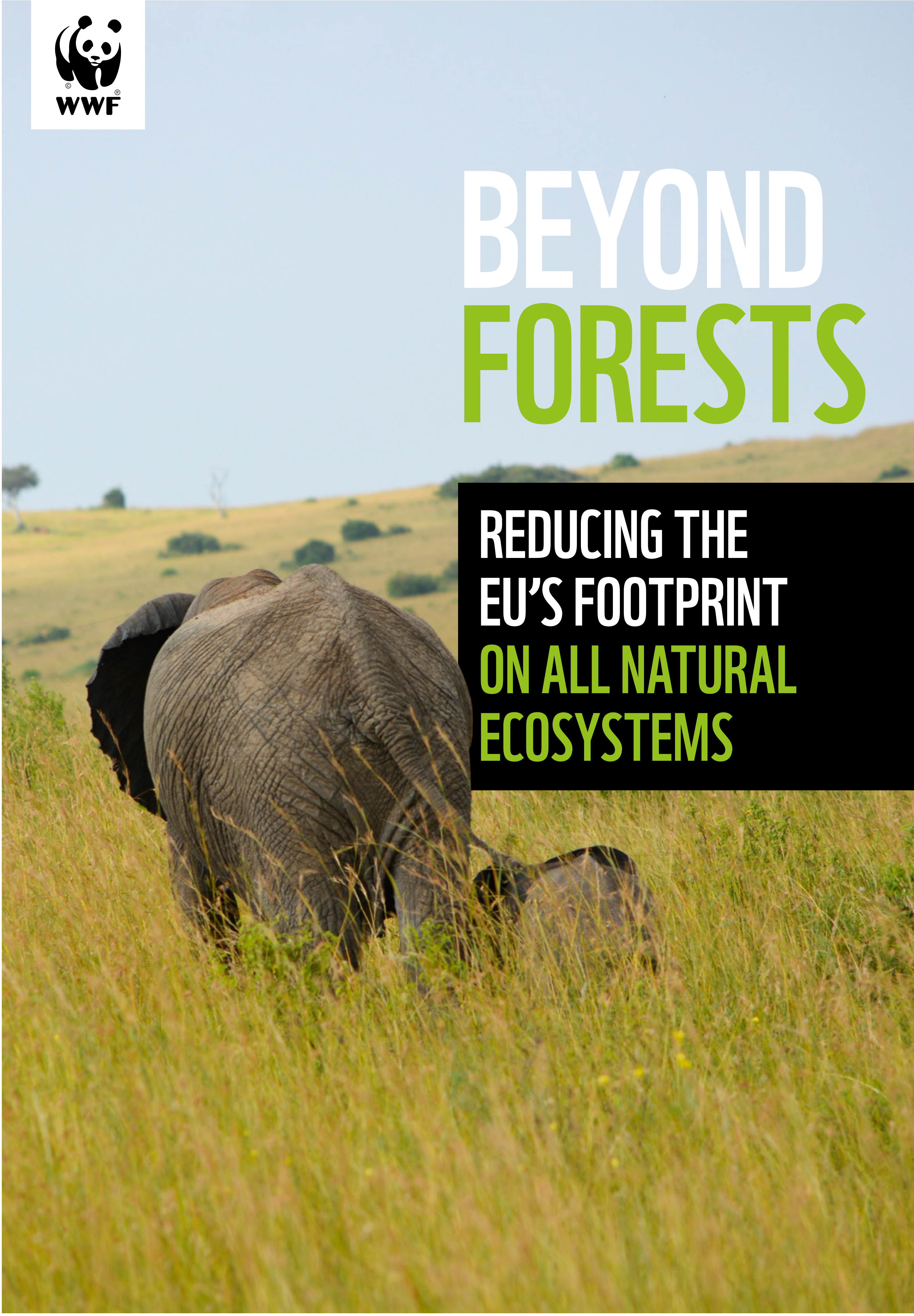

BEYOND FORESTS

REDUCING THE EU'S FOOTPRINT ON ALL NATURAL ECOSYSTEMS

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.

AUTHORS

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BEYOND FORESTS

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EXECUTIVE SUMMARY

Around the world, forests and other natural ecosystems like grasslands, wetlands, peatlands, and savannahs are being destroyed at an alarming rate. This contributes to climate change as well as the loss of biodiversity and vital services that nature provides and on which we depend.

One of the major drivers of these impacts on the natural world is the production of agricultural, livestock, and forestry commodities. The FAO estimates that nearly 90% of deforestation is driven by agricultural expansion. The European Union (EU) imports and consumes huge volumes of such forest and ecosystem risk commodities that drive the conversion of natural ecosystems. EU institutions have recognised the need for urgent action to reverse the climate and biodiversity crises, and to this end, the EU has ratified a suite of commitments, policies, and strategies, including the Paris Agreement and the European Green Deal.

Much attention has focused on the conversion of forests – deforestation - but many natural ecosystems beyond forests are suffering conversion rates as high, or higher than, those of forests (see Figure 1). Scientists and researchers have been emphasising the need for broader ecosystem protection for decades, but this has yet to be reflected in policies, legislation, and wider public discourse.

When the European Parliament asked the European Commission to propose legislation on halting EU-driven land conversion in 2020, it specifically noted the need to extend protection "to high-carbon stock and biodiversity-rich ecosystems other than forests, such as marine and coastal ecosystems, wetlands, peatlands or savannahs, so as to avoid pressure being shifted to these landscapes".[1]

On 17 November 2021, the European Commission presented a "proposal for a regulation on deforestation-free products"[2] requiring companies to conduct due diligence to ensure that certain products placed on the EU market are not driving deforestation. The proposed regulation does not address the conversion of natural ecosystems beyond forests, but it does stipulate a review no later than two years after the law enters into force in order to assess the effectiveness and scope of the legislation, and whether other ecosystems should be included. This future and uncertain inclusion is problematic, as the conversion rate of these rich ecosystems is already very high. Not taking this into account in the legislation would lead to a further loss of the ecosystem services they provide and their role as carbon sinks.

IT IS URGENT TO GO BEYOND FORESTS AND PROTECT OTHER NATURAL ECOSYSTEMS

Natural ecosystems beyond forests include grasslands, savannahs, peatlands, shrublands, and wetlands, amongst others. They are often highly biodiverse, store vast quantities of carbon, and provide protection, livelihoods, materials, food, fresh water, and a sense of cultural identity to millions of indigenous peoples and local communities (IPLCs).

And yet, they are highly threatened by conversion (see Figure 1). For example, more than half of the Cerrado - a complex ecosystem of savannahs, grasslands, and forests in Brazil - has already been cleared of its native vegetation, most of which has occurred since the 1970s. Rates of conversion, driven largely by expanding soy and cattle production, have surpassed those of the Amazon, and with limited public protection, it is ranked amongst the most threatened biomes in South America.

Using such examples, this report explains why the EU urgently needs to provide protection to ecosystems beyond forests.

THERE IS A CLEAR CORRELATION ⇄ BETWEEN EU CONSUMPTION AND THE CONVERSION OF NATURAL ECOSYSTEMS

The EU has a demonstrable role in driving the ongoing and widespread conversion of natural ecosystems beyond forests by importing commodities such as soy, beef, shrimp, natural rubber, palm oil, and wheat that originate from the ecosystems examined in this report, which are undergoing or are threatened with significant conversion.

In some cases, such as with beef and soy from the Brazilian Cerrado and the Argentinean Pampas and Gran Chaco, imports from these areas constitute a large proportion of all EU imports of that commodity (see Figure 3).

