiers in West and Central Africa, and the Mekong region. Cattle ranching is driving deforestation in the Amazon, Eastern Australia and the Chaco.

Regulations in producing countries are not sufficient to protect natural ecosystems: even with zero illegal deforestation, 7 million hectares of land in Paraguay, 10.5 million hectares in Argentina and 88 million hectares in Brazil could still be legally deforested. This makes demand-side measures in consumer countries, including the EU, all the more important.



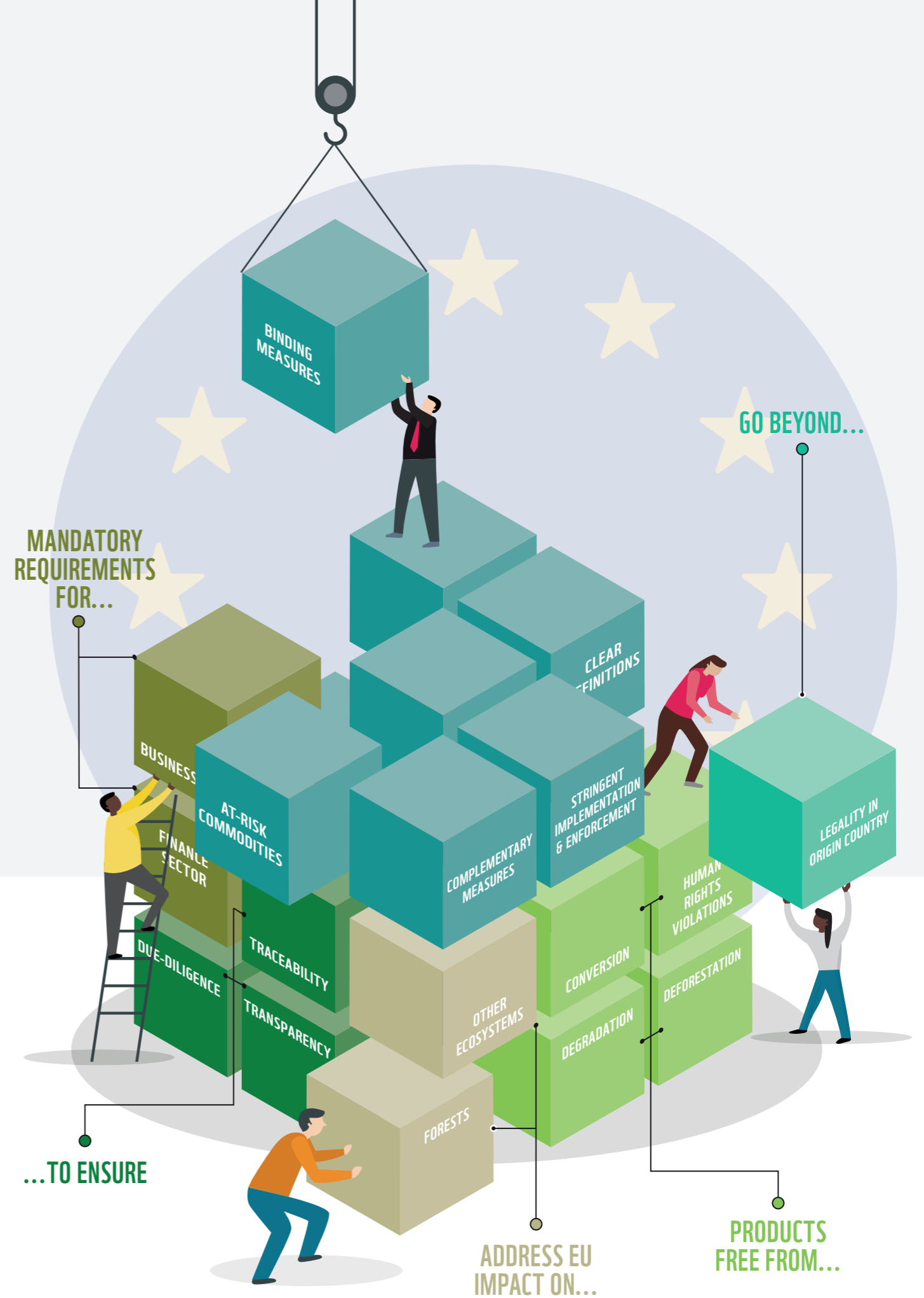
THE FOUNDATIONS OF A STRONG EU LAW

The EU, together with other countries, committed to halt deforestation by 2020 under the Sustainable Development Goals – and although 2020 has gone by, we are far from achieving this goal. As this report shows, the EU continues to drive the destruction of forests and other ecosystems beyond its borders through its consumption of commodities.

New EU legislation, together with other complementary measures such as support to producing countries, is urgently needed to stop the destruction of forests and other ecosystems. We want to see new legislation that ensures the following:¹

- 1 Products and commodities placed on the EU market are sustainable instead of only being considered “legal” according to the country of origin.
- 2 The scope of EU legislation includes the conversion and degradation of natural ecosystems alongside deforestation and the degradation of natural forests.
- 3 Based on objective and scientific criteria, the new legislation covers commodities and products at risk of being linked to conversion or degradation of natural forests and ecosystems.
- 4 No violation of human rights is linked to the harvest or production of commodities placed on the EU market.
- 5 Mandatory requirements are introduced for businesses and the finance sector to ensure due diligence, traceability of commodities and supply chain transparency.
- 6 Clear definitions are provided for relevant terms and concepts used in the legislation.
- 7 The legislation is stringently implemented and enforced across the EU Member States, with effective, proportionate and dissuasive sanctions.
- 8 Complementary additional measures are introduced to address the destruction and degradation of natural forests and other natural ecosystems.

1. For WWF's full position and asks, please see: wwf.eu/wwf_news/publications/7uNewsID=2175966



I. CONTEXT AND OBJECTIVES

Around the world, forests and other natural ecosystems like grasslands, wetlands and savannahs continue to be destroyed at an alarming rate. This contributes to climate change and the loss of biodiversity and the vital services that nature provides.

The expansion of agriculture in tropical regions remains the biggest threat to forests, leading to the conversion of around 5 million hectares per year between 2005 and 2017.² A recent WWF report identifies 24 “deforestation fronts” across the tropics and sub-tropics, where over 43 million hectares of forest were lost between 2004 and 2017³ – equivalent to the combined area of Germany, Belgium and the Netherlands.

Because the agricultural commodities that drive tropical deforestation and ecosystem conversion are traded internationally, tackling the problem is not just the responsibility of producing countries: importing countries also need to take responsibility for the impacts of their use and consumption.

In 2017, the international trade of agricultural products was associated with 1.3 million hectares of tropical deforestation, emitting some 740 million tonnes of CO₂⁴ – equivalent to nearly a fifth of the EU28’s total greenhouse gas emissions that year. Data from satellite imagery released on Global Forest Watch in June 2020 recorded 3.75 million hectares of tree cover loss in humid primary forests in the tropics in 2019, an almost 3% increase from 2018 and the third largest tropical forest loss since 2000.

The main commodities imported from the tropics and consumed in the EU in 2017 were soy, palm oil, maize, wood products, coffee, cocoa, beef and cotton (Table 1).

The EU recognizes the importance of taking measures to address deforestation and other environmental and human rights impacts of its consumption. In 2019, the European Commission adopted the *Communication on stepping up EU action to protect and restore the world’s forests*.⁵ It committed to assessing measures to reduce the footprint of EU consumption on land, including new legislation and supporting deforestation-free supply chains. More recently, the EU Biodiversity Strategy for 2030⁶ and the Farm to Fork

2. Pendrill, F. et al. 2020. Deforestation risk embodied in production and consumption of agricultural and forestry commodities 2005–2017 (Version 1.0) [Data set] Zenodo: <http://doi.org/10.5281/zenodo.4250532>
 3. Pacheco, P., Mo, K., Dudley, N., Shapiro, A., Aguilar-Amuchastegui, N., Ling, P.Y., Anderson, C. and Marx, A. 2021. *Deforestation fronts: Drivers and responses in a changing world*. WWF, Gland, Switzerland. www.fint.awsassets.panda.org/downloads/deforestation_fronts_drivers_and_responses_in_a_changing_world_full_report_1.pdf

4. Pendrill et al., 2020.
 5. ec.europa.eu/info/publications/eu-communication-2019-stepping-up-eu-action-protect-and-restore-worlds-forests_en
 6. ec.europa.eu/environment/strategy-offline/biodiversity-strategy-2030_en

THE EXPANSION OF AGRICULTURE IN TROPICAL REGIONS LED TO THE CONVERSION OF AROUND
5 MILLION
 HECTARES PER YEAR BETWEEN 2005 AND 2017



Table 1: List of main agricultural commodities sourced from 112 tropical countries, imported and consumed by the EU28 in 2017. Based on COMTRADE (2020) and the trade model from Kastner et al. (2011).

COMMODITY	VOLUME (TONNES)	
	IMPORTS	CONSUMPTION*
Soy	21,982,000	23,638,839
Palm oil	9,325,696	14,355,134
Maize	4,023,038	4,032,520
Wood products	3,129,154	3,499,635
Coffee	2,442,182	2,643,821
Cocoa	1,801,614	1,987,347
Beef	167,421	204,380
Cotton	162,029	174,545

* includes the consumption of processed products from intermediate countries that import the original commodities (Kastner et al. 2011)

Strategy⁷ have confirmed this commitment, and has since been reaffirmed by the European Commission’s President, Ursula von der Leyen, at the One Planet Summit in January 2021.⁸

This report aims to support these efforts by providing insights into the EU’s⁹ role in driving deforestation and conversion through the import, use and consumption of key tropical

agricultural commodities. Based on the best and most recent data available, it represents a significant update as until now, the most recent data mainly used by the EU related to the period 1990–2008.¹⁰

First, the report quantifies the tropical deforestation and CO₂ emissions from land-use change embedded in EU commodity imports and Member States’ use and consumption. Second, we demonstrate the impacts of EU

7. ec.europa.eu/food/farm2fork_en
 8. ec.europa.eu/commission/presscorner/detail/en/speech_21_61
 9. As EU28 (including the United Kingdom) at the time of writing.

10. ec.europa.eu/environment/forests/impact_deforestation.htm

consumption of particular commodities through a regional analysis for South America (soy in Brazil, Argentina and Paraguay; beef in Brazil) – a region that contains several of the deforestation fronts identified in WWF’s recent analysis, including the Amazon, Cerrado and Chaco.¹¹ Third, we examine the role of zero-deforestation commitments and certification schemes, the role of other ecosystems, risks of leakage and the urgency of action to prevent conversion in new deforestation frontiers.

As this report shows, EU consumption plays a significant role in driving deforestation and conversion. However, the EU’s market share and political influence mean it can lead the way in halting the conversion and degradation of forests and other ecosystems, and promoting a shift towards sustainable agricultural production that benefits people, nature and the climate.

METHODOLOGICAL NOTES

This report uses data from Pendrill et al. (2020) and Trase, compiled by the Stockholm Environment Institute/Trase. It uses a mixed method approach to provide both global perspectives and insights into specific biomes. These complementary perspectives are provided by two datasets obtained using distinct methods for attributing deforestation and associated emissions to supply chains. The data referenced in this report covers the period 2005-2017, preceding the withdrawal of the United Kingdom from the EU. As such, all data concerning EU imports includes the United Kingdom.

First, data from Pendrill et al. (2020) was used to highlight the role of the EU in tropical deforestation through its imports and consumption of commodities sourced specifically from the tropics. The trade model traces primary and processed agriculture and forestry products to the country where they are either physically consumed as food, or used as feed for livestock or in industrial processes (e.g. highly processed products).¹²

Then, a biome-specific analysis using data

11. Pacheco et al., 2021.

12. A limitation of the data used here is that it does not trace deforestation embodied in livestock feed (e.g. soybean cake) that is further re-exported in the form of e.g. meat or dairy. The effect on the overall EU consumption deforestation footprint is limited according to Pendrill et al. (2020). For individual countries’ deforestation footprints the report uses the wording “use and consumption” to account for the use of feed for animal products destined both for in-country consumption and for export.

43 MILLION

HECTARES OF FOREST WERE LOST IN “DEFORESTATION FRONTS” BETWEEN 2004 AND 2017

from Trase was carried out.¹³ This provides a spatially explicit picture of commodity supply chains linking localities (e.g. municipalities in Brazil, departments in Argentina and Paraguay) and biomes (e.g. Amazon, Chaco, etc.) to the EU. Trase data does not cover re-exports, but identifies the first point of entry into the EU market as the importing country. The best available data at the time of publication was used, but we recognize that there are other countries and commodities associated with deforestation and conversion for which data is not yet available in Trase (e.g. Argentinian beef, commodities from other tropical regions).

The two datasets quantify tropical deforestation differently. The global dataset of Pendrill et al. identifies forest loss as the removal of tree cover in areas with trees at least five metres tall and with at least 25% canopy cover in the year 2000, detected using remote sensing. This definition is likely to underestimate forest and ecosystem loss, particularly in savannah landscapes such as the Cerrado and the Chaco. The Trase analysis complements remote sensing data with additional validation from other sources, such as official government data, mapping initiatives, NGO datasets and maps generated by experts. These datasets generally include all native vegetation types, from natural grasslands, wetlands and savannahs to dry and moist forests.¹⁴

Results presented in this report do not rely on “farm-to-EU” traceability since the source of commodities is presented at the country level or biome or locality level. As a result, the deforestation (in hectares) and CO₂ emissions (in tonnes) linked to commodities imported into the EU should be interpreted as indicators of exposure or “risk”.

Further details on the methodology and the limitations of the study are available in the respective sections at the end of the report.

13. See trase.earth

14. INPE/PRODES, MAPBIOMAS Brazil & Mapbiomas Chaco



© Daniel Martínez / WWF Peru

II. WHAT WE'VE LEARNT

1 EU IMPORTS STILL DRIVE SIGNIFICANT DEFORESTATION AND HABITAT CONVERSION

The EU is the second largest importer of tropical deforestation and associated emissions

In 2017, the global trade of agricultural commodities was associated with 1.3 million hectares of deforestation, representing 740 million tonnes of CO₂ emitted from land-use change. The EU was the second largest importer of agricultural commodities associated with deforestation overseas, and therefore a key market to target policies aimed at reducing the loss and degradation of tropical forests and other ecosystems.

According to Pendrill et al. (2020), the EU caused more deforestation than any other country through its imports of agricultural commodities between 2005 and 2013, with values well above 250,000 hectares per year (132 million tonnes CO₂ per year), before being surpassed by China in 2014. Between 2005-2017, the EU accumulated 3.5 million hectares of deforestation (1,807 million tonnes CO₂) in its imports, representing 21% of deforestation associated with international trade of commodities over that period.

Though deforestation associated with its imports fell steadily by around 40% between 2005 and 2017, the EU is still the second largest importer of deforestation embedded in commodities.¹⁵ The bloc was responsible for 16%

15. Pendrill et al (2020) do not report on trade volumes, but other sources show stable or even increasing imports of commodities that pose potential risks to forests and other ecosystems by the EU28 in the past decade, suggesting that there has been a decoupling of import volumes from embedded deforestation. IDH for instance reports an average net increase in imports year on year between 2011 and 2016 of 14.57% for cocoa, 9.83% for palm oil and 4.38% for soy (Source: IDH. 2020. *The urgency of action to tackle tropical deforestation*. IDH: Utrecht, the Netherlands. www.idhsustainabletrade.com/uploaded/2020/02/IDH_The-UoA-to-Tackle-Tropical-Deforestation_2020-web.pdf).

of deforestation associated with international trade in 2017, totalling 203,000 hectares and 116 million tonnes of CO₂ – equivalent to Belgium's total domestic greenhouse gas emissions the same year.¹⁶ This puts it after China (24%) but ahead of India (9%), the USA (7%) and Japan (5%).

The largest EU economies at the time – Germany, Italy, Spain, the UK, the Netherlands, France, Belgium and Poland – were responsible for 80% of the EU's embedded deforestation through their use and consumption of forest-risk commodities (Figure 2). Between 2005-2017, the Netherlands (18m² per capita), Belgium (14m² per capita) and Denmark (11m² per capita) had the highest mean embedded deforestation per capita,¹⁷ well above the mean for the EU of 5m² per capita.

BETWEEN 2005-2017,
THE EU ACCUMULATED

**3.5
MILLION**

HECTARES OF DEFORESTATION

16. di.unfccc.int/time_series

17. Calculated using population from EUROSTAT (2020).



© WWF-Netherlands



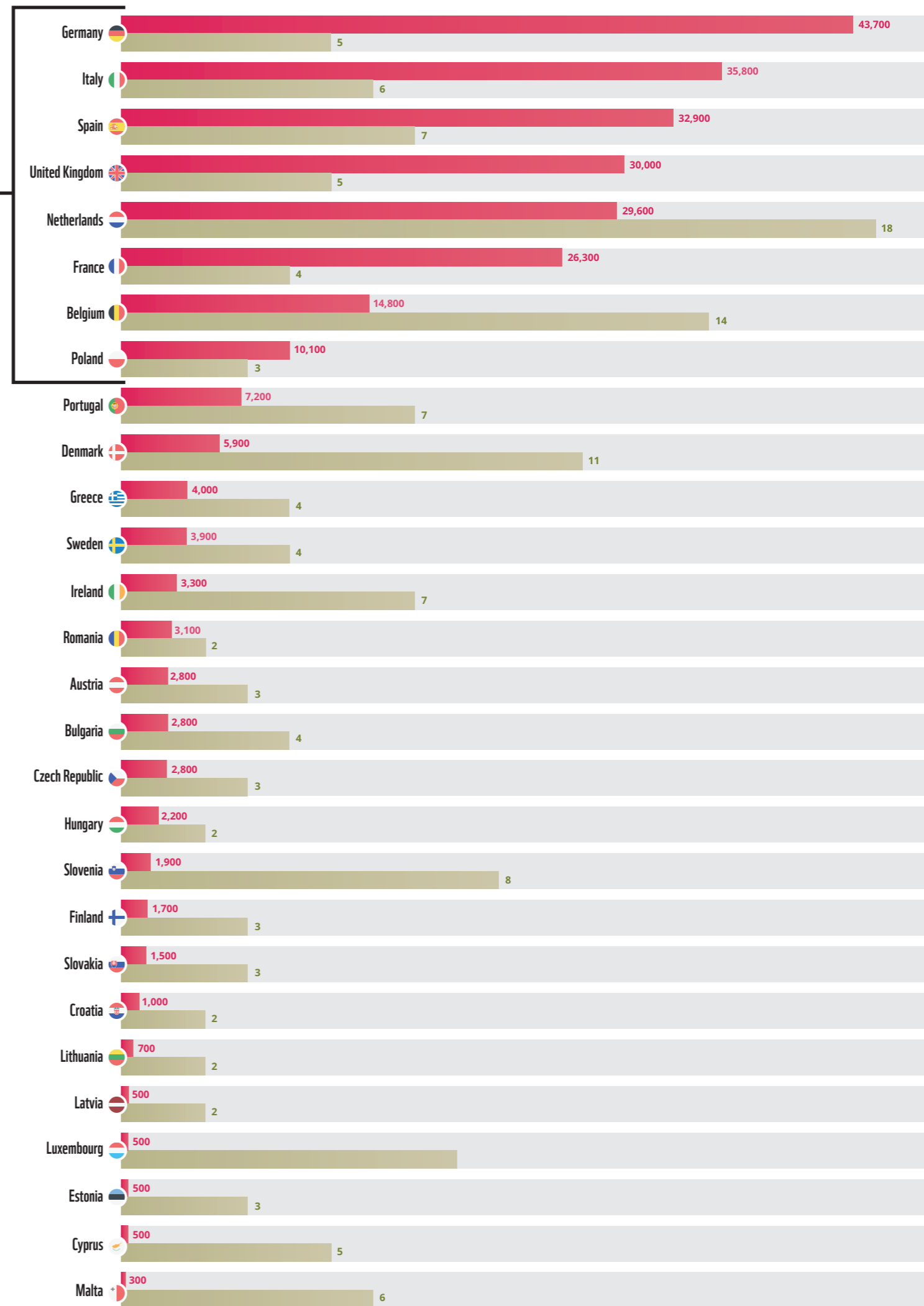
THE LARGEST EU ECONOMIES
AT THE TIME WERE
RESPONSIBLE FOR

80%

OF THE EU'S EMBEDDED
DEFORESTATION THROUGH
THEIR USE AND CONSUMPTION
OF FOREST-RISK COMMODITIES

Figure 2: Tropical deforestation for commodities imported, used and consumed between 2005- 2017 in the EU28 as total deforestation (top) and per capita (bottom). Countries represent the final destination where commodities and transformed products are consumed. The exception is the use of commodities in feed embedded in animal products. The deforestation associated with commodities in feed is attributed to the country where the feed is used, not where the animal product is consumed. Based on Pendrill et al. (2020). See Figure 2A in the appendix) for CO₂ emissions from tropical deforestation.

■ Mean deforestation in ha per year
■ Per capita in m² per year per capita





© Elton Ferreira da Silva / WWF-Brasil

Soy, palm oil and beef sourced from South America or Southeast Asia were the commodities traded with the largest embedded tropical deforestation

Agricultural products imported into the EU are associated with varying levels of tropical deforestation. Products containing soy, palm oil and beef sourced from South America or Southeast Asia had the largest embedded tropical deforestation. More than 80% of soy consumed in Europe is used for animal feed.¹⁸ Palm oil is widely used in the manufacturing of many products, from margarine to lipstick, biscuits to candles, chocolate to laundry detergent, as well as for biofuel (which accounted for about 45% of the EU's use of palm oil in 2014¹⁹).

Between 2005 and 2017, over 80% of tropical deforestation embedded in EU imports was concentrated in soy (31%, 89,000 hectares embedded deforestation per year), palm oil (24%, 69,000 hectares), beef (10%, 28,000ha), wood products (8%, 22,000ha), cocoa (6%, 18,000ha), and coffee (5%, 14,000ha) (Figure 3). In 2017, the ranking differs with palm oil products (42%, 85 000ha) having overtaken soy (17%, 34,000ha), followed by wood products (9%, 22,000ha), coffee (9%, 18,000ha), cocoa (8%, 16,000ha), and beef (5%, 11,000ha).²⁰ In terms of embedded emissions, palm oil consistently surpasses other commodities, contributing 37% of embedded emissions between 2005 and 2017 due to the conversion of forests and peatlands (see Table 1A in Appendix for emissions data).

In the 2005–2017 period, the tropical deforestation embedded in EU imports was greatest for imports from Brazil (30%, embedded deforestation 87,000 hectares per year), Indonesia (22%, 64 000ha), Argentina (10%, 30,000ha) and Paraguay (8%, 22,000ha). In 2017, the EU imported most deforestation from Indonesia (39%, 80,000ha) followed by Brazil (25%, 50,000ha) (see Table 2A in Appendix for corresponding emissions data).

18. European Commission. Oilseeds and protein crops balance sheets. https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/overviews/balance-sheets-sector/oilseeds-and-protein-crops_en
 19. Transport and Environment. 2016. Cars and trucks burn almost half of palm oil used in Europe. www.transportenvironment.org/sites/te/files/publications/2016_05_TE_EU_vegetable_oil_biodiesel_market_FINAL_0_0.pdf
 20. This is due to a decrease of embedded deforestation in EU soy imports over the study period (noting that conversion of non-forest ecosystems is not taken into account here but represents an important footprint for soy – see chapter II.2), while deforestation embedded in palm oil tended to fluctuate and slightly increase.

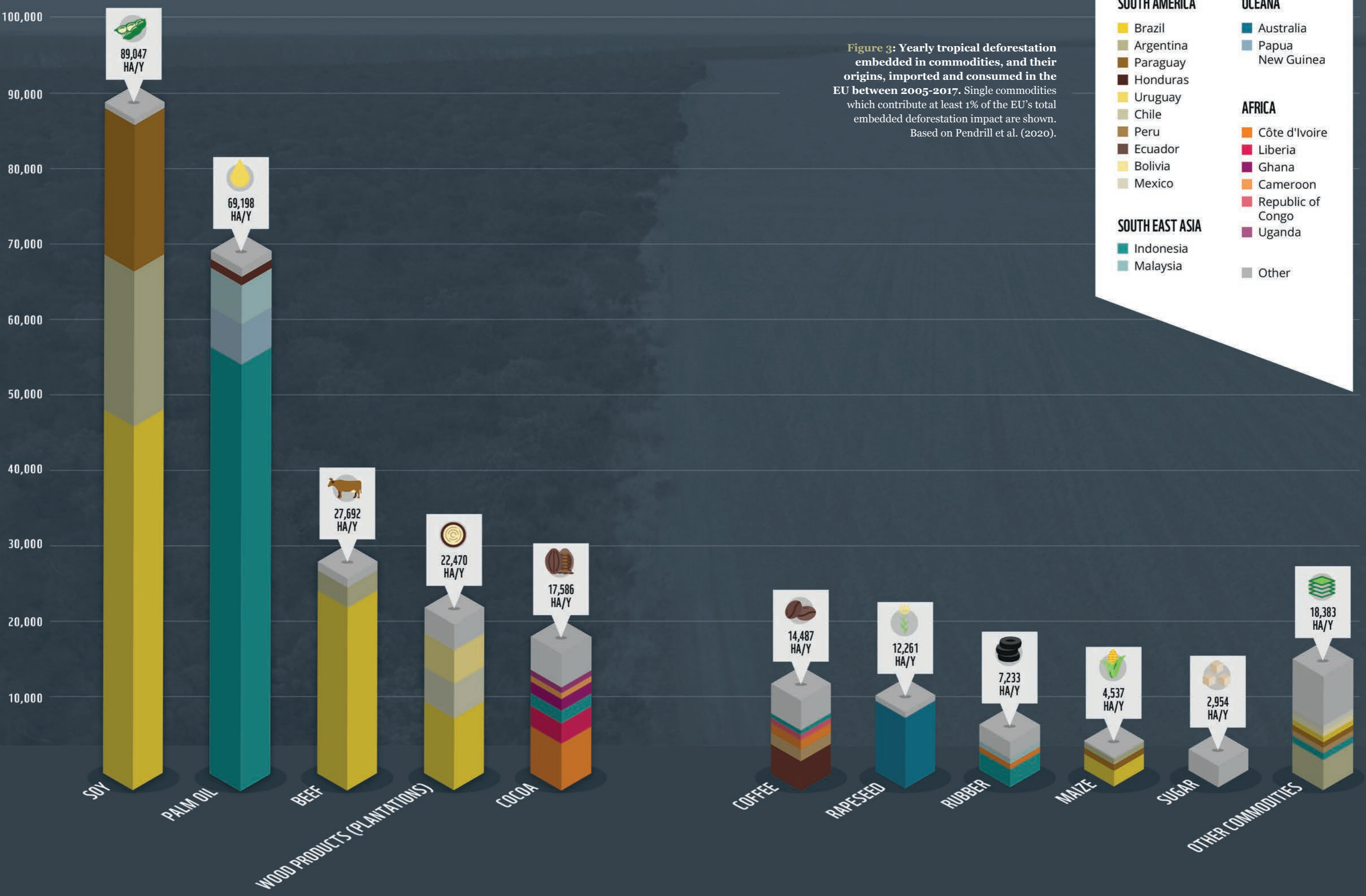
For some of these commodities and/or sources, such as soy from Brazil, the EU's relative deforestation impact was greater than China's, even though China is the larger market. Over the period 2009–2018, Trase data showed that the EU's imports of Brazilian soy led to 1.5 hectares of deforestation and conversion per 1,000 tonnes, compared to 0.75 hectares per 1,000 tonnes for China.²¹ This difference is because the EU's imports are more often sourced from frontiers of deforestation and conversion, such as the Cerrado. The same pattern holds in the case of Argentinian soy, but is reversed in the case of Brazilian beef, where China's deforestation impact (59 hectares per 1,000 tonnes) is double that of the EU (27 hectares per 1,000 tonnes).²²

All of the above results may, however, represent an underestimate of imported deforestation and do not account for conversion of non-forest ecosystems associated with EU consumption (see "Limitations of the study").

21. Trase, 2020b. Trase yearbook 2020: the state of forest-risk supply chains. insights.trase.earth/yearbook/summary
 22. Trase, 2020b

BETWEEN 2005–2017, MORE THAN 80% OF TROPICAL DEFORESTATION WAS CONCENTRATED IN JUST SIX COMMODITIES:





- SOUTH AMERICA**
 - Brazil
 - Argentina
 - Paraguay
 - Honduras
 - Uruguay
 - Chile
 - Peru
 - Ecuador
 - Bolivia
 - Mexico
- SOUTH EAST ASIA**
 - Indonesia
 - Malaysia
- OCEANIA**
 - Australia
 - Papua New Guinea
- AFRICA**
 - Côte d'Ivoire
 - Liberia
 - Ghana
 - Cameroon
 - Republic of Congo
 - Uganda
- Other**

2 EU DEMAND DRIVES CONVERSION IN DEFORESTATION FRONTS

The import of products such as soy, beef, cocoa and palm oil into the EU is associated with production located in agricultural frontiers, where farmland, plantations and pastures are expanding into sensitive natural ecosystems. Analysis using the data from Trase shows the impact of EU consumption on particular regions in South America.

DEFORESTATION FRONTS

A recent WWF report²³ identifies 24 active deforestation fronts, nine in Latin America, eight in Africa, and seven in Asia and Oceania. Over 43 million hectares were lost in these fronts between 2004 and 2017, accounting for over half (52%) of all deforestation in

23. Pacheco et al., 2021

tropical and subtropical regions in this period. Among the direct drivers, commercial agricultural expansion continues to have the largest influence on deforestation, mainly in Latin America and Asia, while the contribution of smallholders keeps growing. In Africa, small-scale agriculture is the primary driver, increasingly including cash crops for export.

Data used in this report could not directly be overlaid on the WWF deforestation fronts. However, the analysis based on Trase

data establishes clear links between EU consumption, particularly of soy and beef, and several of these fronts – the Cerrado and Amazon in Brazil and the Chaco in Argentina and Paraguay. Trase data is not exhaustive, so EU consumption is likely also to drive forest and ecosystem loss in other deforestation fronts. The global data presented in Figure 3 shows a considerable deforestation associated with EU cocoa imports from West Africa, Central Africa and Indonesia and palm oil imports from

Indonesia, Malaysia and Papua New Guinea. Both small- and large-scale agriculture for cocoa and palm oil are identified as key drivers in deforestation fronts identified in these regions.

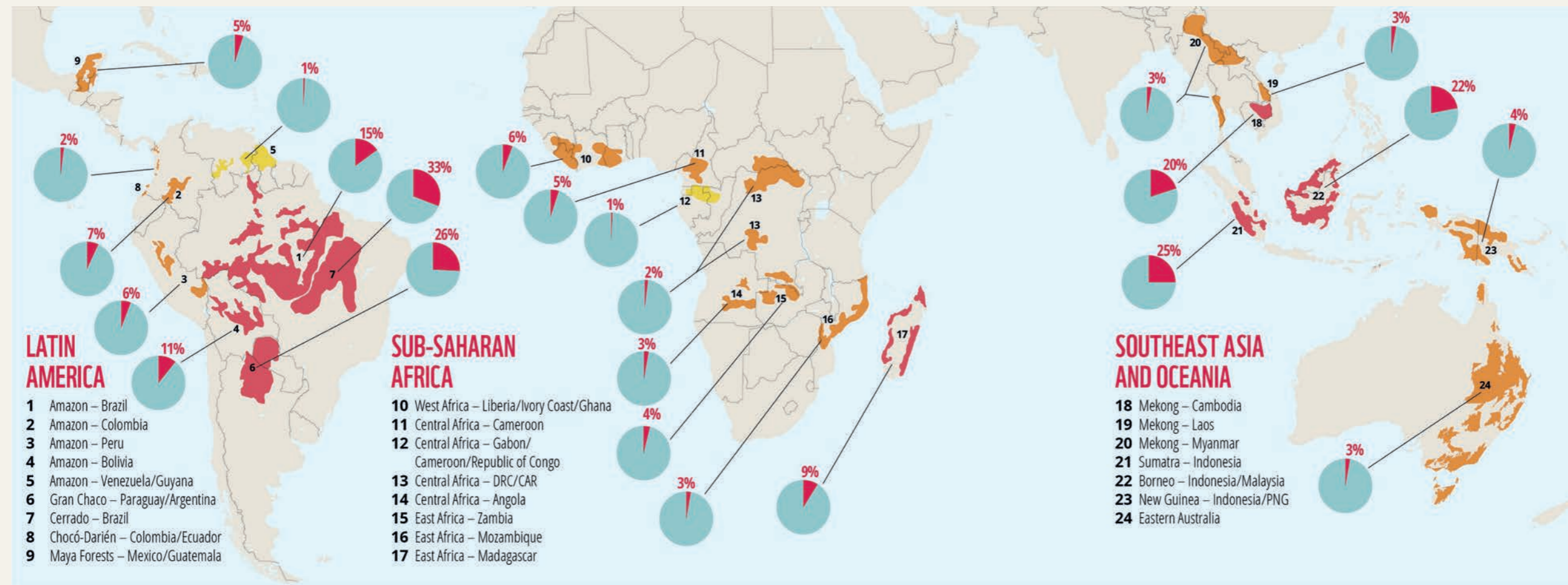


Figure 4: 24 global deforestation fronts with average annual deforestation rates. Source: Pacheco et al., 2021. These 24 deforestation fronts include fronts with established links with the EU market as analysed by Trase (Brazilian Amazon, Cerrado, Gran Chaco) and presumed links (West Africa, Central Africa, Papua New Guinea, Sumatra and Borneo).