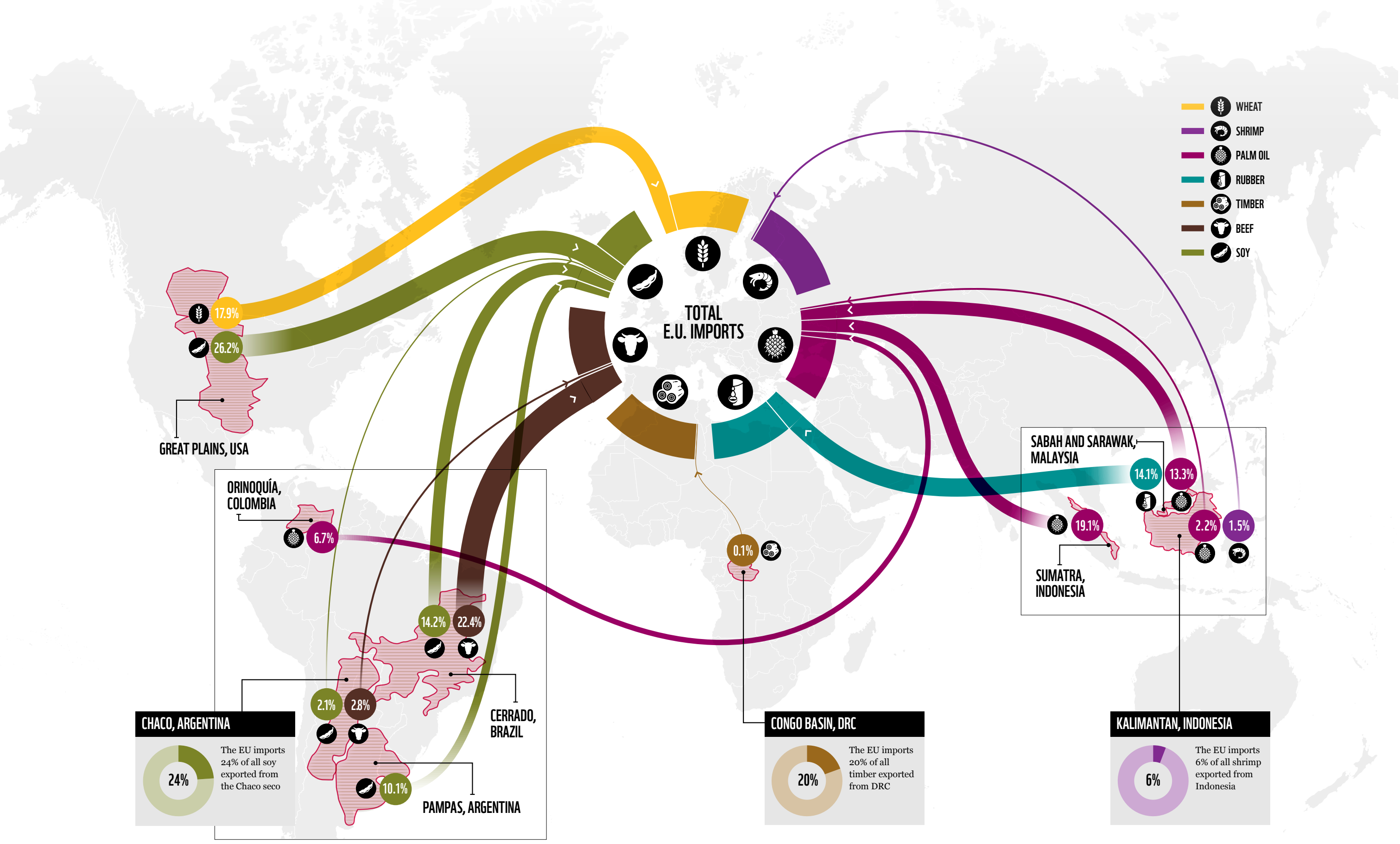


Figure 3: The proportion of EU commodity imports which come from the nine biomes featured in case studies in this report. Arrows show the percentage of EU imports of each commodity which come from each geographical area, an indicator of how important the area is to the EU. Embedded charts show the proportion of the area's production that is exported to the EU. The first is an indicator of how important the area is to the EU. The second is an indicator of how important trade with the EU is to the area, and has been provided in those cases where this gives a different perspective on the relationship than the first indicator alone. (See Appendix 1 for methodology and further details)

If natural ecosystems beyond forests are excluded from the EU's proposed new regulation, conversion due to EU consumption will continue in these ecosystems. Furthermore, there is significant risk that a forest-focused legislation would create major leakage of additional commodity expansion into natural ecosystems beyond forests. Without including such ecosystems, it is difficult to see how the EU's environmental aspirations - such as 'to have a neutral or positive environmental impact' (Farm to Fork Strategy) or becoming carbon neutral by 2050 (EU Climate Law) - could realistically be fully achieved.

This report demonstrates that the EU - through its consumption of forest and ecosystem-risk commodities (FERCs) - has a responsibility to act to halt the destruction of natural ecosystems beyond forests.

THE EU CAN AND MUST INCORPORATE THESE ECOSYSTEMS INTO ITS REGULATION ⚖ NOW

The final question remains whether it is feasible for the EU to include ecosystems beyond forests in its legislation – and especially, whether companies would be able to implement it.

The EU, and some of its member states, have already included the protection of natural ecosystems beyond forests within various laws and policies, and this report identifies these.

This report also notes the widespread use of due diligence in day-to-day corporate practice, under existing regulations such as the European Union Timber Regulation (EUTR) and the EU Conflict Minerals Regulation.

Some companies are already implementing voluntary commitments to exclude conversion of natural ecosystems beyond forests from their supply chains, which demonstrates that from a corporate perspective, including ecosystems beyond forests is feasible. This report identifies a range of tools and support that are already available to companies to enable them to carry out due diligence on the conversion of natural ecosystems beyond forests in their supply chains. To take one example, the Accountability Framework Initiative has developed principles and guidance to help companies implement comprehensive and efficient 'Deforestation and Conversion-free' policies and develop reliable and transparent supply chains. The technology to detect conversion of natural ecosystems beyond forests exists.

While the European Commission is considering a two-year reflection on whether it is necessary and feasible to include other ecosystems beyond forests in the scope of its regulation, this report provides a clear and immediate answer: yes, it is urgent and possible to include them and the EU must do so.

OUR RECOMMENDATIONS

The findings of our report show that ambitious EU legislation is both necessary and feasible. We call on the EU Member States and the European Parliament to adopt a law that retains the useful provisions foreseen by the Commission and fills the gaps identified so far. WWF identifies three main principles for a legislation that is ambitious and effective in reducing deforestation and other negative environmental and human rights impacts of the EU's consumption:

ENSURING THAT PRODUCTS PLACED ON THE EUROPEAN MARKET ARE LEGAL AND ALSO NOT LINKED TO DEFORESTATION, FOREST DEGRADATION, ECOSYSTEM CONVERSION OR DEGRADATION, NOR TO HUMAN RIGHTS VIOLATIONS.

ELEMENTS TO KEEP

The proposed legislation calls for products placed on the EU market to be legal by the producing country's standards and free from deforestation and forest degradation. Measures to work in partnership with producing countries in addressing the underlying drivers of nature destruction are proposed and combined with engagement at international level.

ELEMENTS TO IMPROVE

As laid out in the report, addressing climate change and biodiversity loss requires a holistic approach: other ecosystems besides forests, such as savannahs, grasslands, wetlands, peatlands and mangroves should be included without delay. A focus on forests omits the ongoing pressure for conversion e.g. of savannahs, which could increase even more, if only forests are protected.

The current product scope should be enlarged to include relevant commodities and derived products based on scientific and objective criteria, including rubber and maize, as well as poultry and dairy as part of livestock. A clear reference to international human rights standards respecting particularly the rights of Indigenous Peoples and local communities, including requirements to respect customary tenure rights and the right to Free, Prior and Informed Consent.

PROVIDING A DUE DILIGENCE SYSTEM WITH CLEAR REQUIREMENTS FOR COMPANIES, ENSURING THEIR SUPPLY CHAINS ARE TRACEABLE AND TRANSPARENT.

ELEMENTS TO KEEP

Due diligence has to be carried out before a product is placed on the market and clear traceability requirements to the place where a commodity or product was harvested/produced are introduced. Certification and third party systems are identified as supporting tools but cannot replace the responsibility of an operator to carry out due diligence.

ELEMENTS TO IMPROVE

Country benchmarking should supplement due diligence and enforcement efforts, but should not modify due diligence obligations. A major potential gap in the regulation is the "de facto exemption" of companies sourcing from "low risk" countries from risk assessment and risk mitigation measures. Not only will it disadvantage companies that are putting measures in place to source from high-risk regions, it might also shift product sourcing towards low-risk countries. The same due diligence framework should be used by all companies to ensure a level playing field, without any loopholes for rogue companies.

The low risk category in the country benchmarking should be deleted, determining all countries to be "standard risk", which could become a "high" risk if the application of criteria laid out in Article 27 leads to the conclusion that a higher risk exists. Risk assessment criteria and procedures for the country benchmarking should be clear, objective and based on science.

SUPPORTING A STRONG, HARMONIZED AND ROBUST ENFORCEMENT OF THE LEGISLATION, PROVIDING NATIONAL AUTHORITIES WITH THE NECESSARY MEASURES AND TOOLS TO IMPLEMENT THE LAW.