Average annual deforestation rate for whole deforestation front

- Low <0.1%
- Medium 1-5%
- High >5%

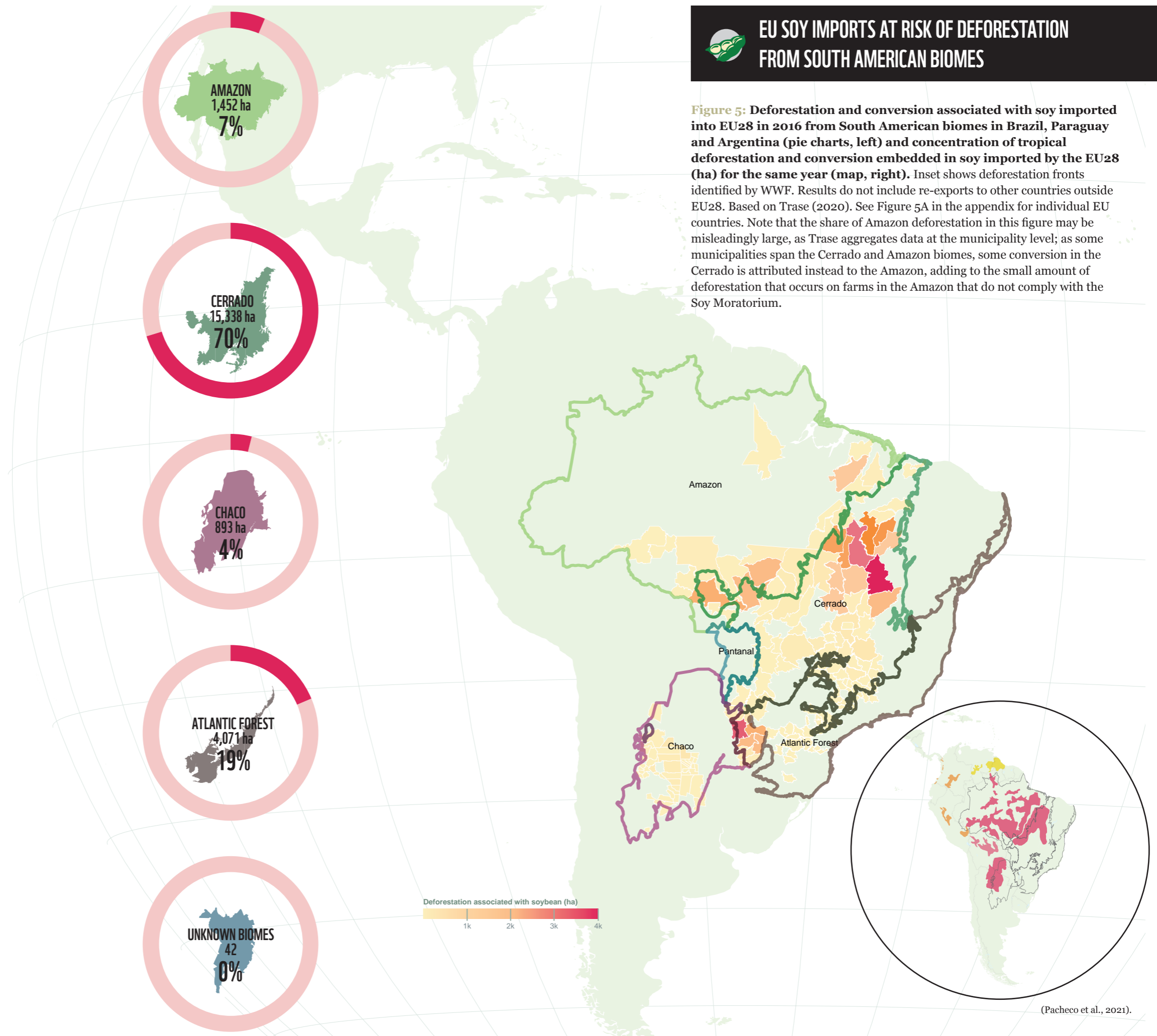
Deforestation 2004-2017 as a percentage of forest area in 2000

According to Trase, imports of soy from South America into the EU in 2018 came from the Cerrado (23%, 4.8Mt), the Atlantic Forest (22%, 4.5Mt), the Amazon (11%, 2.2Mt) and the Chaco (4%, 0.76Mt). The remaining 40% came from other biomes such as the Pampas and Espinal in Argentina and unknown sources due to a lack of visibility in the supply chain (see “Limitations of the study”). In 2017, beef imports from South America were mostly sourced from the Cerrado (37%, 69,797 tonnes), the Atlantic Forest (16%, 29,507 tonnes), the Amazon (7%, 13,880 tonnes), the Chaco (3%, 7,478 tonnes) and other biomes, including the Pampas and the Pantanal, or unknown sources (37%).

Accordingly, EU-driven deforestation and conversion in South America is largely concentrated in the Cerrado for both soy and beef, followed by the Atlantic Forest for soy (Figures 5, see Table 3A). The impact of EU commodity demand on deforestation and conversion in the Chaco is currently limited but risks increasing as this frontier expands.

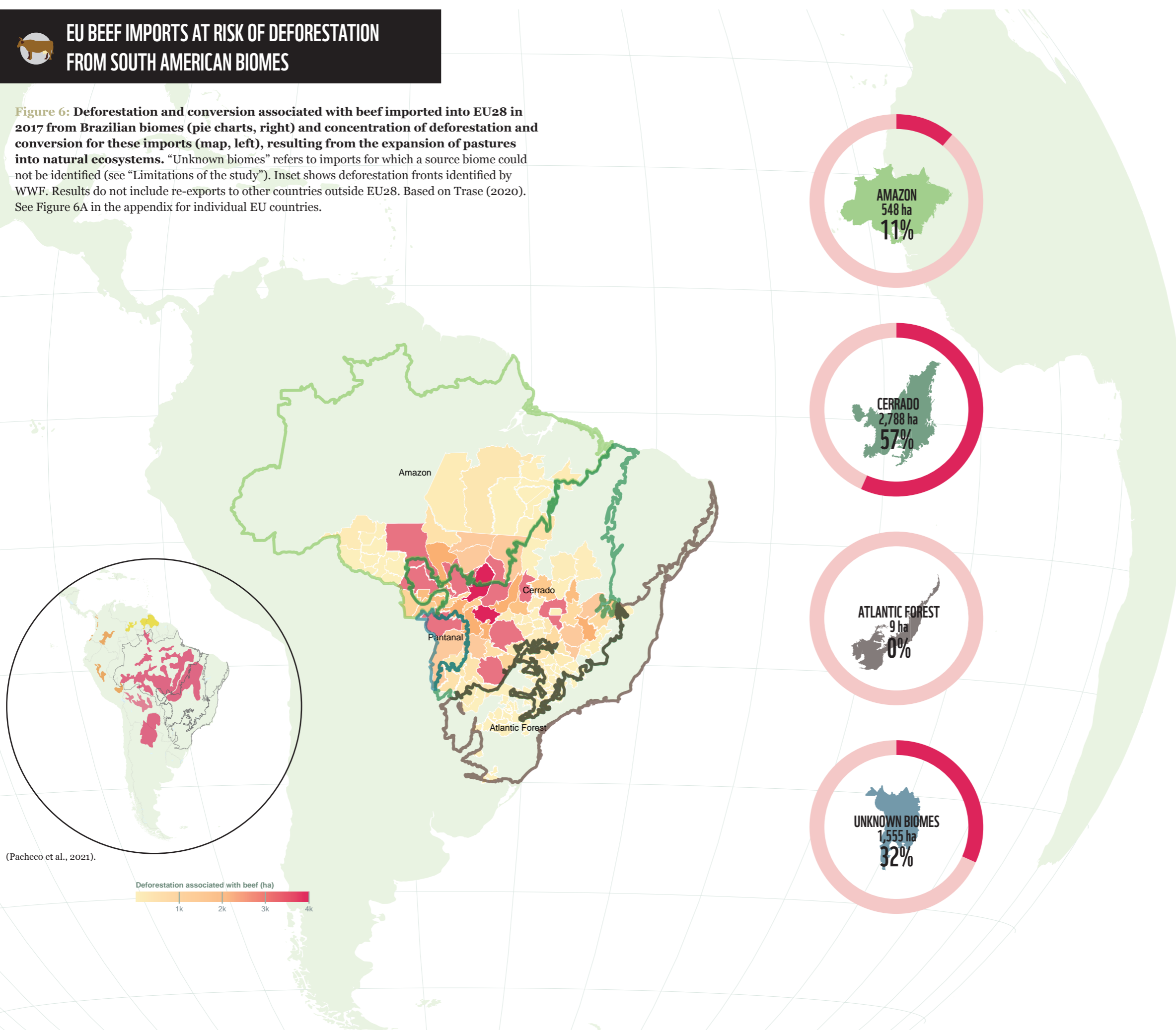
The Amazon Soy Moratorium has dramatically reduced direct deforestation for soy in the Amazon since 2006, and is widely regarded as one of the most successful examples of a market intervention to reduce deforestation.²⁴ However, low levels of deforestation for soy persist in the biome in a small number of non-compliant farms: in 2018, 64,316 hectares of soy was found on land converted after the Moratorium came into force. This represents a comparatively small amount relative to total deforestation in those municipalities (less than 5% of total deforestation)²⁵ and to conversion for soy in the Cerrado (73,348 hectares in 2017 alone).²⁶

24. Gibbs, H.K. et al. 2015. Brazil's Soy Moratorium. *Science* 347(6220): 377-378; Heilmayr, R. et al. 2020. Brazil's Amazon Soy Moratorium reduced deforestation. *Nature Food* 1: 801-810.
 25. Abiove. 2018. Soy Moratorium Report 2018. abiove.org.br/wp-content/uploads/2019/01/Soy-Moratorium-Report-2018.pdf
 26. trase.earth

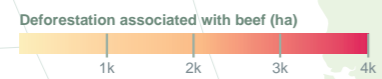


EU BEEF IMPORTS AT RISK OF DEFORESTATION FROM SOUTH AMERICAN BIOMES

Figure 6: Deforestation and conversion associated with beef imported into EU28 in 2017 from Brazilian biomes (pie charts, right) and concentration of deforestation and conversion for these imports (map, left), resulting from the expansion of pastures into natural ecosystems. “Unknown biomes” refers to imports for which a source biome could not be identified (see “Limitations of the study”). Inset shows deforestation fronts identified by WWF. Results do not include re-exports to other countries outside EU28. Based on Trase (2020). See Figure 6A in the appendix for individual EU countries.



(Pacheco et al., 2021).



Within deforestation fronts, conversion is concentrated in a limited number of localities

Using Trase data, we can zoom in further by following supply chains back to the locality²⁷ where the commodity was produced. From this, we can see that a small proportion of localities account for the majority of deforestation and conversion embedded in EU imports.

For soy (Figure 5), 80% of the deforestation and conversion attributed to EU imports occurs in less than 2% of localities (38 from a total of 2,456 localities that produce soy in Brazil, Argentina and Paraguay). These overlap with the deforestation fronts identified in the Amazon, Cerrado and Chaco. For beef (Figure 6), 80% of the deforestation and conversion attributed to EU imports occurs in 3.5% of localities (90 from a total of 2,547 localities with cattle herds in Brazil and Paraguay), overlapping with the Amazon and Cerrado deforestation fronts.

While the above examples are just a snapshot of supply chains for soy and beef from certain biomes, they highlight the potential for consumer countries to accelerate changes on the ground. Improved traceability and transparency bring our understanding of the EU’s impacts much closer to specific areas of production, and can help us better understand and address the underlying drivers of deforestation and conversion in specific commodity supply chains at regional level and localities and develop better integrated approaches to address the problems.

27. As municipalities in Brazil and departments in Argentina and Paraguay. Note that localities may span surfaces equivalent to small EU countries such as Luxembourg (2,600km²) up to Slovenia (20,300km²).

The **Brazilian Cerrado**, which covers over 200 million hectares of dry forests, gallery forests, woody and shrubby savannah and grasslands, is the world's most biodiverse savannah. The Cerrado plays an essential role in supporting Brazil's water cycle as the source of 8 of the country's 12 river basins. As cattle ranching and large-scale agriculture have expanded rapidly across the region over the past four decades, around half its original vegetation has been lost.²⁸

Nearly 10 million hectares of native vegetation, including 3 million hectares of forests (around a third of the total forested area in the year 2000), was converted between 2004 and 2017. Ongoing clearing may reduce rainfall and increase local temperatures, putting remaining vegetation, livelihoods and continued agricultural production in the region at risk.

The Cerrado has long been Brazil's environmental "sacrifice zone", due to the relatively weak protection provided under the Forest Code and the protected areas system. As a result, most deforestation and conversion in the Cerrado is permissible under law.²⁹

28. www.worldwildlife.org/ecoregions/nt0704
29. Pacheco et al., 2021



3 ZERO-DEFORESTATION COMMITMENTS AND CERTIFICATION SCHEMES HAVE NOT ALWAYS DELIVERED CLEAR IMPACT

Private sector commitments are highly variable and patchy in their coverage among commodities and biomes

According to Trase, a majority of EU imports of soy from South America (62% in 2018) were covered by an exporter's zero-deforestation commitment³⁰ or supply-side initiative (Amazon Soy Moratorium), unlike South American beef (19% of imports in 2017) (Figure 7, Table 3A in Appendix). Not all biomes show the same zero-deforestation commitment coverage: the Amazon biome in Brazil had the largest coverage at 97% of traded volume of soy (in 2018) and beef (in 2017). South American soy was widely traded under a company zero-deforestation commitment in 2018 in the Cerrado (72%, or 3.5 million tonnes), Chaco (63%, 0.48 million tonnes) and Atlantic Forest (46%, 2.1 million tonnes). Beef from Brazil and Paraguay had much lower coverage in 2017 in the Cerrado (25%, or 17,600 tonnes), and none in the Chaco and Atlantic Forest, which encompass all beef exports from Paraguay.

Many private sector zero-deforestation commitments have not delivered the desired impact

The effect of private sector zero-deforestation commitments on reducing deforestation in commodity supply chains still remains to be seen in many cases.

The Amazon Soy Moratorium, adopted in 2006, contributed to a dramatic reduction in deforestation directly related to soy conversion in the Brazilian Amazon. In the two years preceding the agreement, 30% of soy expansion

30. A company was considered to have a zero-deforestation commitment when it had made a publicly available commitment to zero net or zero gross deforestation or to zero conversion on its website or in company documents (including future targets). Commitments had to explicitly include the commodity and apply to the country in question.

occurred through deforestation rather than replacing pasture or other previously cleared lands. By 2014, deforestation for soy had decreased to about 1% of expansion in the Amazon biome.³¹ Public investments in property registries and monitoring deforestation and soy expansion played a critical role in enabling its effectiveness and credibility.³²

In the case of soy from the Cerrado, despite reliable available annual data on land-use change, company zero-deforestation/conversion commitments³³ have not significantly reduced embedded deforestation and conversion (Figure 8).³⁴ Individual corporate commitments are more recent (post-2014) but there is no evidence of additional reductions in companies' deforestation/conversion per unit of sourced soy in the years after adopting a zero-deforestation commitment.

Globally, the annual assessment of 350 of the most influential companies in forest-risk supply chains by Forest 500 in 2020 concludes that although some leading companies have made progress towards removing deforestation from their supply chains, the necessary sector-wide transformation has not yet occurred. Only 25% of companies have a commitment for all the high-risk commodities they are exposed to, only 34% of those with a commitment are reporting progress, and 34% do not have any commitment.³⁵

Government and international commitments to halt deforestation in supply chains by 2020 have missed their targets

Next to private sector commitments, there are also a number of commitments made by or including governments. The 2014 New York Declaration on Forests, signed by companies, governments and civil society, included a commitment to "...help meet the private-sector goal of eliminating deforestation from the production of agricultural commodities" by 2020; an assessment in 2020 showed that the goal was ultimately not met.³⁶ Similarly, the target of "halting deforestation by 2020" under the Sustainable Development Goal 15 "Life on land"³⁷ was also not achieved.

Building on the New York Declaration on Forests, Denmark, France, Germany, the Netherlands, the UK and Norway (later joined by Italy) launched the Amsterdam Declarations Partnership to support private and public sector commitments to achieve fully sustainable and deforestation-free agro-commodity supply chains as well as a fully sustainable palm oil supply chain by 2020. As agriculture supply chains were not free from deforestation by 2020, in January 2021, the countries renewed their commitment to eliminate deforestation in relation to agriculture commodities by 2025 and to "support a strengthened action at EU level to achieve sustainable and deforestation-free agricultural commodity supplies". In 2021 Belgium and Spain joined the Amsterdam Declarations Partnership.³⁸

31. Gibbs, H.K. et al. 2015.
 32. Heilmayr, R. et al. 2020.
 33. Some but not all of the company commitments analysed in the study encompass non-forest ecosystems
 34. Zu Ermgassen, K.H.J. et al. 2020. Using supply chain data to monitor zero deforestation commitments: an assessment of progress in the Brazilian soy sector. Environmental Research Letters 15(3): 035003
 35. Thomson, E. 2020. Time for change: delivering deforestation-free supply chains. Global Canopy, Oxford, UK.

36. forestdeclaration.org/goals#goal-2
 37. sdgs.un.org/goals/goal15
 38. Amsterdam Declarations Partnership. 2021. Statement of Ambition 2025. ad-partnership.org/wp-content/uploads/2021/02/AD-Partnership-Ambition-Statement-2025.pdf

1 IN 3 OF THE MOST INFLUENTIAL COMPANIES IN FOREST-RISK SUPPLY CHAINS HAVE NO ZERO-DEFORESTATION COMMITMENT

Figure 7: Zero deforestation commitments (ZDCs) from the private sector linked to the exports of commodities to the EU28 from South America (volume in tonnes for soy in 2018, top; beef in 2017, below). ZDCs here cover those made either by an exporter or through supply-side initiatives such as the Soy Moratorium, TAC and G4 in Brazil. "Unknown biome" represents the traded volume of a commodity whose biome of origin could not be established. "Not assessed" refers to traders whose policies have not been assessed, some of which may have a zero-deforestation commitment. Based on Trase (2020).

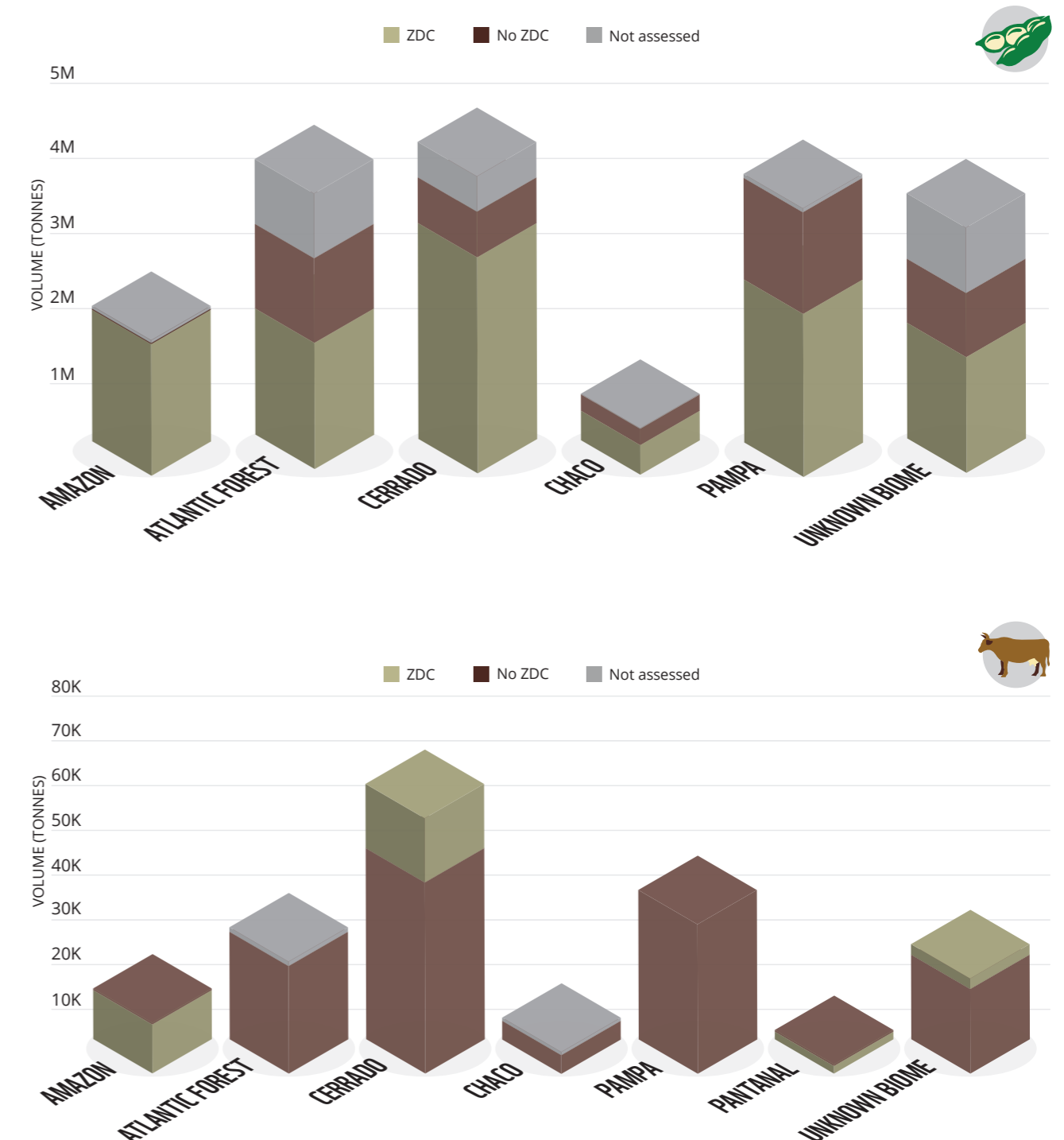
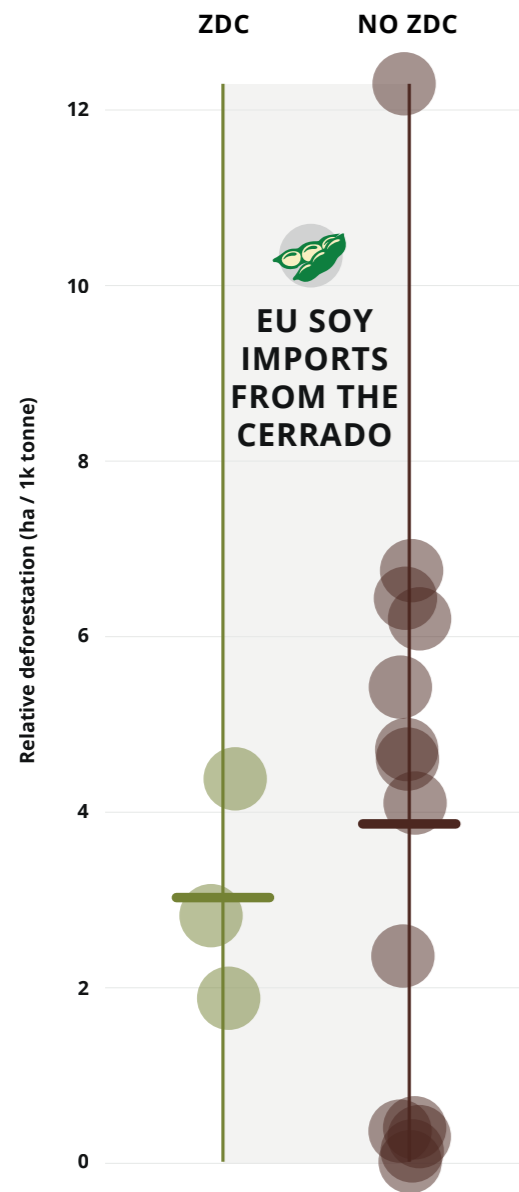


Figure 8: The deforestation/conversion caused per 1,000 tonnes of soy sourced in the Cerrado by companies importing soy into the EU28 (2016).



Commodity certification schemes show ambiguous outcomes in reducing forest cover loss and have uneven uptake in the EU

Certification of products aims to drive more sustainable consumption in the EU market. Such schemes rely on a set of environmental and social criteria which can differ greatly based on the commodity, and may not necessarily require that supply chains be deforestation and/or conversion free. Not all certified products can be traced back to a certified supplier; schemes may allow companies to mix certified and non-certified material or purchase a volume of certified commodities corresponding to some or all of what they use, even though the actual ingredients in their products may not come from a certified source. Such systems are therefore insufficient to demonstrate that materials in the supply chain are deforestation and conversion-free. The consumption and coverage of credibly certified commodities is highly variable amongst EU countries.³⁹

Globally, voluntary certification schemes have limited market share. Up to a third of cocoa production is grown under a third-party certification scheme,⁴⁰ 19% of palm oil is certified under the Roundtable on Sustainable Palm Oil (RSPO),⁴¹ and only 1% of soy is certified under the Round Table on Responsible Soy (RTRS).⁴² Certification schemes have been widely scrutinized, and the results show ambiguous outcomes in reducing forest cover loss – in some cases, certification resulted in lower forest cover loss, but in others it had no measurable impact. Overall, certification in coffee and palm oil have reduced rates of tree-cover loss in certified farms in some specific settings, with the caveat that certification of oil palm plantations tends to occur in places that experienced higher pre-certification rates of forest-cover reduction;⁴³ there is no evidence on whether voluntary standards have wider effects on deforestation outside the boundaries of certified areas.⁴⁴

39. IDH. 2019. The urgency for action against deforestation. www.idhsustainabletrade.com/uploaded/2019/06/IDH_Urgency-of-action.pdf
 40. Fountain, A.C. and Hütz-Adams, F. 2020. 2020 Cocoa Barometer. www.evidensia.eco/resources/2101/cocoa-barometer-2020
 41. www.rspo.org/about [accessed 26 August 2020].
 42. responsiblesoy.org/impacto?lang=en and www.fao.org/faostat/en/#data/QC
 43. Carlson, K. et al. 2018. Effect of oil palm sustainability certification on deforestation and fire in Indonesia. *PNAS* 115 (1) 121-126
 44. Komives, K. et al. 2018. *Conservation impacts of voluntary sustainability standards: How has our understanding changed since the 2012 publication of Toward sustainability: The roles and limitations of certification?* Meridian Institute, Washington, DC.



© Martina Lippuner / WWF-Africa

4 To reduce the pressure on nature, solutions need to go beyond forests

A narrow focus on forests ignores the problem of conversion in other ecosystems

While tropical forests receive a lot of attention, non-forest ecosystems also have extremely rich, unique and threatened biodiversity. In addition to supporting large herds of wild animals and thousands of endemic species of plants, grasslands and savannahs are critical for global food security. Communities depend upon grasslands to raise their livestock and maintain their rural livelihoods and cultures.

As for forests, the biggest drivers of conversion in other ecosystems are commodity crop production for animal feed, energy crops and human consumption, cattle ranching and plantations.

Some of the most significant impacts of EU consumption are already concentrated in landscapes that do not classify as forests, as in parts of the Cerrado and Chaco. EU demand may also be driving conversion of other less scrutinized ecosystems. For example, the EU also imports significant quantities of soy from the US, where agricultural expansion threatens the Northern Great Plains⁴⁵: half of the prairie area, one of only four remaining intact temperate grasslands in the world, has already been converted to agriculture and pasture.

As such, it is crucial that the EU takes measures to prevent further conversion not only of forests but of all natural ecosystems.

Integrated approaches across regions and sectors are needed to prevent destruction of other ecosystems, displacement or leakage

Shifting sourcing away from a particular region, or substituting commodities linked with conversion, may simply displace conversion pressure onto ecosystems in other parts of the world (leakage). To overcome this risk, legislation and market policies and commitments should avoid focusing exclusively on a single biome but consider all major landscapes affected by conversion-risk commodities. They should apply consistent cut-

45. WWF. 2020. Plover Print. c402277.ssl.cf1.rackcdn.com/publications/1359/files/original/PloverprintReport_2020_FINAL_08042020.pdf?1596569610

off dates after which no conversion is permitted and transparent monitoring, reporting and verification systems.

The same holds true across commodity sectors. Uniform conditions and cut-off dates across sectors are needed to avoid unwanted leakage effects from one commodity to another. A common baseline across biomes and sectors would deter further conversion, as no commodities produced on converted lands would be allowed to be placed on the EU market.

Integrated approaches should also support efforts to optimize production on already degraded lands and reduce the overall land footprint, rather than expanding into natural ecosystems. In Brazil, researchers estimate that while the country is poised to undergo a massive expansion of agricultural production over the coming decades, this can be done without further conversion of natural ecosystems. Increased productivity in cultivated pasturelands could meet demands for meat, crops, wood products and biofuels until at least 2040.⁴⁶

46. Strassburg, B. et al. 2014. When enough should be enough: Improving the use of current agricultural lands could meet production demands and spare natural habitats in Brazil. *Global Environmental Change* 28: 84-97

70%
OF SOY-DRIVEN AND
57%
BEEF-DRIVEN DEFORESTATION AND CONVERSION FOR EU IMPORTS ORIGINATES IN THE CERRADO

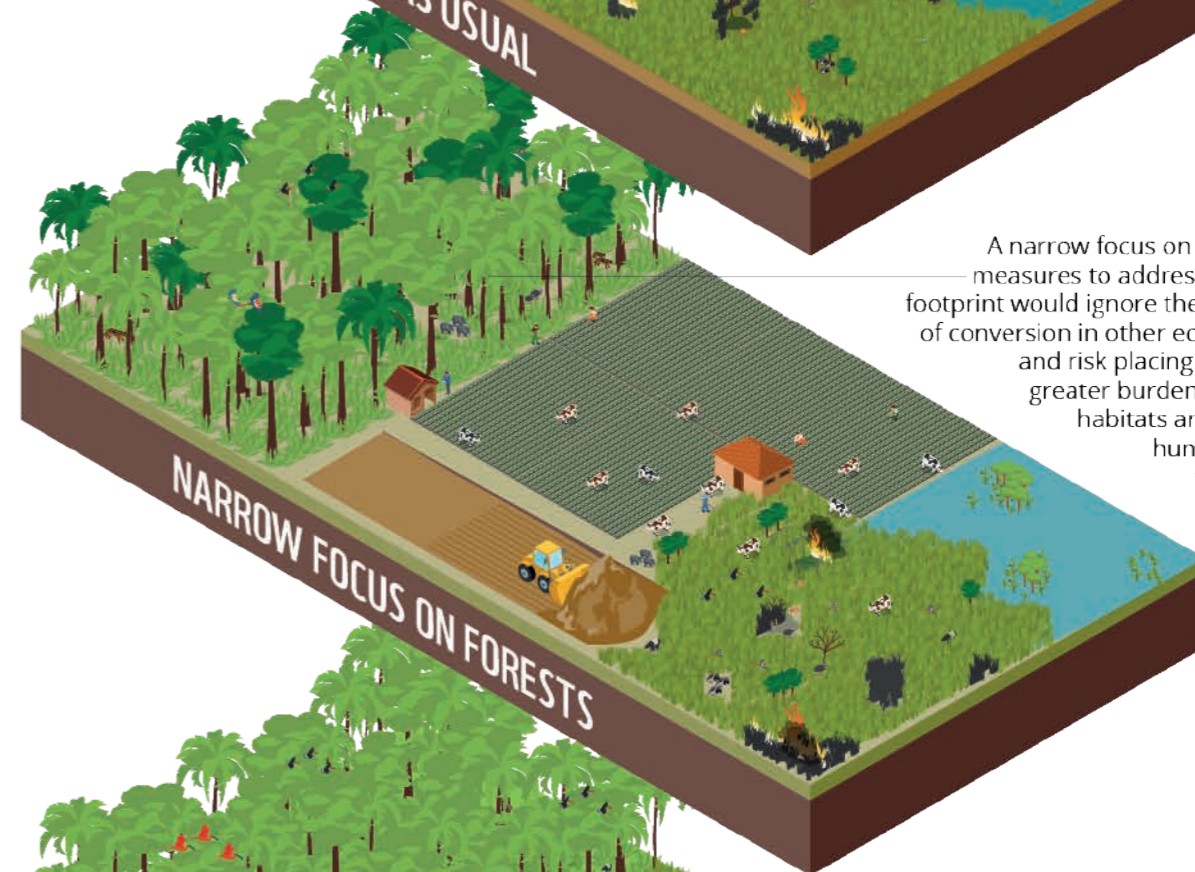
WHY THE EU LEGISLATION SHOULD INCLUDE FOREST AND NON-FOREST ECOSYSTEMS



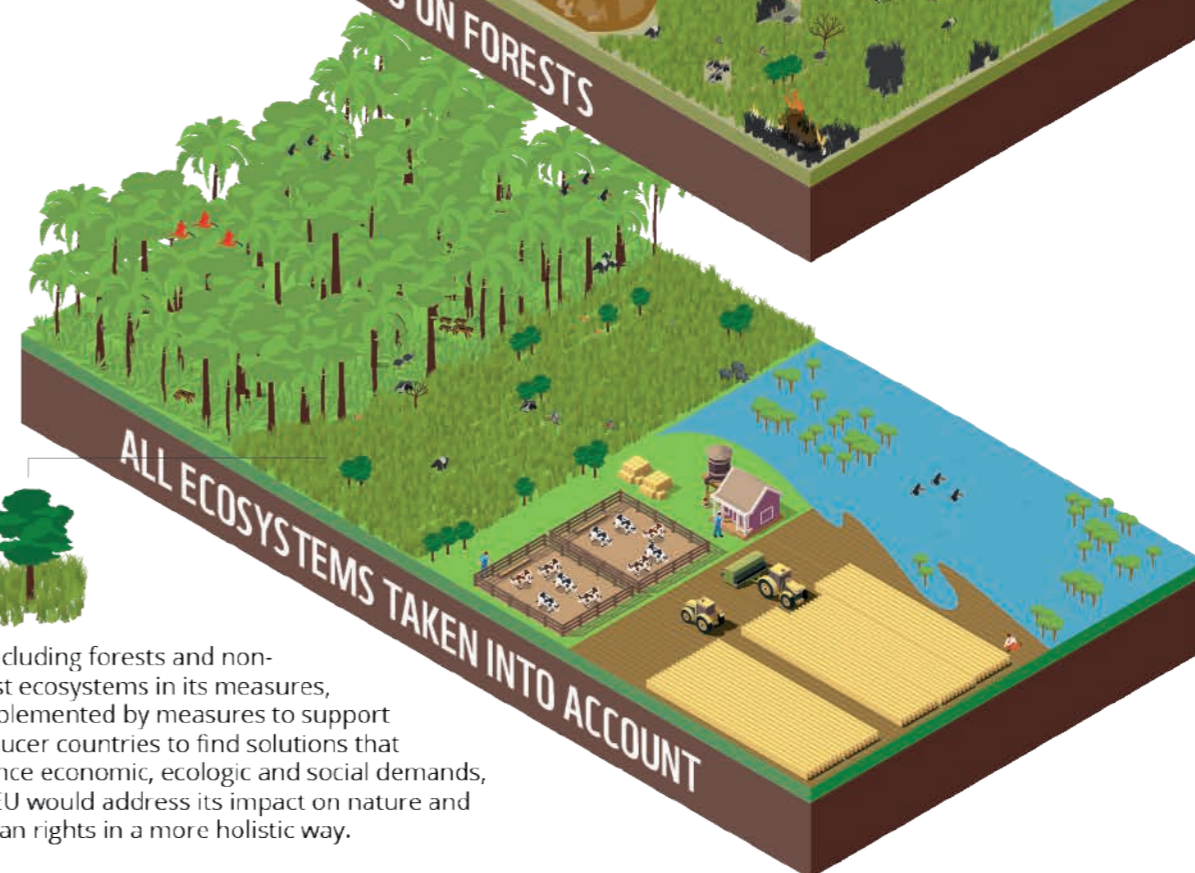
EU consumption of agricultural commodities is contributing to the destruction of forests and other natural ecosystems, including grasslands and wetlands, as well as human rights violations