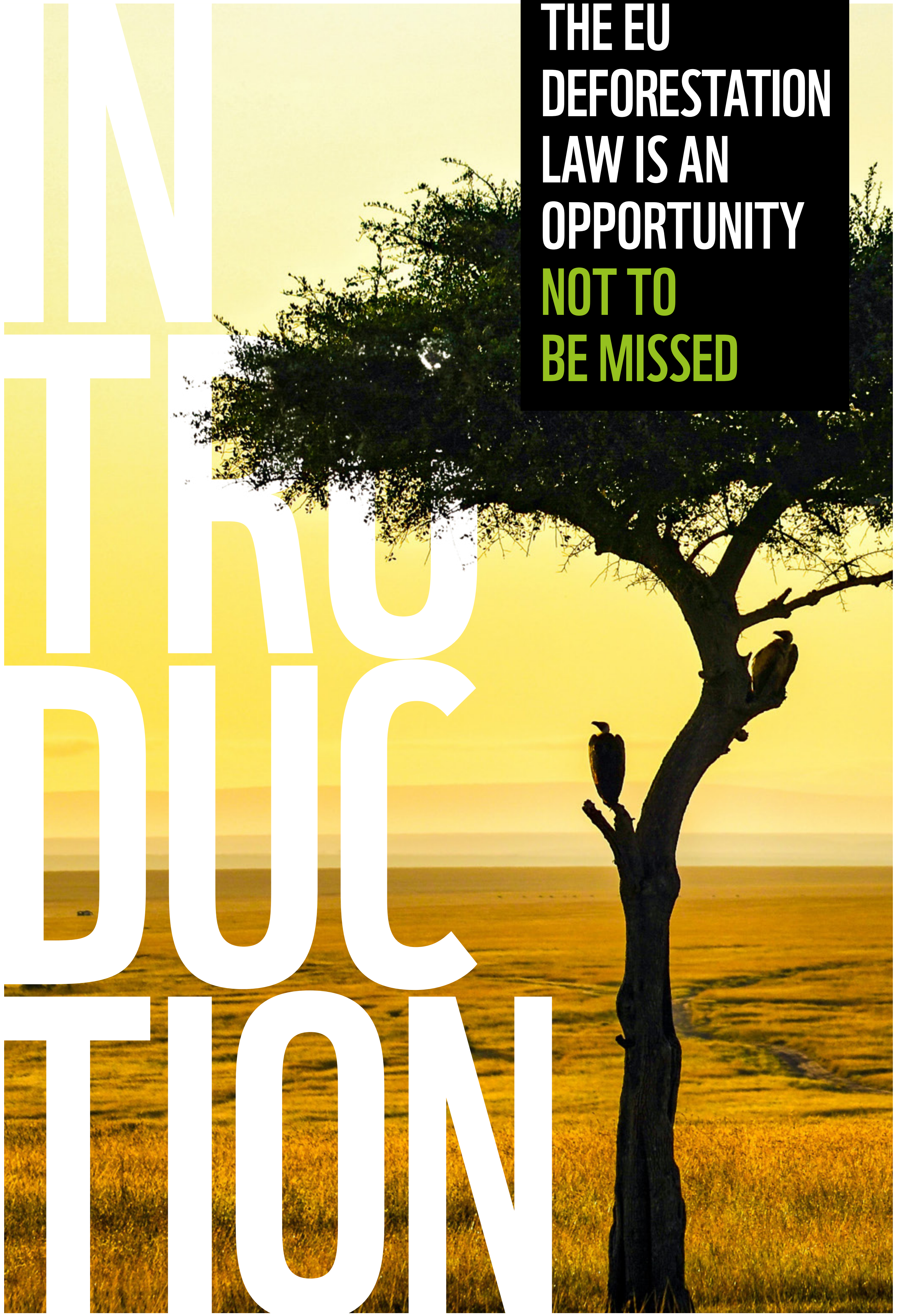
ELEMENTS TO KEEP

Clear enforcement measures and penalties are put forward, providing stringent standards for application of the legislation. This has been combined with a good basis for harmonization across the enforcement chain within and between EU Member States. The introduction of an EU-wide database to register operators and traders together with due diligence statements will lead to more transparency and therefore improve enforcement of the new law. Substantiated concerns by third parties are properly taken into account, supporting the Competent Authorities in their work.

ELEMENTS TO IMPROVE

Interim and corrective action such as confiscation should not replace penalties for companies, in order to dissuade non-compliance with the regulation. Reporting requirements are not stringent enough, excluding SMEs and introducing the possibility to also fulfil reporting under other legislation. As reporting on due diligence systems is an important tool to analyse the compliance with the regulation, all companies should have the same reporting requirements under the new legislation. Civil liability and access to justice for serious non-compliance should be introduced to offer the possibility to seek redress in case of harm caused.

INTRODUCTION



THE EU DEFORESTATION LAW IS AN OPPORTUNITY NOT TO BE MISSED

On 17 November 2021, the EU published its “proposal for a Regulation on deforestation-free products” (henceforth “the regulation”)[3] governing the placing on the EU market of certain agricultural commodities and products. This report argues that, by not including natural ecosystems beyond forests within the scope of the regulation, the EU is missing the opportunity to address a huge part of its own footprint, and risks undermining its own goals on climate change and biodiversity loss. This report provides the evidence for this claim and demonstrates that it is necessary and feasible for the EU to include ecosystems beyond forests in this regulation.

NATURAL ECOSYSTEMS BEYOND FORESTS ARE UNDER ⚠ THREAT

We are living through global crises of climate change[4] and biodiversity loss.[5] Nearly three quarters of the ice-free land on earth is significantly altered by human activities,[6] entailing loss of the natural vegetation, habitats, and ecosystem services that such places provide.

There is widespread recognition of the scale and impact of deforestation,[7] but many natural ecosystems beyond forests are suffering conversion rates as high, or higher than, those of forests (see Figure 1). Scientists and researchers have for years been calling for the scope of protection to be widened to ecosystems beyond forests, but public awareness remains low, and regulatory protection for other ecosystems in most cases lags far behind that afforded to forests.

One of the major drivers of these impacts on the natural world is the production of agricultural, livestock, and forestry commodities, which account for around 23% of all net anthropogenic carbon emissions globally.[8]

Natural ecosystems beyond forests include mangroves,[9] grasslands, savannahs, wetlands, and peatlands, among many others. They include some of the most extensive and biodiverse ecosystems on the planet. They store significant quantities of carbon,[10] often held in long-term stores below ground,[11] and they provide protection, livelihoods, materials, food, fresh water, and a sense of place and cultural identity to hundreds of millions of indigenous peoples and local communities (IPLCs).

The rate of loss of natural ecosystems means that the twin crises of biodiversity loss and climate change cannot be halted and reversed without decoupling agriculture, livestock, and forest commodity production from the conversion of natural ecosystems.

CONVERSION OF 5 NATURAL ECOSYSTEMS

In the period 1985-2020, more than 26 million hectares have been lost in the Cerrado, equivalent to an area greater than the size of the United Kingdom.

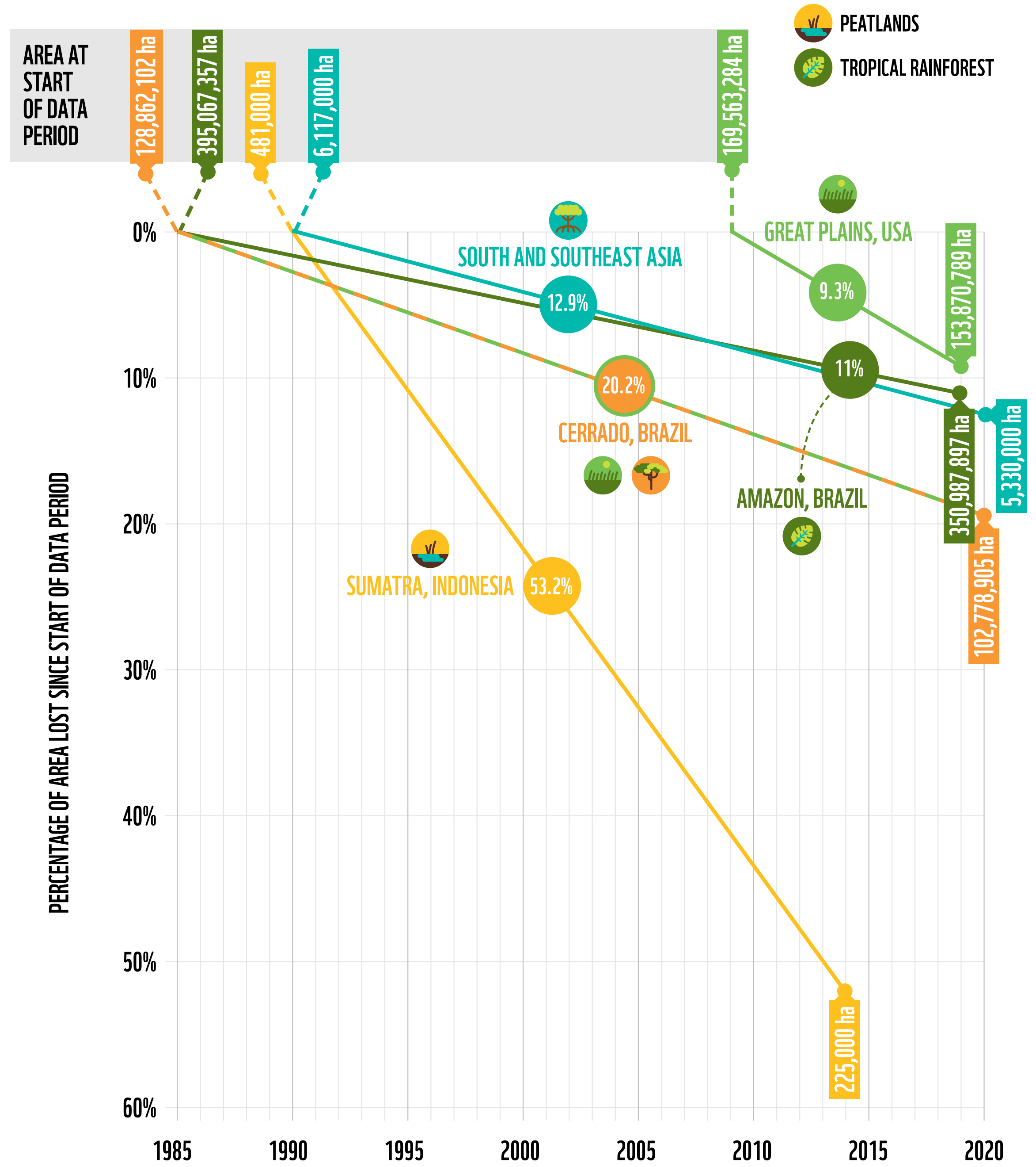


Figure 1: Conversion of 5 natural ecosystems. The change in area of the Amazon forest in Brazil is given as a comparator[12] (see Appendix 1 for details).