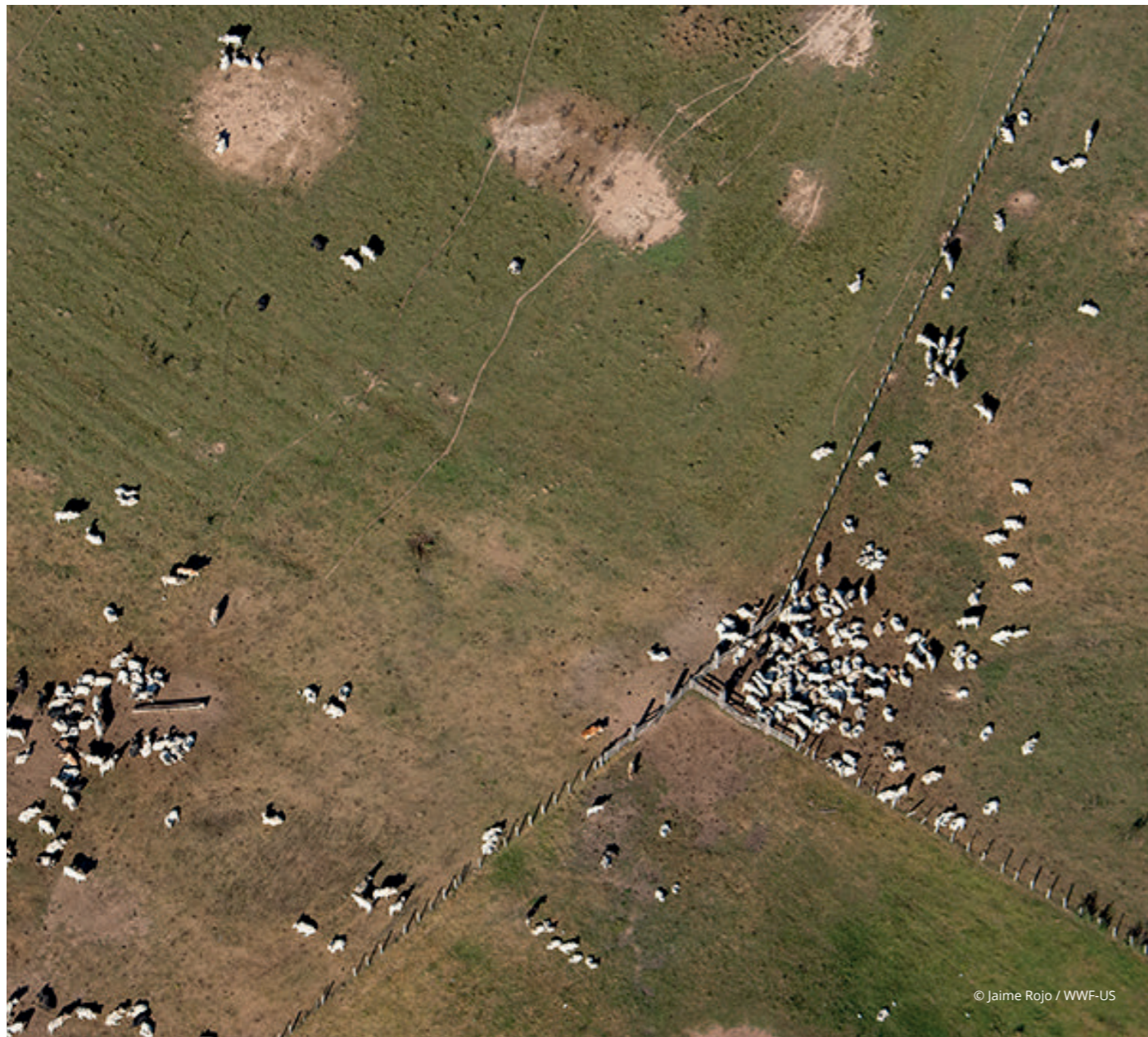


A narrow focus on forests in measures to address the EU's footprint would ignore the problem of conversion in other ecosystems and risk placing an even greater burden on these habitats and related human rights violations



By including forests and non-forest ecosystems in its measures, complemented by measures to support producer countries to find solutions that balance economic, ecologic and social demands, the EU would address its impact on nature and human rights in a more holistic way.





© Jaime Rojo / WWF-US

5 URGENT ACTION IS NEEDED AS AGRICULTURE EXPANDS INTO NEW FRONTIERS

Global markets are putting increasing pressure on remaining intact areas of tropical forest and non-forest ecosystems around the world

Increasing demand for commodities from the EU and emerging markets such as China and India, coupled with infrastructure development, is creating new conversion frontiers as agriculture expands further into forests and other ecosystems.

Measures to address the EU's overseas footprint need to take account of these emerging frontiers, in addition to those where most deforestation and ecosystem conversion has occurred to date.

Large-scale commercial agriculture is a primary and increasing driver of forest and ecosystem conversion in the Chaco, Cameroon and the Mekong. Small-scale agriculture, including for cash crops destined in part for export markets, is increasingly driving deforestation and conversion in frontiers in West and Central Africa, and the Mekong region. Cattle ranching is driving deforestation in the Amazon, Eastern Australia and the Chaco.⁴⁷

47. Pacheco et al., 2021.

Table 2. Analysis of drivers for 24 global deforestation fronts (Source: Pacheco et al., 2021)

		Cattle ranching	Large-scale agriculture	Smallholder farming	Tree plantations	Large-scale logging	Small-scale timber extraction	Fuelwood and charcoal	Mining operations	Transport infrastructure	Hydroelectric power	Urban expansion	Fires
Deforestation front		Agriculture and plantations			Extractive activities			Infrastructure expansion			Other		
Amazon	Brazil	↗	→	→		↘	↘		→	↗	↗		↗
	Colombia	↗		↗			↗		↘	↗			
	Peru	↗	→	↗		↗	↗		↗	↗			
	Bolivia	↗	↗	↗		→	↘		↗	↗	↗		↗
	Venezuela/Guyana	→	→	→		→			↗				
Gran Chaco	Paraguay/Argentina	↗	↗	→			→						
Cerrado	Brazil	→	→					→	↗				→
Chocó-Darién	Colombia/Ecuador	↗	↗	↗				↗	↗			→	
Maya Forests	Mexico/Guatemala	↗	↗	↗		↘	→	→				↗	→
West Africa	Liberia/Ivory Coast/Ghana		↘	↗			→	→	↗	↗			
Central Africa	Cameroon	→	↗	↗		↗	↗	→	↗	↗		→	
	Gabon/Cameroon/Republic of Congo		↗	↗		→		↗	→	↗		↗	
	DRC/CAR		↗	↗		→	→	→	↗	↗			
	Angola		↗	↗	→	↗	→	↗	→	↗		↗	↗
East Africa	Zambia	↗		↗			↗	↗	↗	↗			↗
	Mozambique		→	→			→	→				→	→
	Madagascar	→		→			→	↗	→	→			↗
Mekong	Cambodia		↗	↗	↗	↘	↗	↗	→	↗	→	↗	→
	Laos		↗	↗	↗	↘	↗	↗	→	↗	→		
	Myanmar		↗	↗		↗	→	↗	↗	↗	↗		
Indonesia	Sumatra		↗	↗	↗		↘		→	↗		→	↗
Borneo	Indonesia/Malaysia		↗	↗	↗		↘		→	↗		→	↗
New Guinea	Indonesia/PNG		↗	↗	↗	↗			→	↗			→
Eastern Australia		↗	↗		↗	↗			→	→		→	↗

Relative influence

- Primary cause of forest loss and/or severe degradation
- Important secondary cause of forest loss and/or severe degradation
- Less important cause of forest loss and/or severe degradation

Trends

- Increase
- Decrease
- Stable

The evolution of these deforestation frontiers is likely to follow the development of more established agricultural producing regions. Producers from older agricultural frontiers may move to new regions – sometimes crossing international borders – where land prices are lower, setting the stage for an influx of people, capital investment and the development of infrastructure.⁴⁸ This process has been documented in South America,⁴⁹ and may also extend further into Africa.⁵⁰

One example of a frontier that may undergo large-scale conversion in the coming years is the Chaco in South America. Typically in South America, land is initially cleared for cattle pasture, which is often followed by soybean and maize (as seen in Brazil). The Paraguayan Chaco has only recently been ramping up soybean production, which may expand further due to global demand facilitated by expanding road networks and waterways.⁵¹ Global demand, particularly from the EU market, is also increasing soybean production in the Argentinian Chaco.

Legal protections are not sufficient

Deforestation and ecosystem conversion often have deep and complex roots, and addressing illegality alone will not necessarily reduce

conversion significantly. While deforestation and conversion are often accompanied by the expansion of illegal and/or informal economies,⁵² current protections still allow for large-scale legal conversion. A recent IUCN review of forest laws in Argentina, Paraguay and Brazil concluded that, even with zero illegal deforestation, 7 million hectares of land in Paraguay, 10.5 million hectares in Argentina and 88 million hectares in Brazil could still be legally deforested.⁵³

Without strong environmental protections, demand-side measures in consumer countries, including the EU, are all the more important. As well as addressing the degradation and conversion of forests and other ecosystems, whether legal or illegal, these should provide support for producing countries to address underlying drivers.

52. Pacheco et al., 2021

53. Van Dam, J, et al. 2019. *An analysis of existing laws on forest protection in the main soy producing countries of Latin America*. IUCN. www.iucn.nl/files/publicaties/an_analysis_of_existing_laws_on_forest_protection_ja_final.pdf. See also Soares-Filho, B. et al. 2014. Cracking Brazil's Forest Code. *Science* 344(6182): 363-364.

48. Le Polain de Waroux, Y. 2019. Capital has no homeland: The formation of transnational producer cohorts in South America's commodity frontiers. *Geoforum* 105: 131–144, doi: 10.1016/j.geoforum.2019.05.016

49. Le Polain de Waroux, 2019.

50. Arvor, D. et al. 2017. Land use sustainability on the South-Eastern Amazon agricultural frontier: Recent progress and the challenges ahead. *Applied Geography* 80: 86–97, doi: 10.1016/j.apgeog.2017.02.003

51. Henderson et al., in review

BETWEEN 2004 AND 2017, 5.2 MILLION HECTARES OF FOREST IN THE GRAN CHACO WERE CONVERTED TO CROPLAND AND PASTURE



The **Gran Chaco** is a mixed landscape ranging from dry forest, woodlands and grasslands to flooded savannahs. It stretches across 107 million hectares spanning Argentina, Paraguay and Bolivia – an area almost 1.5 times the size of France. The deforestation front of the Chaco in Paraguay and Argentina covers 46.3 million hectares.

It has one of the highest rates of deforestation and conversion in the world, driven particularly by soybean production and large-scale cattle ranching.

Between 2004 and 2017, 5.2 million hectares of forest, representing more than a quarter (26.1%) of the total forest area in 2000, were converted to cropland and pasture.



© Jason Houston/WWF-US

III. RECOMMENDATIONS

This report shows that the EU, through its consumption of commodities, can be linked to the destruction of forests and other ecosystems beyond its borders.

Action is urgently needed. The EU, together with other countries, committed to halt deforestation by 2020 under the Sustainable Development Goals – and although 2020 has gone by, we are far from achieving this goal.

In the face of the shortcomings of voluntary government and corporate commitments, new legislation in the EU is urgently needed to stop the destruction of forests and other ecosystems, together with other complementary measures such as support to producing countries.

The following is a summary of WWF's asks for the development of new legislation at the EU level.⁵⁴

1 PRODUCTS AND COMMODITIES PLACED ON THE EU MARKET ARE SUSTAINABLE INSTEAD OF ONLY BEING "LEGAL" ACCORDING TO THE COUNTRY OF ORIGIN

Commodities and products placed on the EU market should be sustainable: they should not be placed on the EU market if there are risks that they are produced in breach of the country of origin law. Commodities placed on the EU markets should meet the human rights related and environmental sustainability criteria laid down in EU legislation.

National laws to prevent deforestation and conversion in producer countries can be weak and/or lack the necessary provisions to protect

54. Our full position can be found online at wwf.eu/wwf_news/publications/?uNewsID=2175966

natural forests and ecosystems as well as the people whose livelihoods depend on them.

Limiting measures to legality will not meet the objectives outlined in the "EU communication on stepping up EU action to protect and restore the world's forests":⁵⁵ The first priority aims to reduce the EU consumption footprint on land and encourage the consumption of products from deforestation-free supply chains in the EU. Many ecologically sensitive regions of the world, including the Amazon, Cerrado and Chaco, either lack sufficient legal environmental protection, have experienced dismantling of laws, or are challenged with weakened enforcement of existing laws.

2 THE SCOPE OF EU LEGISLATION INCLUDES THE CONVERSION AND DEGRADATION OF NATURAL ECOSYSTEMS ALONGSIDE THE DEFORESTATION AND DEGRADATION OF NATURAL FORESTS

EU consumption is directly linked to the destruction and degradation of both natural forests and other natural ecosystems, including savannahs, wetlands and grasslands. While the current focus on forests recognizes their high carbon, biodiversity and social and cultural importance, these values are also relevant for other ecosystems.

The EU will be failing to take responsibility for its footprint if the scope of the law is limited

55. ec.europa.eu/info/publications/eu-communication-2019-stepping-eu-action-protect-and-restore-worlds-forests_en

to forests, and does not recognize the huge pressures on other ecosystems. Any measures to address the EU's footprint must encompass the conversion and degradation of all natural ecosystems.

3 BASED ON OBJECTIVE AND SCIENTIFIC CRITERIA, THE NEW LEGISLATION COVERS COMMODITIES AND PRODUCTS AT RISK OF BEING LINKED TO CONVERSION OR DEGRADATION OF NATURAL FORESTS AND ECOSYSTEMS

The EU is exposed to tropical deforestation through the import of a wide range of agricultural commodities. New legislation should therefore have a comprehensive range of commodities and products in its scope.

The inclusion of a commodity in new legislation should be based on objective and scientific criteria. Credible evidence should be used to identify those commodities with the highest risks of deforestation, forest degradation, ecosystem conversion and degradation, as well as human rights violations at global and/or EU level.

The European Commission-funded *Feasibility study on options to step up EU action against deforestation*⁵⁶ argues that all commodities with a spatial component (those which take

56. COWI. 2018. Feasibility study on options to step up EU action against deforestation. Luxembourg; Publications Office of the European Union. Feasibility study on options to step up EU Action against deforestation

up land to be produced) should be considered. In the first instance, new legislation should focus on agricultural commodities and derived products. Legislation should at least cover, but not be limited to, the following commodities and products: palm oil, soy, rubber, beef and leather, maize, cocoa, coffee, poultry, pork, beef, eggs, salmon and dairy.