THE EU'S COMMODITY IMPORTS ARE DRIVING ECOSYSTEM CONVERSION GLOBALLY

The EU is a major importer of forest and ecosystem risk commodities that are directly associated with the loss of natural ecosystems; so called 'imported deforestation and conversion'. The EU ranks as the second biggest importer of tropical deforestation after China, and was responsible for an estimated 16% of all tropical deforestation associated with international trade in 2017 (totalling 203,000 hectares and 116 million tonnes of CO_2)[13]. Although attention has focused on the EU's role in tropical deforestation, the EU also imports significant volumes of commodities that originate from natural ecosystems beyond forests, such as savannahs, grasslands, wetlands, and peatlands (see Section "Urgency"). This report demonstrates that EU supply chains have a direct and ongoing role in the conversion of ecosystems beyond forests around the world.

EU RESPONSIBLE FOR
16%
OF ALL TROPICAL DEFORESTATION
ASSOCIATED WITH INTERNATIONAL TRADE IN 2017

THE EU'S PROPOSED REGULATION IS A KEY OPPORTUNITY TO PROTECT NATURAL ECOSYSTEMS BEYOND FORESTS

The EU has already recognised its responsibility to reduce its global footprint and has set out its ambitions for environmental leadership in the European Green Deal.[14] It has recognised a need to ensure that its food chain has a neutral or positive environmental impact, helps to mitigate climate change, and reverses the loss of biodiversity.[15] However, providing protection only to forests is a missed opportunity for the EU to reduce its role in driving conversion across all ecosystems. It may even have the effect of increasing conversion rates in ecosystems which fall outside the 'forest' definition, and will very likely make it impossible for the EU to achieve its overarching objectives to halt and reverse its impacts on climate change and biodiversity loss.

This report demonstrates that, unquestionably, the EU must integrate protection for ecosystems beyond forests into its legislation. The report also makes clear that the EU can do so, and that companies will be able to implement such requirements without undue difficulty.

The recently proposed regulation has developed from a series of policy and legislative initiatives which have previously recognised the need to protect ecosystems beyond forests. For example, in July 2019, the European Commission adopted a Communication on Stepping up EU Action to Protect and Restore the World's Forests, focusing on five priority areas.[16] This Communication recognised that "actions identified in this Communication can also be beneficial for certain other natural ecosystems as their loss is largely caused by the same drivers that cause loss of forests," elaborating that "certain natural ecosystems such as peatland and savannah, rich in carbon and biodiversity, do not meet the definition of forests, but are affected by agricultural production and are seriously threatened...".[17]

In October 2020, the European Parliament adopted a resolution calling on the Commission to develop an EU legal framework, based on mandatory due diligence, to regulate the placing of FERCs on the EU market.[18] This resolution explicitly included "conversion and degradation of other natural ecosystems and human rights abuses, including violations of the formal and customary rights of Indigenous Peoples and local communities" within the scope of the proposed legislation.

In the last quarter of 2020, the European Commission set out its work programme for 2021, which included proposing legislation to minimise "the risk of deforestation and forest degradation associated with products placed on the EU market".[19] It also held a public consultation on "Deforestation and Forest Degradation - Reducing the Impact of Products Placed on the EU Market", taking forward work from the "Stepping Up" communication. But the proposed "demand-side measures to increase supply-chain transparency and minimise the risk of deforestation and forest degradation associated with commodity imports in the EU" on which they consulted did not mention preventing the conversion of natural ecosystems beyond forests.[20]

Nearly 1.2 million citizens from the EU and beyond responded to the consultation, a record number, demonstrating the high value that people place on forests and demanding that the products they buy are not linked to forest and ecosystem destruction.[21]

On 17 November 2021, the Commission published its "Proposal for a regulation on deforestation-free products".[22] Despite the broad support from both the Members of the European Parliament and EU citizens, the proposed regulation includes only forest ecosystems within its scope.

The proposed legislation stipulates that a review of the scope of ecosystems covered within the legislation will take place two years after the proposal is adopted.[23] By then however, many of these ecosystems will already have undergone irreversible degradation and destruction, and the carbon storage potential, biodiversity richness, and ecosystem services on which millions of IPLCs rely will, in many cases, be irrevocably depleted.

WWF and a number of other NGOs have repeatedly called for the scope of the EU legislation to cover "conversion and degradation of natural ecosystems alongside deforestation and the degradation of natural forests".[24,25] This report provides further evidence to demonstrate that it is both necessary and feasible for the EU to redraft this regulation to include ecosystems beyond forests now.

ABOUT i THIS REPORT

This report challenges the EU to broaden the scope of its proposed legislation to provide protection for natural ecosystems beyond forests.

It begins by setting out the urgent need to protect and restore natural ecosystems beyond forests around the globe, focusing on four key ecosystem types - grasslands, savannahs, peatlands, and mangroves - to explain why these are important and how they have been and continue to be lost to commodity-driven conversion.

The report then demonstrates the responsibility that the EU has to protect all natural ecosystems from the impacts of its supply chains by focusing on nine case studies of biomes from South America, North America, Asia, and Africa. These case studies represent a varied, but not exhaustive, illustration of how EU imports of agricultural commodities from these biomes drive the conversion of natural ecosystems beyond forests.

Finally, the report shows that it is perfectly feasible to include natural ecosystems beyond forests within the EU's regulation – and that companies will be able to implement such requirements – using evidence from existing EU legislation, company practice, and a review of available tools, support services, and guidance.

The biomes and commodities studied in this report are by no means an exhaustive list of those areas to be addressed within the EU regulation, and nor does the report seek to specify the boundaries or criteria for which ecoregions should be included within the scope of the legislation. For example, the following important biomes dominated by non-forest ecosystems around the world are under significant threats from commodity-driven conversion and require urgent attention and protection, but due to limitations of space and/or paucity of data, they have not been included in the study:

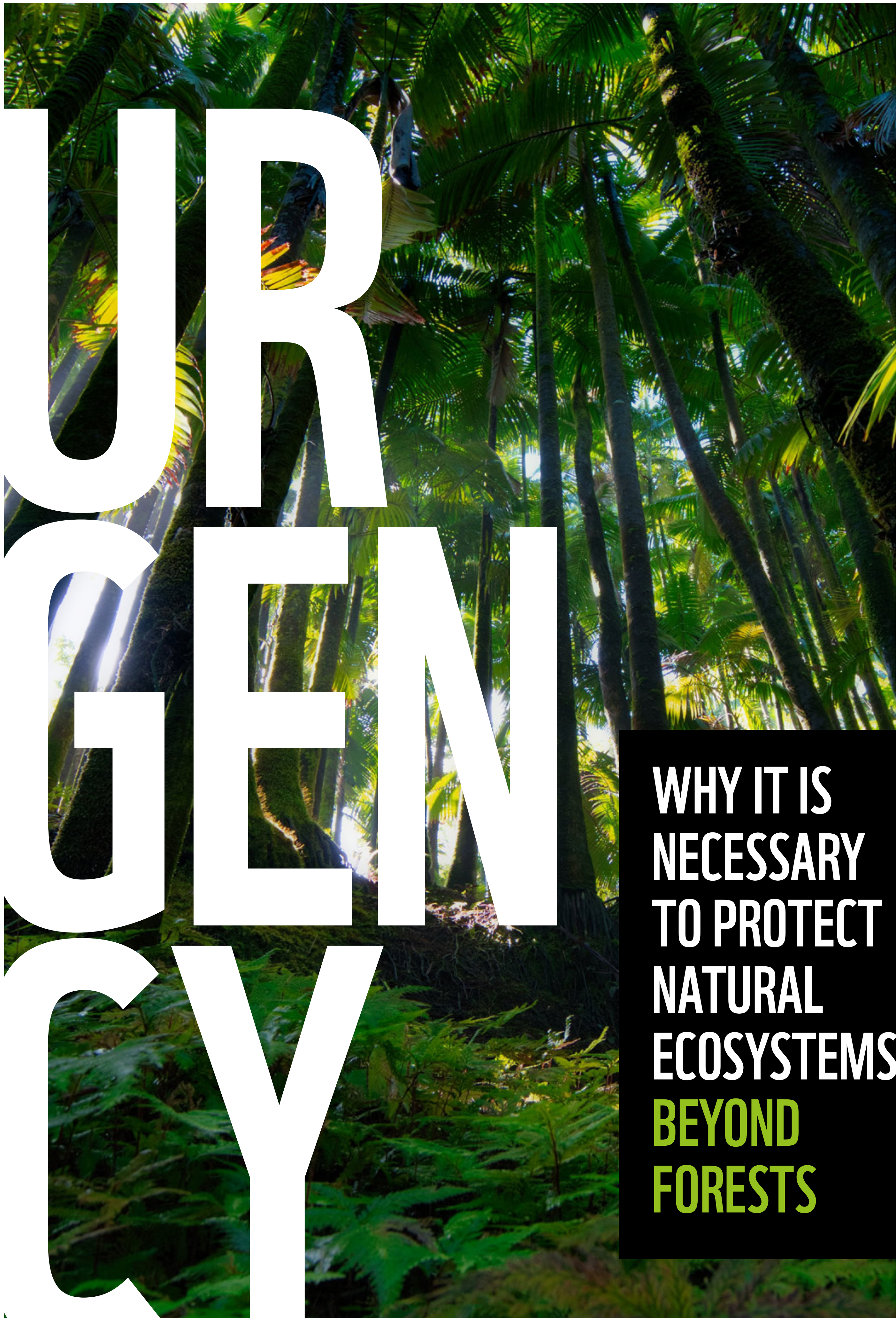
- Swamps and grasslands in Eastern Russia are being converted at a rapid pace into agricultural land for soybeans, corn, and wheat.[26]
- The savannahs of the Congo Basin of the Republic of Congo are under significant threat, especially from the expansion of palm oil.[27]
- The parámo grasslands in Ecuador have been rapidly converted into cropland over the past three decades, which has led to substantial losses in soil carbon.[28]