New legislation addressing deforestation and ecosystem conversion should also include timber but not weaken the standards laid out in the EU Timber Regulation.

4 NO VIOLATION OF HUMAN RIGHTS IS LINKED TO THE HARVEST OR PRODUCTION OF COMMODITIES PLACED ON THE EU MARKET

Commodities and products placed on the EU market should not be linked to the violation of human rights, particularly land use and tenure rights of indigenous peoples and local communities. To address this, new legislation should build on international provisions such as the United Nations Declaration on the Rights of Indigenous Peoples,⁵⁷ the International Labour Organization Indigenous and Tribal Peoples Convention,⁵⁸ and FAO Voluntary Guidelines on Responsible Governance of Tenure.⁵⁹

Reflecting the European Parliament's resolution "on an EU legal framework to halt and reverse EU-driven global deforestation"

57. www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html

58. www.ilo.org/global/topics/indigenous-tribal/lang-en/index.htm

59. www.fao.org/tenure/voluntary-guidelines/en

of 22 October 2020,⁶⁰ commodities and products covered by the legislation should not be harvested, extracted or produced from the lands of indigenous peoples and local communities (either under formal title or customary ownership) without their free, prior and informed consent. The legislation should allow third parties to take action before national courts to claim compensation or other measures to be taken in case of damage. A cut-off date or baseline year should not apply to violations of human rights included in the regulation, as claims related to human rights violations should not be restricted.

Not including these issues would be a missed opportunity to address wider sustainable development concerns associated with agricultural commodity supply chains.

5 MANDATORY REQUIREMENTS ARE INTRODUCED FOR BUSINESSES AND THE FINANCE SECTOR TO ENSURE DUE DILIGENCE, TRACEABILITY OF COMMODITIES AND SUPPLY CHAIN TRANSPARENCY

WWF considers legislation that requires mandatory due diligence to be the best option, combined with an obligation of transparency along the supply chain.

Companies that first place a product or commodity on the EU market, should assess and minimize to a negligible level the risk of their products and commodities being linked to the conversion or degradation of forests and other ecosystems or related human rights violations (due diligence). These companies, and those who buy or sell a commodity or a product already placed on the EU market, should ensure traceability and transparency along the supply chain and provide the relevant documentation.

Any EU legislation needs to cover all companies. A simple threshold on business size is likely to miss smaller companies that import significant quantities of agricultural commodities.

60. www.europarl.europa.eu/doceo/document/TA-9-2020-0285_EN.html

Financial organizations that operate in the EU and provide finance, investment, insurance or other services to operators, as defined in the regulation, should be required to carry out due diligence, identifying, preventing and mitigating negative environmental and human rights impacts. Financial institutions should be required to comply with the same rules as their clients, to maintain market coherence; this is reflected in a wide range of international standards, including UN Guiding Principles and OECD guidelines for multinational enterprises.

6 CLEAR DEFINITIONS ARE PROVIDED FOR RELEVANT TERMS AND CONCEPTS USED IN THE LEGISLATION

New legislation should provide clarity on terms and concepts that are essential for its application, including on what constitutes a natural forest or a natural ecosystem, deforestation, degradation and conversion.

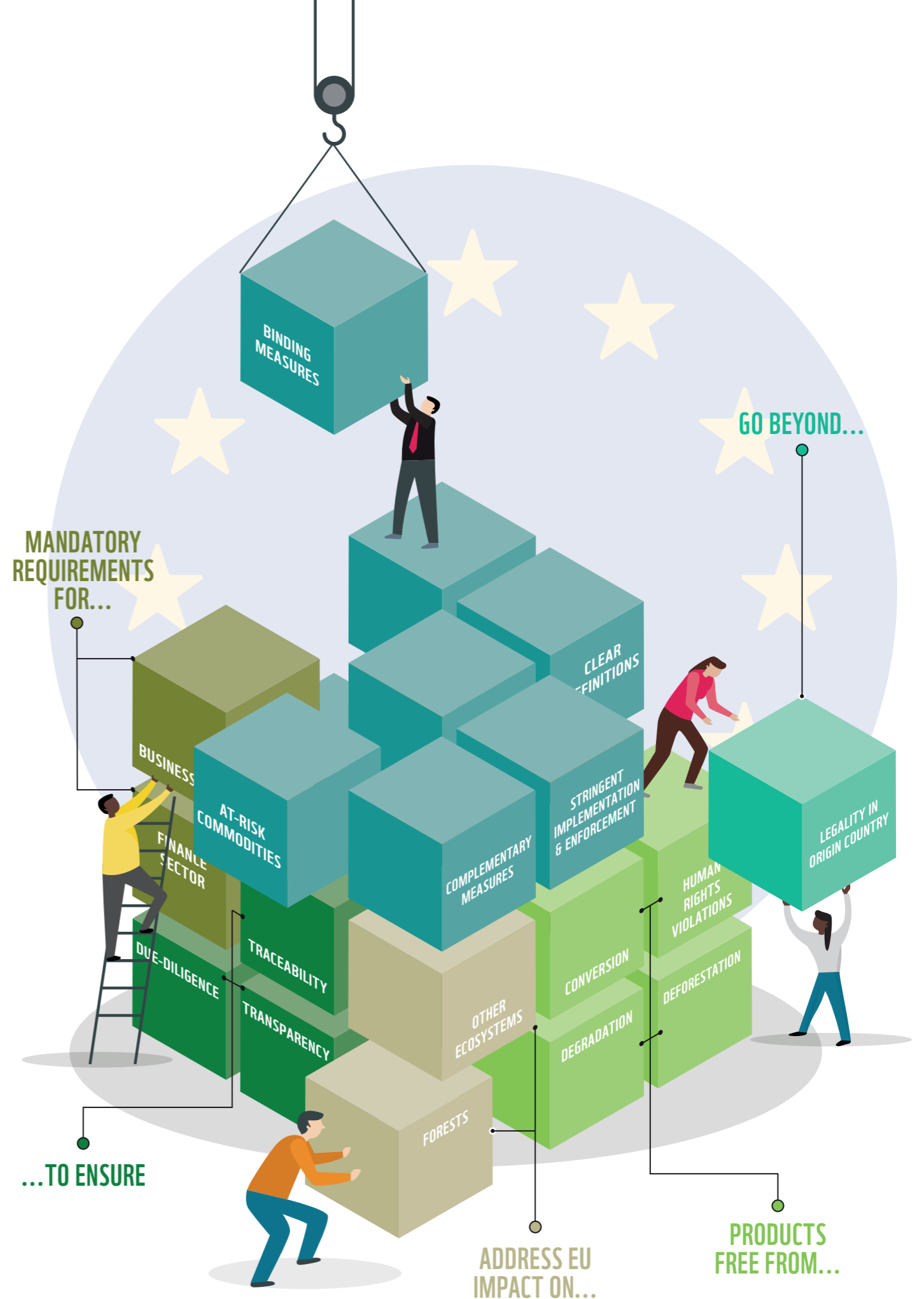
The European Commission should develop definitions through a multi-stakeholder process at the EU level. They should be based on objective and scientific criteria, taking into account relevant sources from international law, international organizations and other initiatives.

WWF recommends using the principles and definitions of the Accountability Framework initiative as a basis.⁶¹ These should be complemented by elements of other initiatives such as the high carbon stock (HCS) and high conservation value (HCV) approach, where compatible and applicable.

The European Commission's legislative proposal should include a cut-off date for deforestation, conversion and degradation. Such a cut-off date should be in the past as a cut-off date in the future could create speculative deforestation and conversion. WWF welcomes the proposal of the European Parliament for a cut-off date in 2015 as a good basis for discussion.⁶²

61. accountability-framework.org

62. www.europarl.europa.eu/doceo/document/A-9-2020-0179_EN.html





© WWF-France

7 THE LEGISLATION IS STRINGENTLY IMPLEMENTED AND ENFORCED ACROSS THE EU MEMBER STATES, WITH EFFECTIVE, PROPORTIONATE AND DISSUASIVE SANCTIONS

The EU legislation should provide clear requirements and measures for implementation and enforcement. Harmonized implementation and enforcement by national governments, especially with regard to penalties and sanctions, will be necessary to make the new law effective.

National legislation across all Member States should therefore include proportionate, effective and dissuasive penalties and sanctions in case of non-compliance with provisions of the legislation. These should include dissuasive monetary sanctions and the possibility of permanent seizure of commodities and products or criminal fines in case of serious breaches of the legislation.

European Member States should ensure stringent and effective implementation and enforcement of the legislation, including through clear and thorough rules at national level for checks and inspections and providing sufficient resources and clear competences to authorities responsible for implementing the legislation. This also includes regular exchange between different authorities and transparency towards third parties.

The European Commission should be formally assigned to develop implementing and delegated acts to specify the elements of the legislation as well as providing guidance on the interpretation and application of the main elements of the regulation. This includes the development of a methodology for due diligence and transparency and traceability based on a multi-stakeholder process, but also checking the implementation of the legislation regularly and working with Member States on a coherent framework for enforcement.

8 COMPLEMENTARY ADDITIONAL MEASURES ARE INTRODUCED TO ADDRESS THE DESTRUCTION AND DEGRADATION OF FORESTS AND OTHER ECOSYSTEMS.

Legislation at the European level should be complemented by a comprehensive set of measures and initiatives, following the commitments laid out in the EC communication on “Stepping up action to protect and restore the world’s forests”.

As an essential and complementary effort, the EU should strengthen cooperation with producing countries to support them in halting deforestation, forest degradation and conversion or degradation of natural ecosystems and human rights violations.

Working in partnership with **producer countries**, the EU should prioritize protection, restoration and sustainable management of forests and other important ecosystems through inclusive governance and human-rights based approaches. Such interventions should focus on regions with high concentrations of deforestation and preventing conversion in new frontier landscapes. This should include scaled up finance and technical support for the transition to sustainable agriculture practices and to strengthen enabling conditions for fair, sustainable production and value chains. Other important responses that require support include land use and tenure rights, better governance, multi-stakeholder land-use planning, payments for ecosystem services and developing alternative livelihoods.

The **EU** should also look into policy incentives to lower the excessive production and consumption of animal products in the EU. It should develop an EU protein transition strategy, addressing the need to diminish the demand while also making the supply more sustainable, and facilitating consumer uptake of healthy and sustainable diets to reduce negative impacts on the environment and health.

Solutions should also be developed to improve access to information and data about supply chains, legislative frameworks, deforestation and conversion risks (e.g. satellite data about conversion rates) for all actors involved.

IV. METHODOLOGY

The results presented in this report were derived using three distinct datasets: a dataset from Pendrill et al. (2020) for global analyses, the Trase (2020) data for a biome-level analysis, and Trase’s zero-deforestation commitment dataset to link trade to coverage.

The data referenced in this report covers the period 2005-2017, preceding the withdrawal of the United Kingdom from the EU. As such, all data concerning EU imports includes the United Kingdom.

GLOBAL ANALYSES USING PENDRILL ET AL. (2020)

Global analyses are based on the dataset from Pendrill et al. (2020) following methods described in Pendrill et al. (2019, 2019b) with an expansion of the time series to include the years between 2005 and 2017. This dataset includes the production and trade of 120 products and 108 tropical and sub-tropical countries, linked to tropical forest loss in each country. Forest loss was defined as the removal of tree cover in areas with trees at least five metres tall and with at least 25% canopy cover in the year 2000.⁶³ The CO₂ emissions from tropical deforestation include the net change in carbon stocks from above- and below-ground biomass and soil organic carbon, as well as emissions from peatland drainage. Information on forest loss and CO₂ emissions was then attributed to tree plantations, pasture and cropland expansion following a simple land-use model before being allocated to commodities assuming a three-year time lag following forest loss.⁶⁴

63. Pendrill et al. 2019b, from Hansen et al., 2013.
64. Pendrill et al. 2019b

Results from tropical deforestation and associated CO₂ emissions associated with commodity production are then linked to the physical trade model which tracks the commodities to the final destination of physical consumption as per Kastner et al. (2011). Physical consumption is defined as the consumption of food or industrial processes, but does not include more complex products for which commodities are ingredients. Moreover, the version of the data used for this report considers the embedded deforestation for feed (e.g. soy feed) but does not trace that deforestation to the country of consumption of animal products (an update is expected in the future). The effect is, however, limited according to Pendrill et al. (2020), and is further limited by our analysis of EU28 consumption as trade among Member States occurs within the same economic bloc. The resulting dataset, therefore, is a global view of the EU’s tropical deforestation embedded in the import and consumption of agricultural products. This limitation will however lead to a higher figure for embedded deforestation in Member States that are net exporters of animal products.






BIOME AND REGIONAL ASSESSMENTS USING TRASE

Biome-specific assessments were carried out using Trase (2020) with a specific focus on soybean and beef from South America (Brazil, Argentina, Paraguay), which are the commodities with the greatest deforestation associated with production and trade from that region. Trase data was obtained by combining key information (e.g. trade data, tax information, infrastructure ownership, etc.) to construct spatially explicit supply chain maps of commodities that link localities of production and traders to importing countries. This supply

chain information is then combined with data gathered at the jurisdiction level, such as commodity production, deforestation, and CO₂ emissions from land-use change. Deforestation data was obtained from the best available data from local governments (e.g. INPE-PRODES in Brazil), NGOs (e.g. SOS Mata Atlantica, WWF, etc.), or research led by academic partners (e.g. Humboldt-Universität zu Berlin). Sources and methods used for deriving deforestation in Trase are available in the online documentation (http://resources.trase.earth/documents/data_methods/Trase_deforestation_risk_method_final%20Sept%202020.pdf). Results in Trase are sub-national supply chain maps of commodities linked to both importing countries and traders with both embedded deforestation and CO₂ emissions from land-use change associated with trade.

The Trase data is focused on a set of countries and commodities representing the most important hotspots of tropical deforestation. There are clear overlaps with the locations identified in WWF’s recent *Deforestation Fronts* report, although the data used in this report has not been directly overlaid on these deforestation fronts. Trase’s data coverage relies on publicly available information allowing for the construction of both the supply chain of a given commodity, and deforestation/conversion data in any given year. The list of coverage at the time of writing (December 2020) is shown in Table 3. Trase data is publicly available on trase.earth, meaning that all analyses in this report may be repeated in subsequent years, including other countries and commodities following the expansion of the spatial and temporal extent of the Trase data. Finally, the Trase data considers import countries as the final destination of the commodity so does not include re-exports to third countries as in Pendrill et al. (2020).

Table 3: List of Trase datasets available at the time of writing (December 2020). All data available on trase.earth.