Similarly, not all commodities that are driving conversion have been analysed in this report. For example, maize is a significant driver of conversion in the Great Plains but has not been included as it is not as significant within the EU's imports as soy and wheat. Hence, while this report in no way attempts to provide an exhaustive list of biomes and commodities to include within due diligence, we rather seek to demonstrate, through analysis and case studies, the ecological and social importance of natural ecosystems beyond forests around the world, the EU's responsibility to protect such ecosystems, and the feasibility from both a policy and corporate perspective to commit to such protection.

DEFINITIONS[29]

This report focuses on the 'conversion' of natural ecosystems. 'Conversion' in this report is defined in accordance with the Accountability Framework as the change of a natural ecosystem to another land use or profound change in a natural ecosystem's species composition, structure, or function - whether the changes are legal, or not. Conversion includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function.[30]

The term 'degradation' is often used in the literature alongside 'conversion' and refers to less severe but nonetheless negative changes within natural ecosystems. However, as the production of the commodities we consider generally causes full-scale land-use change, this report is limited to considering conversion rather than degradation.



URGENCY

WHY IT IS NECESSARY TO PROTECT NATURAL ECOSYSTEMS BEYOND FORESTS

Natural ecosystems beyond forests provide significant benefits including carbon storage, biodiversity, and social and cultural values that are comparable to those provided by forest ecosystems (Figure 2). However, they are being rapidly converted and lost. It is therefore critical that they are afforded the same level of attention and protection as forests by being included within the scope of the EU's "regulation on deforestation-free products".

In this report, we focus on four ecosystems - savannahs, grasslands, peatlands and mangroves - in order to summarise evidence on how they are valuable and how they continue to be threatened by commodity production. We then provide nine case studies of biomes from around the world to show how the EU's imports drive ecosystem conversion.

While mangroves and forested peatlands would in many cases fall within the FAO definition of forest ecosystems,[31] they have been included in this study as they share several traits with non-forest ecosystems: some areas do not fit the forest definition proposed by the EU, some have already lost their tree cover but remain crucial ecosystems to be protected, they store the majority of their carbon below-ground and they have historically been overlooked.

Case studies were chosen to demonstrate a range of ecosystems and commodities - some are the usual suspects, while others are less well known. They illustrate the diversity of vegetation observed in many ecosystems and the need to consider natural ecosystems that do not fit strictly into a single definition.

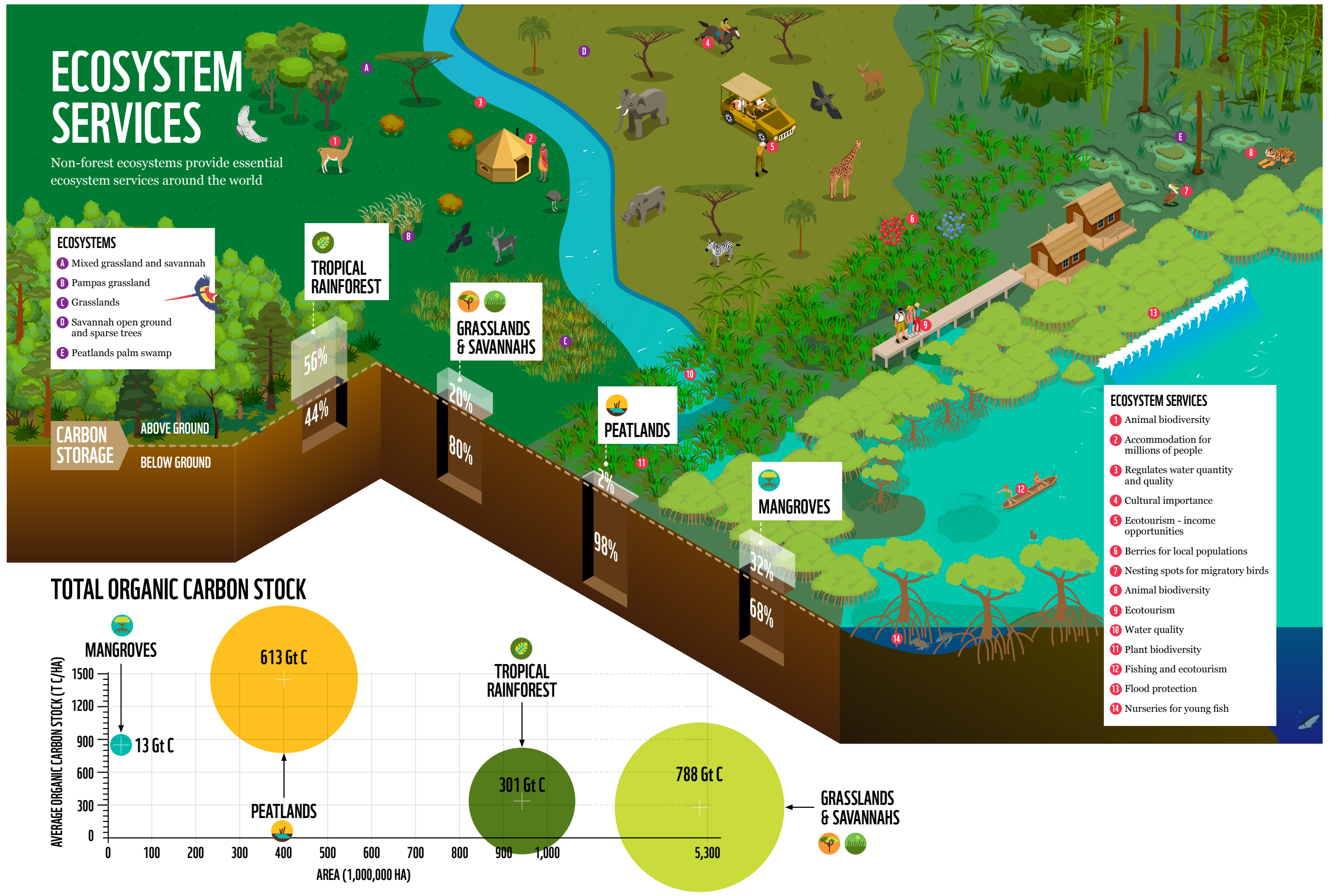


Figure 2: Illustration of the ecosystem services provided by mangroves, grasslands, savannahs, and peatlands, including biodiversity, livelihoods, and carbon storage both above and below ground (see Appendix 1 for details and methodology).

GRASSLANDS & SAVANNAHS

DESCRIPTION

"Grassland" is a broad term with varying definitions.[32] A dominance of grasses is the unifying trait of these definitions, although it is widely acknowledged that grasslands may also include vegetation such as trees and shrubs.[33] Broadly speaking, savannahs can be considered a type of grassland with a greater presence of trees and shrubs, and they are sometimes included within the category of woodlands.[34,35] The variety of names - prairies, shrublands, llanos, paramos, meadows, steppe, veld, plains, pampas, campos, grasslands, rangelands, savannahs - of grass-dominated ecosystems indicates their diversity and their distribution all around the world.[36] They have evolved over millions of years and have been shaped by the progressively cooling global climate, seasonal wildfires, frost, and/or the emergence of large herbivores.[37]

ECOLOGICAL IMPORTANCE

Grassland ecosystems have immense ecological significance and are crucial in the fight against climate change. They are rich in endemic, specialized biodiversity, and they have been found to store approximately the same amount of carbon as forest ecosystems;[38] as much as 30% of total terrestrial carbon.[39] In addition, grassland ecosystems are often more stable stores of carbon than forests, as the vast majority is stored below ground, meaning it is less vulnerable to disturbance by droughts and fires than forests.[40]

In addition to their importance for mitigating climate change, grasslands and savannahs are home to incredible global biodiversity and support extremely rich flora and fauna. For example, the Cerrado biome of Brazil, largely dominated by savannah, has plant species richness on par with that of the Amazon rainforest,[41] and the Orinoquía region of Colombia contains over 55% of Colombia's wetland habitats and supports 318 mammal species, representing 69% of all mammal species in Colombia.[42]

SOCIAL IMPORTANCE

Grasslands and savannahs are not only significant for ecological reasons; they are also home to more than one billion people around the world for whom they provide essential ecosystem services.[43] Livestock grazing has provided sustainable livelihoods for indigenous peoples and local communities throughout all of human history. In addition to providing key services such as food, water, medicines and fuel, grasslands and savannahs also provide important cultural and spiritual services to the millions of people that live in them across Africa, Asia, Australia, as well as North and South America.[44,45] In Brazil's Cerrado, for example, foraging for wild fruit - some traded internationally as "superfoods" - and ecotourism are just two of the important sources of income the habitat provides for IPLCs in the region.[46] The services provided by these ecosystems extend to people far beyond those living there; the Cerrado is the origin of 8 out of 12 of Brazil's watersheds, and thus, the citizens of major Brazilian cities are dependent on the health of the Cerrado for both the quantity and quality of the water they consume.[47]

THREATS

Despite the large number of both ecological and social ecosystem services provided by grassland ecosystems, about half of the planet's grasslands and savannahs have already been lost.[48]

Persistent burning of grasslands and overgrazing when land is converted to pasture has contributed to grasslands and savannahs becoming among the most threatened ecosystems on the planet,[49] and despite their ecological and climatic importance, they are afforded very low levels of protection; only 8% of grasslands across the world are protected.[50]

Grassland conversion has also already resulted in the decline of species; for example, since the 1960s, the number of grassland songbirds in the Great Plains has declined by 80%, and species like the Chestnut-collared Longspur are under notable threat.[51]

Agricultural commodities have been found to be a main driver of the threats towards grasslands and savannahs; a study on the 133 Brazilian municipalities that supply soy directly to the UK – most of which also supply the EU – showed that remaining non-forest vegetation that has no legal protection, and which is therefore at an elevated risk of conversion, stores 149.8 million tonnes of carbon.[52] The same municipalities contain 619 critically endangered, endangered or vulnerable species[53]. Protecting such ecosystems is thus critical for reversing the current sixth mass extinction that we find ourselves in.[54]

Without increased protection and recognition in environmental legislation such as the due diligence laws currently being developed by the EU, such conversion is likely to continue. A much stronger focus on grasslands and savannahs is needed to ensure they get the recognition and protection they deserve; whilst many researchers understand their critical importance, this urgently needs to be elevated and amplified among governments, private sector actors, and citizens.

PEATLANDS

DESCRIPTION

Peatlands[55] are important natural wetland ecosystems with high value for biodiversity, climate regulation, and human welfare. They are found in more than 180 countries,[56] from sub-polar to boreal zones and the tropics. Although they cover less than 3% of the Earth's surface, they store one-third of total global soil carbon.[57] Many IPLCs are dependent on peatlands, and the ecosystems also provide a wealth of goods and services to industrial societies, including carbon storage, water regulation, and biodiversity conservation.

Peat soils are formed by the build-up of partially decomposed organic matter under waterlogged anaerobic conditions. Most peat is found in cool climatic regions where decomposition is slower, but deposits are also found in the tropics, and recent discoveries suggest the extent and depth of these, and hence carbon stored, is much larger than originally thought.[58] Peatlands may be naturally forested, as is often the case in Southeast Asia, or naturally open and vegetated with mosses or sedges, as is often the case in Latin America.[59] Suitable conditions for the formation of peatlands occur in many parts of a landscape – they can be found on watersheds and in river valleys, around lakes, along seashores, in high mountains, and even in the craters of volcanoes.

ECOLOGICAL IMPORTANCE

Peatlands are the most carbon-dense of any terrestrial ecosystem in the world,[60] storing twice as much carbon per hectare as the world's forests.[61] Peatlands globally hold an average of approximately 1,375 tonnes of carbon per hectare.[62] Forested peatlands have particularly high carbon stocks and are extremely vulnerable to logging and changes in regional climate.[63]

Current greenhouse gas emissions from drained or burning peatlands are estimated to be up to five percent of all emissions caused by human activity – in the range of two billion tonnes of CO_2 per year,[64] approximately double the emissions from global aviation[65] and twice as large as the CO_2 emissions occurring due to deforestation and fires in the Amazon rainforest.[66]

Tropical peatlands support a wide range of unique, threatened and/or endemic tropical species including 31 species of lowland rainforest trees known as dipterocarps across Southeast Asia[67] and five of the six species of great apes. Often inaccessible, the biodiversity of most peatlands is poorly understood.[68]

Peatlands are important for the long-term storage of water, globally, as they consist of about 90% water[69] and thus act as vast water reservoirs. Worldwide, peatlands contain 10% of global freshwater reserves,[70] contributing to the water security of human populations and ecosystems downstream. They play an important role in the provision of drinking water and for agricultural irrigation, both in areas where catchments are largely covered by peatlands, and in drier regions where peatlands provide a limited but constant availability of water.

SOCIAL IMPORTANCE

Peatlands have supported the health and wellbeing of people for thousands of years,[71,72] and provide food security and livelihoods for many communities,[73] although tropical and temperate peatlands can have very different uses, histories, and contemporary threats.

Pristine peatlands in boreal and temperate regions are a source of berries, mushrooms, and medicinal plants,[74] and in the tropics provide an even wider variety of non-timber products. In many areas, including Indonesia, fishing in peatland catchments is the main source of income; people here traditionally catch fish and reptiles, as well as collecting fuel wood, grass and other products.[75] Across the Cuvette Centrale peatlands in both the Republic of the Congo and the Democratic Republic of the Congo, people also rely on peat forest resources for their livelihoods, with a focus on fishing and small-scale farming of crops such as manioc and banana.[76] These products are important sources of vitamins and proteins, especially for rural communities.[77]

THREATS

Around the world peatlands are under threat from drainage for development, mainly for the purposes of agriculture, forestry, resource extraction, and infrastructure development. At least 15% of global peatland reserves are estimated to have been either destroyed or degraded.[78] Over 90% of peat swamp forests in Southeast Asia have been impacted by deforestation, conversion, drainage and legal or illegal logging.[79] In Western Europe, many countries have converted over 90% of the original extent of their peatlands over the past centuries,[80] contributing to the loss of 50%[81] or more[82] of some of these countries' original biodiversity and releasing vast amounts of carbon into the atmosphere.

Clearance and drainage of peatlands results in the oxidation of the carbon-rich soil and release of carbon to the atmosphere. Initially, the organically rich soil means peatland areas can be highly productive when first converted to agriculture, but the generally low level of nutrients means they are quickly exhausted. Once dried, peatlands are vulnerable to widespread and prolonged fires. The low oxygen content of peatlands results in partial burning of the organic matter and high loads of particles, contributing disproportionally to air pollution and haze.

Much of the small-scale but widespread agricultural encroachment in tropical peatlands is linked to severe poverty,[83] whereas large-scale encroachment is driven mainly by palm-oil plantations. In Southeast Asia, oil palm plantations have been one of the main drivers of peatland degradation (along with Indonesia's unsuccessful 'Mega Rice Project' of the 1990s[84]). Of the 4.3 million hectares of peatland in Peninsular Malaysia, Sumatra, and Borneo that has now been converted, 73% is occupied by oil palm plantations.[85]

Nowadays, there is very little new peatland drainage in temperate zones[86] due to declines in crop production and increasing costs.[87] However, the area being drained in the tropics is dramatically increasing, particularly in Southeast Asia, thus increasing flammability and risk of pollution-related public health crises. In 2010, toxic smoke from burning of degraded peatlands in Russia resulted in 50,000 additional deaths in the city of Moscow.[88] In 2015, fires burned for 5 months across 2.6 million ha of land in Indonesia, of which 33% was peatlands; the total cost of the fire was estimated at USD 16.1 billion.[89] About 500,000 people were hospitalized and thousands of others suffered including people in the neighbouring countries of Malaysia and Singapore.[90]

MANGROVES

DESCRIPTION

Mangrove forests occur along sheltered tropical and subtropical shorelines including the west and east coasts of Africa, Asia, and North and Central America.[91,92] They support around 60 species of salt-tolerant trees and a wide variety of aquatic and salt-tolerant plants and animals.[93] Mangrove trees have distinctive semi-submerged roots, which allow them to grow in waterlogged and oxygen-poor soils in the intertidal zone between terrestrial and near-shore marine ecosystems. The trees are highly adapted to their habitat and their aerial roots absorb oxygen from the air whilst their leaves excrete excess salt.[94] Although usually considered a subset of forests, the unique characteristics of mangroves and the severe consequences of their degradation and conversion warrants their inclusion here.