COUNTRY	BIOME	COMMODITY	SUPPLY CHAIN PERIOD AVAILABLE	DEFORESTATION FOOTPRINT PERIOD AVAILABLE
Brazil	Amazon, Cerrado, Atlantic Forest, Pantanal		2004-2018	2006-2018
Brazil	Amazon, Cerrado, Atlantic Forest, Pantanal		2015-2017	2015-2017
Paraguay	Chaco, Atlantic Forest		2014-2018	2014-2016
Paraguay	Chaco		2014-2018	2018
Argentina	Chaco		2016-2018	2016-2018

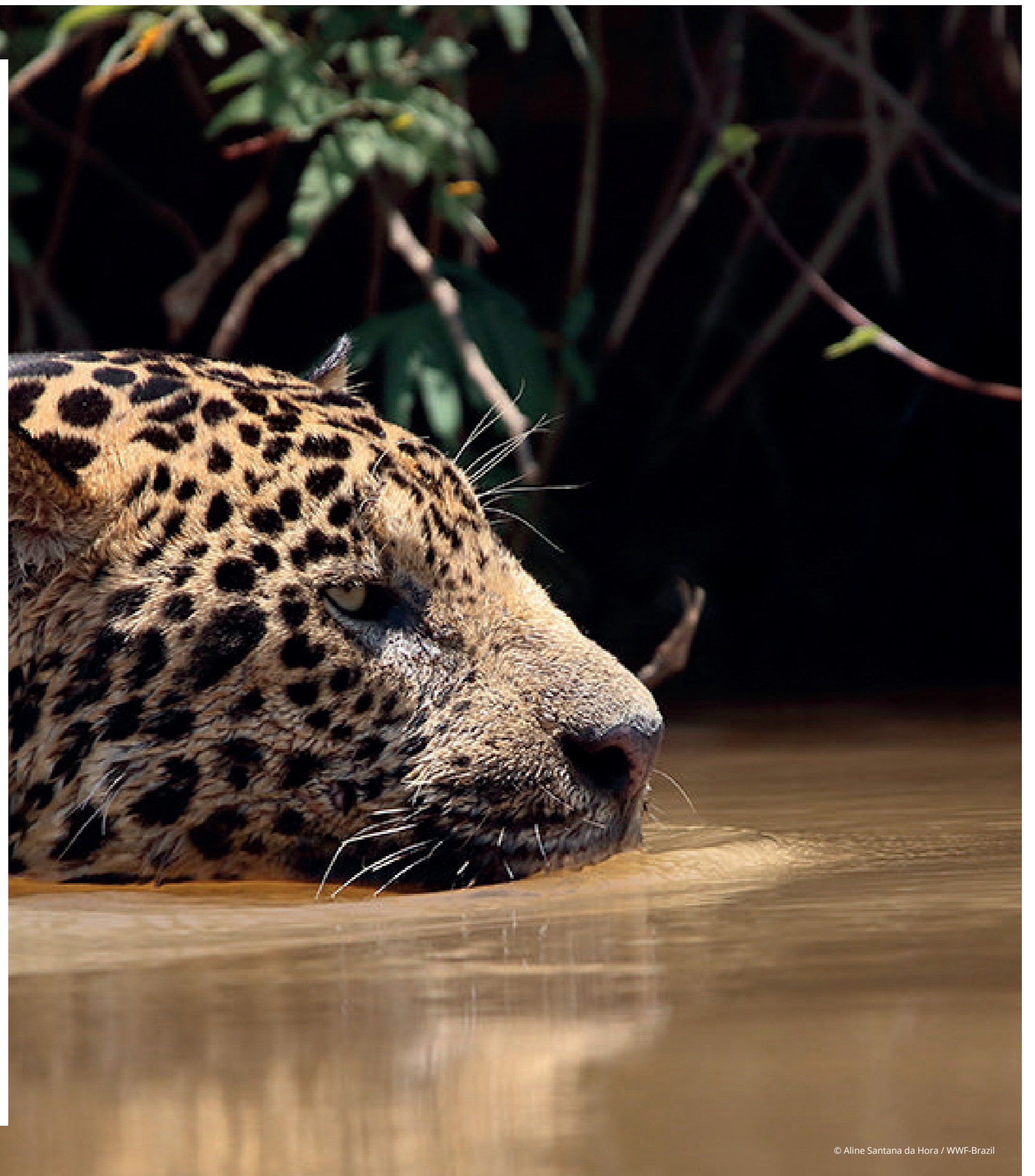
Specific details on the methods used to derive the supply chain maps are available online, together with detailed sources used to obtain embedded deforestation and CO₂ emissions for specific commodities: trase.earth/about/methods-and-data

COMMODITY DEFORESTATION AND CO₂ EMISSIONS RISK

Results presented in this report do not rely on “farm-to-EU” traceability since the source of commodities is presented at the country level or biome or locality level. As a result, the deforestation (in hectares) and CO₂ emissions (in tonnes) linked to commodities imported into the EU should be interpreted as indicators of exposure or “risk”. This description of risk follows the terminology used in Trase where commodity deforestation risk describes the exposure of an actor (company or country) to the risk that the commodity it is sourcing is directly associated with recent deforestation in the region where it was produced. The detailed description of the methodology behind the assessment of commodity deforestation risk in Trase is available online: http://resources.trase.earth/documents/data_methods/Trase_deforestation_risk_method_final%20Sept%202020.pdf.

ZERO-DEFORESTATION COMMITMENTS

“A study was carried out (by Trase) in 2019”. This study consisted of researching specific company commitments made by traders identified in Trase for each of the country-commodity combinations. Information was gathered on the set of traders responsible for 90% of trade by volume (according to trade data). A company was considered to have a zero-deforestation commitment when it had made a publicly available commitment to zero net or zero gross deforestation, or to zero conversion on its website or in company documents (including future targets). Commitments had to explicitly include the commodity and apply to the country in the country-commodity combination. Information on zero-deforestation commitments is available on trase.earth. Zero-deforestation commitments are assessed only for commodity exporters. In Brazil, zero-deforestation commitments also include supply-side initiatives such as the Soy Moratorium, TAC and G4 initiatives.



© Aline Santana da Hora / WWF-Brazil

V. LIMITATIONS OF THE STUDY

DATA COVERAGE

Both Pendrill et al. (2020) and Trase (2020) have different coverage in time and space. Both datasets are considered to be i) the best available data at the time of publication, and ii) complementary in the analysis provided in this report. While the global dataset of Pendrill et al. is available from 2005 to 2017 specifically for tropical deforestation and associated CO₂ emissions, the coverage of the Trase data depends on the country and commodity of interest (Table 3). For instance, the latest year available for Brazilian soybean was 2018, but for Brazilian beef it was 2017. Similarly, Paraguay deforestation data was available until 2016 in the Atlantic Forest, and deforestation embedded in Paraguayan beef exports from the Chaco was only available for 2018. The country-commodity combinations considered in this report (Table 3) should therefore be considered as case studies, not comprehensive assessments.

DATA RESOLUTION

The data from Pendrill et al. (2020) was used to provide a global view of trade and embedded deforestation and CO₂ emissions for imports of commodities into the EU, while the Trase data provided a more spatially explicit assessment of the countries and biomes in South America with greatest deforestation for commodity production (Brazil, Argentina, Paraguay). The results therefore provide different resolutions following distinct methodologies and, consequently, differences are expected when comparing deforestation. Results from Pendrill et al. (2020) rely on the assumption that the net expansion of land for agricultural production is proportional to its role in deforestation within the country. The sub-national results from Trase rely on remote sensing information and per pixel analyses of land use for commodity

production and deforestation in each of the biomes. As a result, it is important to present global and regional messages separately, as described in this report. In some cases, detailed sourcing information could not be derived from the Trase data due to a lack of information to construct the commodity supply chain. In these cases, the source jurisdiction or biome is labelled as “unknown” but is still shown in the results.

RE-EXPORTS OF COMMODITIES WITHIN THE EU

Analysis using Trase data considers the EU as the final destination of the imported commodity, and does not consider any re-export to a third country of either commodities or products derived from them (e.g. meat products containing embedded soy). For instance, the Netherlands is considered the final destination of all the soy the country imports, when in fact much of this is subsequently transferred to other EU countries. By contrast, data from Pendrill et al. (2020) does consider re-exports, except for soy used as feed that is embedded in re-exported animal products. While this has only a limited effect on the results for the EU28 as an economic bloc and the insights we have drawn, it can distort the results at a country level.



© Daniel Martínez / WWF-Peru

VI. REFERENCES

- Abiove. 2018. Soy Moratorium Report 2018. abiove.org.br/wp-content/uploads/2019/01/Soy-Moratorium-Report-2018.pdf
- Amsterdam Declarations Partnership. 2021. Statement of Ambition 2025. ad-partnership.org/wp-content/uploads/2021/02/AD-Partnership-Ambition-Statement-2025.pdf
- Arima, E.Y., Richards, P., Walker, R., and Caldas, M.M. 2011. Statistical confirmation of indirect land use change in the Brazilian Amazon. *Environmental Research Letters* 6(2): 024010.
- Arvor, D., Tritsch, I., Barcellos, C., Jégoud, N., Dubreuil, V. 2017. Land use sustainability on the South-Eastern Amazon agricultural frontier: Recent progress and the challenges ahead. *Applied Geography* 80: 86–97. doi: 10.1016/j.apgeog.2017.02.003
- Barreto, P., Pereira, R., Brandão, A., and Baima, S. 2017. Os frigoríficos vão ajudar a zerar o desmatamento da Amazônia? Imazon, Belem, Brazil.
- Carlson, K., Heilmayr, R., Gibbs, H., Noojipady, P., Burns, D., Morton, D., Walker, N., Paoli, G. and Kremen, C. Effect of oil palm sustainability certification on deforestation and fire in Indonesia. *PNAS* 115 (1) 121-126. doi: 10.1073/pnas.1704728114
- COWI. 2018. Feasibility study on options to step up EU action against deforestation. Luxembourg: Publications Office of the European Union. *Feasibility study on options to step up EU Action against deforestation*
- Dou, Y., da Silva, R.F.B., Yang, H. and Liu, J. 2018. Spillover effect offsets the conservation effort in the Amazon. *Journal of Geographical Sciences* 28(11): 1715–1732. doi: 10.1007/s11442-018-1539-0
- European Commission. 2013. *The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation*. ec.europa.eu/environment/forests/impact_deforestation.htm
- European Commission. 2019. *EU Communication (2019) on stepping up EU action to protect and restore the world's forests*. ec.europa.eu/info/publications/eu-communication-2019-stepping-up-eu-action-protect-and-restore-worlds-forests_en
- European Commission. EU biodiversity strategy for 2030. ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/eu-biodiversity-strategy-2030
- European Commission. Oilseeds and protein crops balance sheets. https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/overviews/balance-sheets-sector/oilseeds-and-protein-crops_en
- European Commission. 2020. Farm to fork strategy – for a fair, healthy and environmentally-friendly food system. ec.europa.eu/food/farm2fork_en
- European Commission. 2021. Speech by President von der Leyen at the One Planet Summit. https://ec.europa.eu/commission/presscorner/detail/en/speech_21_61
- Fountain, A.C. and Hütz-Adams, F. 2020. *2020 Cocoa Barometer*. Cocoa Barometer Consortium. www.evidensia.eco/resources/2101/cocoa-barometer-2020
- Gibbs, H.K., Rausch, L., Munger, J., Schelly, I., Morton, D.C., Noojipady, P., Soares-Filho, B., Barreto, P., Micol, L. and Walker, N.F. 2015. Brazil's Soy Moratorium. *Science* 347(6220): 377-378. doi: 10.1126/science.aaa0181
- Gollnow, F., Hissa, L.d.B.V., Rufin, P., and Lakes, T. 2018. Property-level direct and indirect deforestation for soybean production in the Amazon region of Mato Grosso, Brazil. *Land Use Policy* 78: 377-385.
- Heilmayr, R., Rausch, L., Munger, J. and Gibbs, H.K. 2020. The Amazon Soy Moratorium reduced deforestation. *Nature Food* 1: 801–810. doi: 10.1038/s43016-020-00194-5
- Henderson J., Godar J., Ponzoni Frey G., Börner J., Gardner T. The Paraguayan Chaco at a Crossroads: Drivers of an Emerging Soybean Frontier. In review.
- IDH. 2019. *The urgency for action against deforestation*. IDH: Utrecht, the Netherlands. www.idhsustainabletrade.com/uploaded/2019/06/IDH_Urgency-of-action.pdf
- IDH. 2020. *The urgency of action to tackle tropical deforestation*. IDH: Utrecht, the Netherlands. www.idhsustainabletrade.com/uploaded/2020/02/IDH_The-UoA-to-Tackle-Tropical-Deforestation_2020-web.pdf
- Komives, K., Arton, A., Baker, E., Kennedy, E., Longo, C., Pfaff, A., Romero, C. and Newsom, D. 2018. *Conservation impacts of voluntary sustainability standards: How has our understanding changed since the 2012 publication of 'Toward sustainability: The roles and limitations of certification'?* Meridian Institute, Washington, DC. www.evidensia.eco/resources/181/conservation-impacts-of-voluntary-sustainability-standards-how-has-our-understanding-changed-since-the-2012-publication-of-toward-sustainability-the-roles-and-limitations-of-20 certification
- Le Polain de Waroux, Y. 2019. Capital has no homeland: The formation of transnational producer cohorts in South America's commodity frontiers. *Geoforum* 105: 131–144. doi: 10.1016/j.geoforum.2019.05.016
- Pacheco, P., Mo, K., Dudley, N., Shapiro, A., Aguilar-Amuchastegui, N., Ling, P.Y., Anderson, C. and Marx, A. 2021. *Deforestation fronts: Drivers and responses in a changing world*. WWF, Gland, Switzerland. wwfint.awsassets.panda.org/downloads/deforestation_fronts_drivers_and_responses_in_a_changing_world_full_report_1.pdf
- Pendrill, F. et al. 2019. Deforestation displaced: trade in forest-risk commodities and the prospects for a global forest transition. *Environmental Research Letters* 5(14): 055003. doi: 10.1088/1748-9326/ab0d41
- Pendrill, F. et al. 2019b. Agricultural and forestry trade drives large share of tropical deforestation emissions. *Global Environmental Change* 56: 1–10. doi: 10.1016/j.gloenvcha.2019.03.002
- Pendrill, F. et al. 2020. Deforestation risk embodied in production and consumption of agricultural and forestry commodities 2005–2017 (Version 1.0) [Data set] Zenodo. doi: 10.5281/zenodo.4250532
- Seymour, F. and Harris, N.L. 2019. Reducing tropical deforestation. *Science* 365(6455): 756-757.
- Soares-Filho, B. et al. 2014. Cracking Brazil's Forest Code. *Science* 344(6182): 363-364. doi: 10.1126/science.1246663
- Soterroni, A. et al. 2019. Expanding the Soy Moratorium to Brazil's Cerrado. *Science Advances* 5(7): eaav7336. doi: 10.1126/sciadv.aav7336
- Strassburg, B. et al. 2014. When enough should be enough: Improving the use of current agricultural lands could meet production demands and spare natural habitats in Brazil. *Global Environmental Change* 28: 84-97. doi: 10.1016/j.gloenvcha.2014.06.001
- Strassburg, B. et al. 2017. Moment of truth for the Cerrado hotspot. *Nature Ecology & Evolution* 1(4): 0099. doi: 10.1038/s41559-017-0099.
- Thomson, E. 2020. Time for change: delivering deforestation-free supply chains. Global Canopy, Oxford, UK.
- Transport and Environment. 2016. Cars and trucks burn almost half of palm oil used in Europe. www.transportenvironment.org/sites/te/files/publications/2016_05_TE_EU_vegetable_oil_biodiesel_market_FINAL_o_o.pdf
- Trase. 2020b. Trase yearbook 2020: the state of forest-risk supply chains. insights.trase.earth/yearbook/summary
- Van Dam, J, Van Den Hombergh, H. and Hilders, M. 2019. *An analysis of existing laws on forest protection in the main soy producing countries of Latin America*. IUCN. www.iucn.nl/files/publicaties/an_analysis_of_existing_laws_on_forest_protection_la_final.pdf
- WWF. 2020. *Plow Print*. c402277.ssl.cf1.rackcdn.com/publications/1359/files/original/PlowprintReport_2020_FINAL_08042020.pdf?1596569610
- Zu Ermgassen, K.H.J. et al. 2020. Using supply chain data to monitor zero deforestation commitments: an assessment of progress in the Brazilian soy sector. *Environmental Research Letters* 15(3): 035003, doi: 10.1088/1748-9326/ab6497

VII. APPENDIX

Table 1A. Emissions from tropical deforestation embedded in commodity imports for EU28, by commodity, per year (Pendrill et al., 2020).











PERIOD/YEAR	COMMODITY	MILLION TONNES CO ₂ PER YEAR
2005-2017	 Palm oil	54
2005-2017	 Soy	32
2005-2017	 Beef	13
2005-2017	 Wood products	2.2
2005-2017	 Coffee	7.9
2005-2017	 Cocoa	7.2
2017	 Palm oil	61
2017	 Soy	13
2017	 Beef	4.7
2017	 Wood products	1.9
2017	 Coffee	8.5
2017	 Cocoa	5.3

Table 2A. Emissions from tropical deforestation embedded in commodity imports for EU28, by producer country, per year (Pendrill et al., 2020).