ECOLOGICAL IMPORTANCE

The total carbon storage potential of mangroves (above- and below-ground) is considerable and roughly 50% higher than that of tropical rainforests (470 tonnes C/ha compared to 320 tonnes C/ha).[95,96] The majority of the carbon is held in the waterlogged, peaty soils where it can remain stored for centuries if not disturbed. Enhanced sedimentation caused by mangrove forests can increase the formation of coastal carbon-rich peat soils.[97] Global mangrove forests currently store over 21 gigatons of CO_2[98] but annual rates of mangrove clearance release 24 million tonnes of CO_2 each year; equivalent to approximately 5 million passenger vehicles driven for one year.[99]

Mangroves support very high biodiversity and unique ecological communities. Occurring at the interface between terrestrial and marine ecosystems, mangroves provide a wide array of habitats and are home to a diversity of terrestrial, estuarine, and marine plants and animal species. Mangrove trees and other species have evolved adaptations to the salty, oxygen-poor coastal conditions and tidal regimes, and are highly unique to mangrove ecosystems. Mangrove forests also provide critical shelter for nurseries of young fish and other marine life as well as being key nesting and stop-over sites for migratory birds.[100] They are critical to the existence and health of adjacent habitats, including seagrass beds and coral reefs, through controlling nutrient and sediment flows and protecting coastal areas from flooding, erosion, and storm damage[101]. Globally, mangroves support over 340 internationally threatened species including the hawksbill turtle, the Bengal tiger and several water bird species[102].

SOCIAL IMPORTANCE

Particularly in rural coastal areas with high rates of poverty, mangroves provide a critical source of livelihoods, food, construction materials and fuel for local populations, as well as providing employment and income opportunities through fishing and tourism.[103,104] Mangroves also underpin the existence and health of adjacent habitats including coral reefs, which have significant cultural value.[105] Communities traditionally use mangrove forests for subsistence fishing and harvesting products including firewood, fruit, salt, and leaves for livestock feed.[106] The impact of subsistence exploitation of mangroves is relatively small. Wood removal for firewood, for example, may lead to some degradation of the habitat but is rarely a cause of mangrove loss.[107]

In addition to supporting livelihoods and food security, mangroves play a valuable role in coastal protection. Dense mangrove forests significantly attenuate the energy of waves providing protection to coastal communities against storms and erosion.[108] This ecosystem service is becoming increasingly important as rising sea levels intensify the threat to coastlines. The flood and erosion protection provided by healthy mangrove forests is worth millions of dollars to affected areas each year.[109]

THREATS

Mangrove forests are declining at an extremely rapid rate worldwide. Around 1-2% are lost per year - a rate equal to or greater than declines in coral reefs and tropical forests[110] - and approximately 35% of mangroves have been lost in the last 20 years.[111] Direct human impacts are responsible for over 60% of mangrove loss.[112] This is primarily through conversion to produce commodities such as rice, shrimp, and palm oil, which accounted for 62% of global mangrove losses between 2000 and 2016.[113] Other pressures include coastal urbanisation, mining, and petroleum extraction.[114] Climate change also poses a major threat to mangroves through sea level rise and increasing storm frequency and intensity. Losses are occurring in nearly all countries that have mangroves[115] with particularly extensive losses in Southeast Asia, which hosts around one-third of global mangroves.[116]

RISKS ⚠ OF PRODUCTION LEAKAGE TO NATURAL ECOSYSTEMS BEYOND FORESTS

If the EU's product-based due diligence legislation includes protection only for forests, it is likely that part of the production currently expanding into forests will sooner or later shift from forest to natural ecosystems beyond forests, adding itself to the existing overwhelming pressure of commodity expansion onto natural ecosystems beyond forests. This shift is already happening. For example, while the Amazon Soy Moratorium, adopted in 2006, is widely held to have contributed to a dramatic reduction in deforestation related to soy conversion in the Brazilian Amazon, conversion of the Cerrado to cropland over the same period has continued to rise; from 7% between 2003-2005 to 16% between 2011-13.[117] This has been the case even though there are large areas of degraded land elsewhere that could be used for agriculture rather than clearing native vegetation. One reason is that while financial returns of converting pastureland to cropland are higher than converting native vegetation, lower land prices for native vegetation means that this is often cleared instead of land that has already been converted. Moreover, the flat topographies of savannahs and their sparse vegetation compared to forests increases the ease of conversion and is thus a key driver of land clearing; as a result, they are now among the most threatened ecosystems globally.[118]

This phenomenon of increased pressure on other natural ecosystems when protection is afforded only to forests has also been seen in other contexts.[119] For example, in the Congo Basin, the government decided in 2019 that all large-scale agricultural activities beyond five hectares should be oriented to the savannahs in response to calls to protect forests.[120] In addition, North American soy producers market themselves to European and Asian Markets on improved environmental practices compared to South America,[121] which has resulted in European soy buyers increasing their imports from North America to reduce deforestation risks, while the large-scale crop-related conversion of the Great Plains is overlooked.

The ecological reality is that there are rarely distinct borders between one ecosystem and another: there are transition zones and complex mosaics of vegetation. Given the complex land use dynamics associated with agricultural expansion, it is essential to avoid focusing exclusively on a single ecosystem or small group of commodities and instead consider all major landscapes affected by commodities that risk driving habitat conversion. To ensure that agricultural production becomes genuinely sustainable, rather than simply shifting the production from forest areas to other valuable natural ecosystems, the EU must include all natural ecosystems within the scope of its due diligence legislation.

CASE STUDIES – HOW THE EU'S IMPORTS DRIVE ECOSYSTEM CONVERSION

This section outlines the responsibility of the EU for the conversion of valuable natural ecosystems around the world. This is illustrated through case studies of nine ecological regions for which the main commodities driving conversion are identified and the share of the EU's imports of the given commodity from the region are estimated (Figure 3). This demonstrates how the EU, by virtue of its size and weight as a global trade partner, has a significant role in the conversion of these habitats and a responsibility to protect these and other natural ecosystems from commodity-related conversion.

The nine biomes highlighted are illustrative examples. Each illustrates specific elements of the links between EU supply chains and conversion, and the consequences of that conversion:

- The volume of imports of palm oil from peatlands in Sumatra and Kalimantan, of soy and beef from the Cerrado in Brazil, wheat and soy from the Great Plains in the USA and natural rubber from Sumatra, Indonesia all demonstrate the scale of potential impact of the EU on these threatened ecosystems.
- Other case studies demonstrate often overlooked EU supply chains that originate in ecosystems beyond forests, and which can have disproportionate environmental and social consequences (e.g., shrimp from mangrove ecosystems in Kalimantan, Indonesia).
- The case of the Cuvette Centrale, Congo Basin, Democratic Republic of Congo is an example of an emerging frontier of conversion in which the EU has an opportunity to play a role in preventing the large-scale ecosystem destruction that has been repeated so often elsewhere.

Figure 3 displays the supply chain links between the nine case study ecosystems and the EU. The arrows indicate the exports from the biomes to the EU, which in many cases represent a significant proportion of EU imports of that commodity. In other cases (e.g., soy from the Chaco in Argentina, shrimp from mangroves in Kalimantan, and timber from DRC), the trade volumes to the EU are a significant proportion of exports of commodities from those places and this is shown by the embedded charts.

The EU therefore has a clear responsibility to regulate to ensure that natural ecosystems beyond forests are not degraded or converted to supply the EU's ongoing demand for agricultural, livestock and forest products.