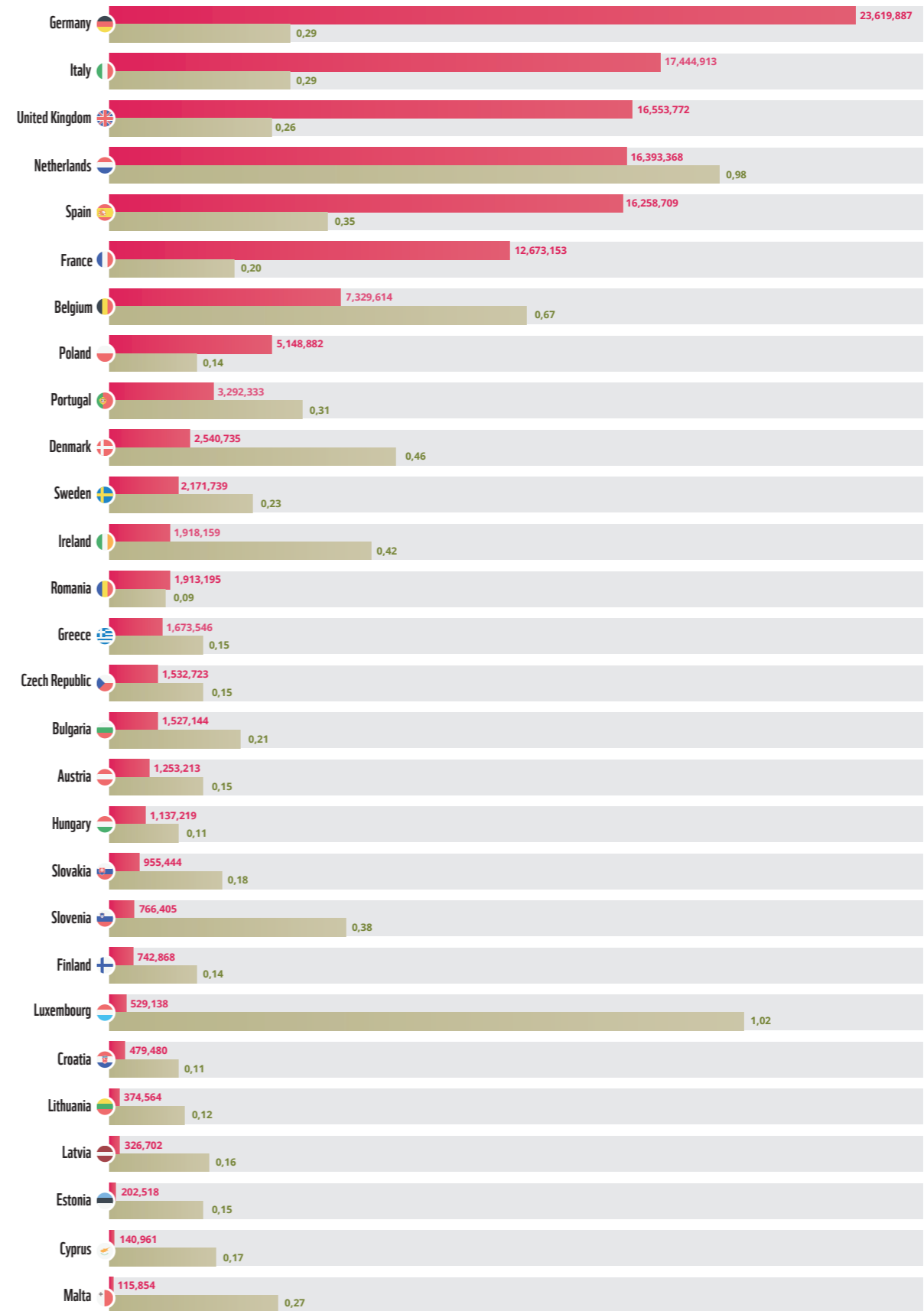
PERIOD/YEAR	COUNTRY	MILLION TONNES CO ₂ PER YEAR
2005-2017	Indonesia	54
2005-2017	Brazil	32
2005-2017	Malaysia	13
2005-2017	Papua New Guinea	2.2
2005-2017	Argentina	7.9
2005-2017	Paraguay	7.2
2017	Indonesia	61
2017	Brazil	13
2017	Malaysia	4.7
2017	Papua New Guinea	1.9
2017	Argentina	8.5
2017	Paraguay	5.3

Table 3A. Deforestation embedded into commodities imported into the EU28 and covered by a zero-deforestation commitment (ZDC), by volume. Based on Trase (2020).

BIOME - COUNTRY	COMMODITY	YEAR	VOLUME (TONNES)	EMBEDDED DEFORESTATION (HA)	DEFORESTATION FOOTPRINT (HA PER KT)	ZDC COVERAGE (%)
Amazon - Brazil	Soybeans	2015	2.5 million	1590	0.63	78
		2018	2.2 million	990	0.45	97
	Cattle	2015	11,115	550	49	97
		2017	13,880	550	39	99
Cerrado - Brazil	Soybeans	2015	6.7 million	17,773	2.7	49
		2018	4.8 million	5292	1.1	73
	Cattle	2015	82,764	3450	42	16
		2017	69,797	2790	40	25
Atlantic forest - Brazil	Soybeans	2015	3.0 million	<100	0.0096	18
		2018	3.0 million	<100	0.0029	34
	Cattle	2015	35,943	<100	0.56	0*
		2017	26,773	<100	0.34	0*
Atlantic Forest - Paraguay	Soybeans	2016	2.7 million	4050	1.5	61
	Cattle	2016	2734	Not available		0
Chaco - Paraguay	Soybeans	2016	80,965	<100	1.0	13
		2018	56,730	~0	~0	57
	Cattle	2018	7478	6480	870	0*
Chaco - Argentina	Soybeans	2016	861,681	810	0.94	27
	Soybeans	2018	702,881	550	0.78	64

*the majority of ZDCs were not assessed. For more details see "Methodology" section.

Figure 2A: CO₂ emissions from tropical deforestation for commodities imported and consumed between 2005 and 2017 in the EU28 countries as total mean annual (top) and per capita mean annual (bottom). Emissions (using population data from EUROSTAT (2020)). Countries represent the final destination of consumption of the commodities. Based on Pendrill et al. (2020).



■ Mean emissions from embedded tropical deforestation per year (tCO₂) ■ Per capita emissions from embedded tropical deforestation (tCO₂)

Figure 5A. Deforestation and conversion associated with soy imported into EU28 countries in 2016 from biomes in Brazil, Paraguay and Argentina. These biomes overlap with the Amazon, Cerrado and Chaco deforestation fronts of Pacheco et al. (2021). Results do not include re-exports to other countries within or outside the EU28. Based on Trase (2020).

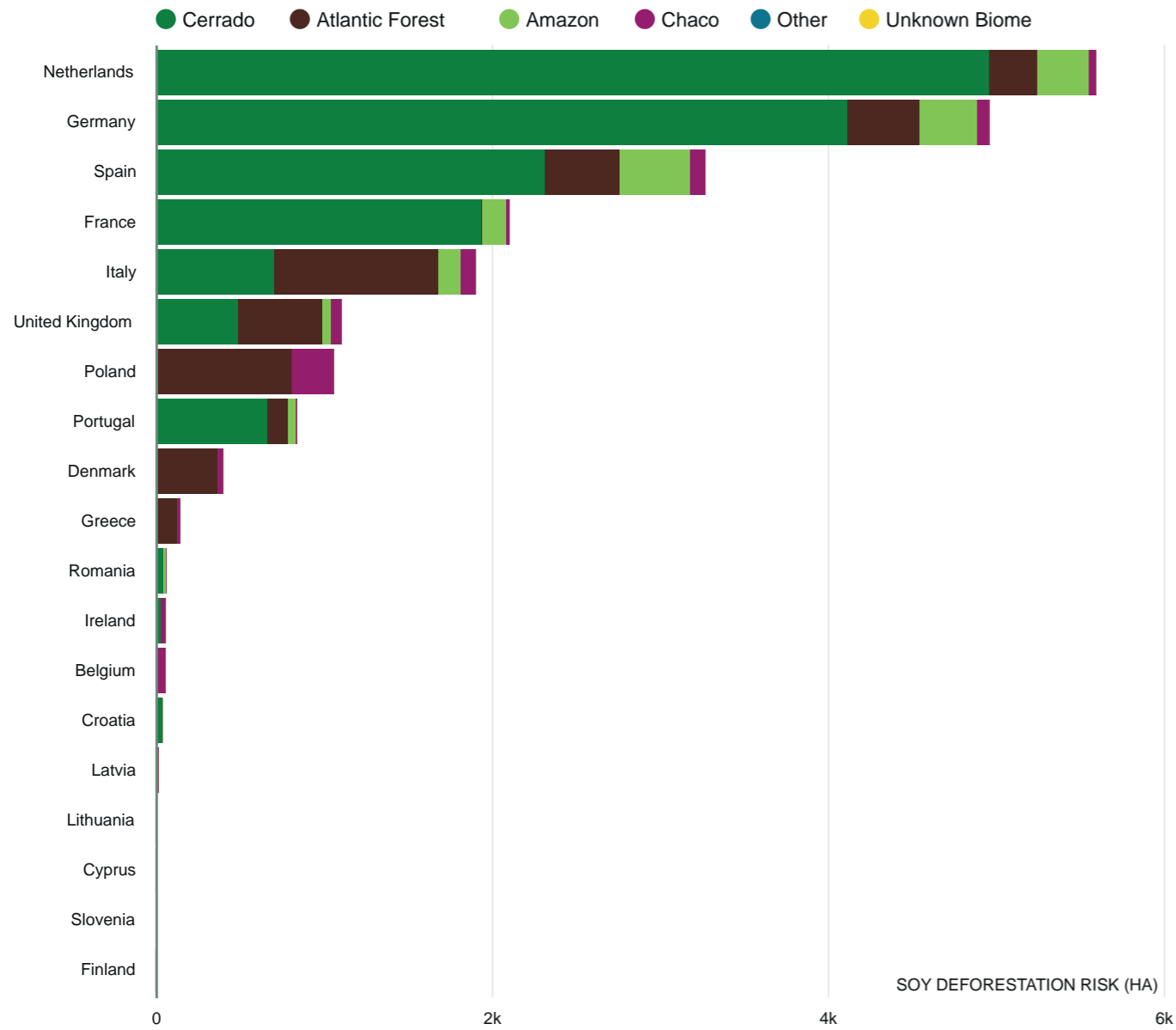
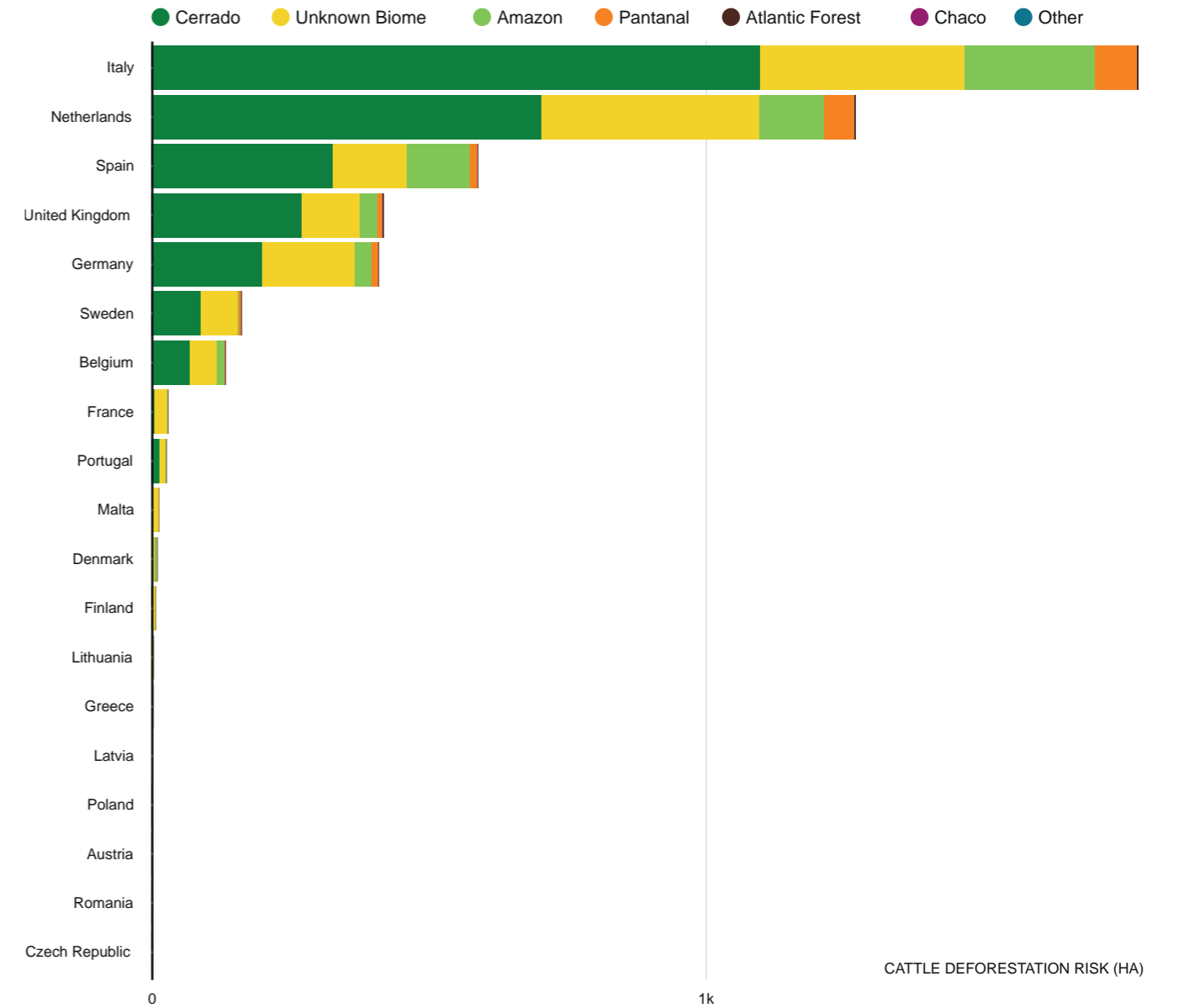
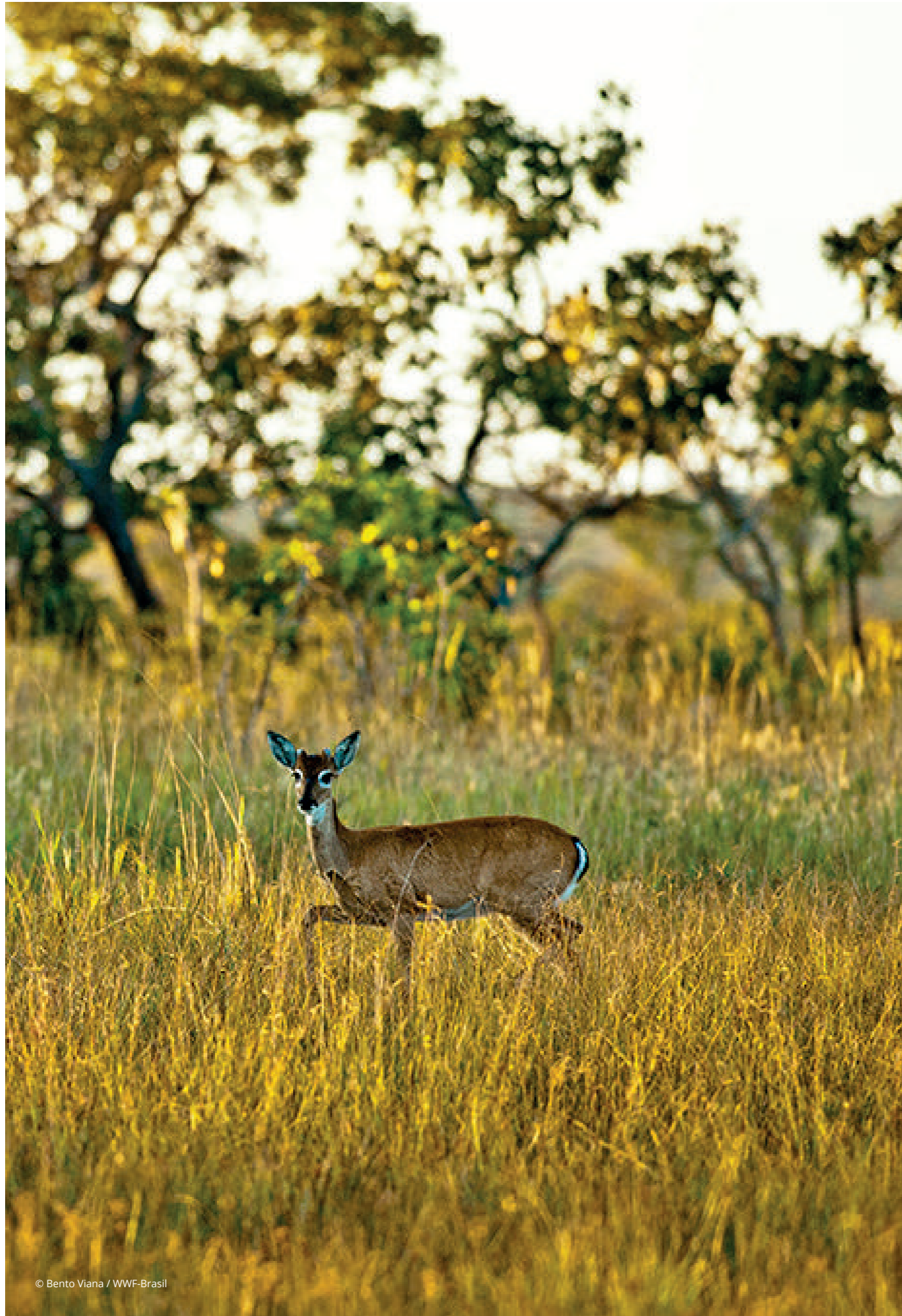


Figure 6A. Deforestation and conversion associated with beef imported into EU28 countries in 2017 from Brazilian biomes. Note that “other” includes “unknown biomes” for which a source biome could not be identified (see “Limitations of the study”). These biomes overlap with the Amazon and Cerrado deforestation fronts of Pacheco et al. (2021). Results do not include re-exports to other countries within or outside the EU28. Based on Trase (2020).





**OUR MISSION IS TO STOP THE
DEGRADATION OF THE EARTH'S
NATURAL ENVIRONMENT AND
TO BUILD A FUTURE IN WHICH
HUMANS LIVE IN HARMONY
WITH NATURE.**



Working to sustain the natural world for the benefit of people and wildlife.

together possible™ www.wwf.eu

© 2021

Paper 100% recycled

© 1986 Panda symbol WWF – World Wide Fund for Nature (Formerly World Wildlife Fund)

® "WWF" is a WWF Registered Trademark.

WWF European Policy Office, 123 rue du Commerce, 1000 Brussels.

For contact details and further information, please visit our website at www.wwf.eu