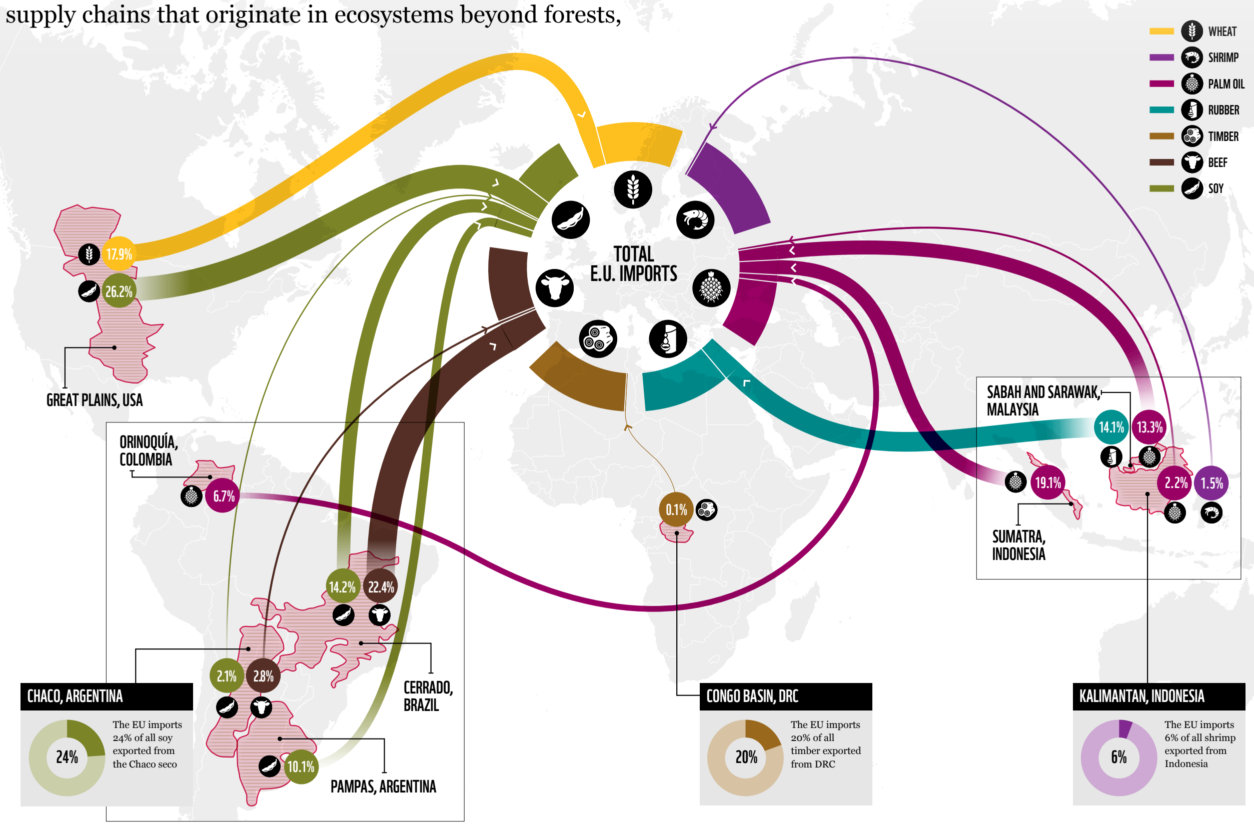
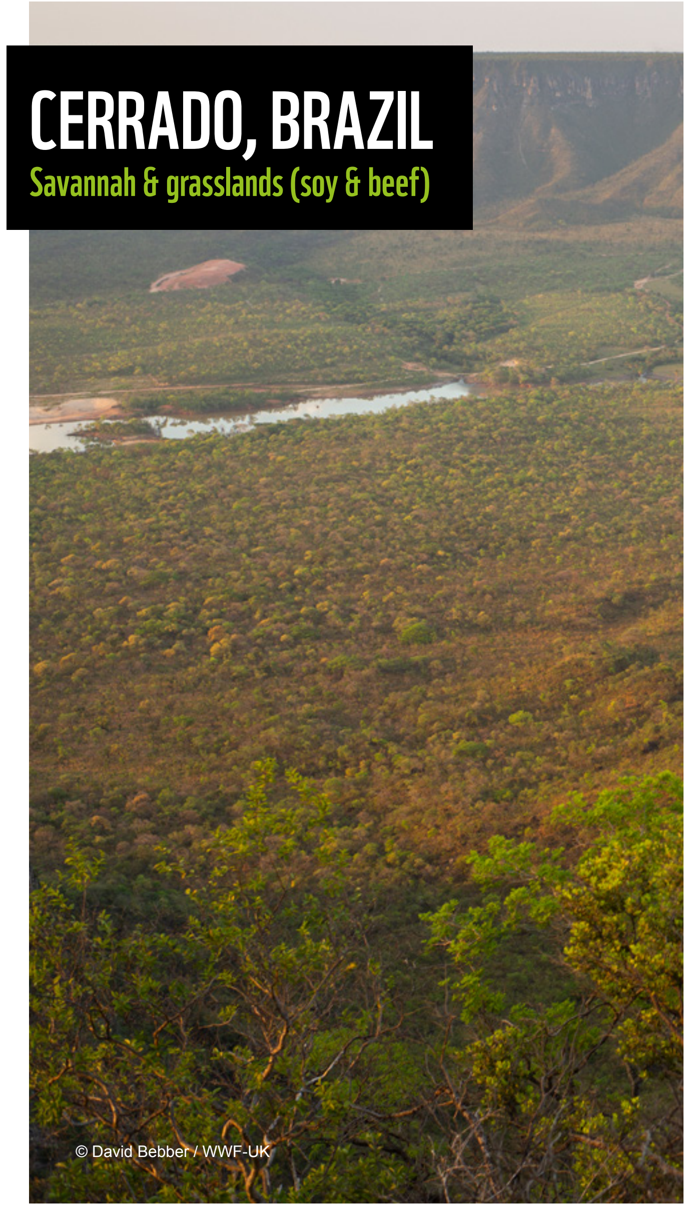


Figure 3: The proportion of EU commodity imports which come from the nine biomes featured in case studies in this report. Arrows show the percentage of EU imports of each commodity which come from each geographical area, an indicator of how important the area is to the EU. Embedded charts show the proportion of the area's production that is exported to the EU. The first is an indicator of how important the area is to the EU. The second is an indicator of how important trade with the EU is to the area, and has been provided in those cases where this gives a different perspective on the relationship than the first indicator alone. (See Appendix 1 for methodology and further details)

CERRADO, BRAZIL

Savannah & grasslands (soy & beef)



ECOSYSTEM DESCRIPTION:
Characteristically savannah, but in reality, a complex mosaic of savannah, grassland, and forest.[122]

AREA:
200 million hectares[123]

CONVERSION:
More than half of the Cerrado has already been cleared of its native vegetation, mostly since the 1970s.[124] Soy and beef production are two of the major drivers of conversion.[125]

BIODIVERSITY:
The most species-rich tropical savannah in the world, the Cerrado is home to nearly 5% of the world's species,[126] and approximately 5,000 plant species can be found only in the Cerrado.[127]

CARBON STORAGE:
Cerrado vegetation stores significant quantities of carbon: 22-78 tonnes of carbon per hectare in the vegetation, with a further 97-210 tonnes per hectare in the soil.[128]

OTHER OUTSTANDING CHARACTERISTICS:
The Cerrado contains 8 out of 12 of Brazil's watersheds,[129] and these rivers are crucial for regulating both the quality as well as the quantity of water supplies to major cities in Brazil.[130] The Cerrado is home to over 80 indigenous peoples.[131]

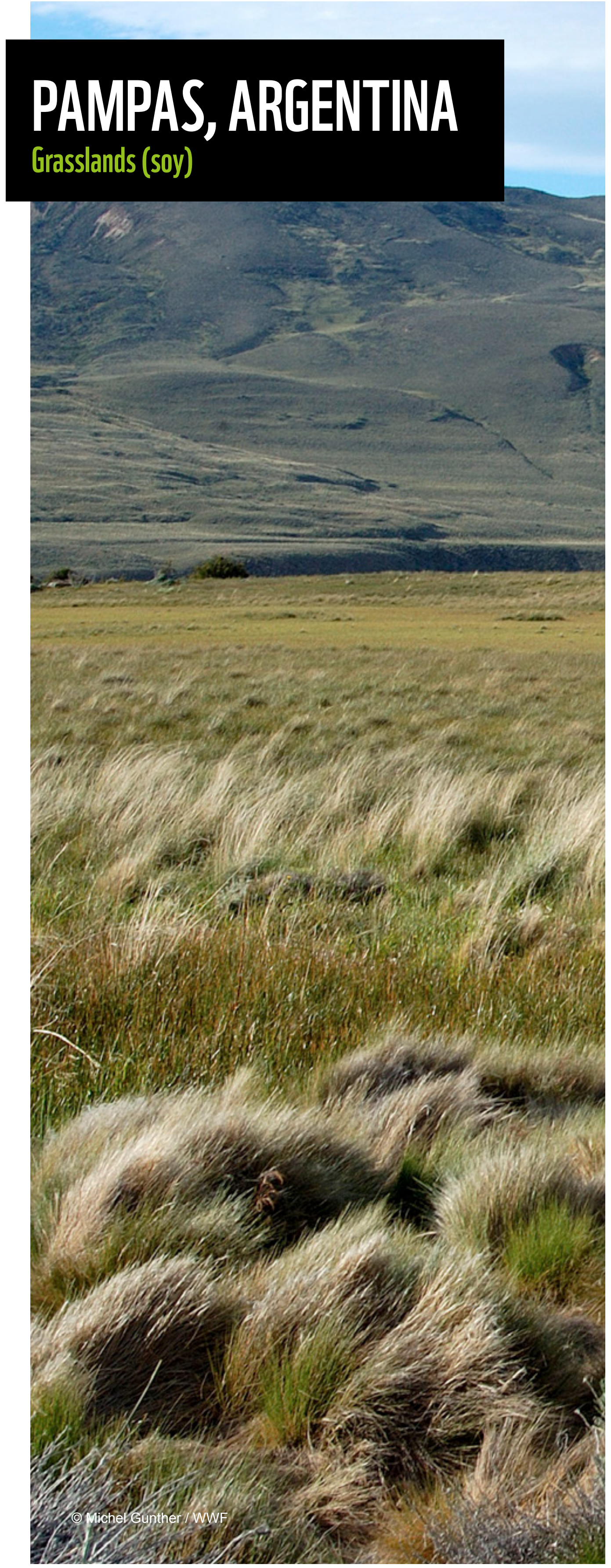
EU IMPORTS OF SOY AND BEEF FROM THE CERRADO, BRAZIL

Soy. In 2019, the EU imported an estimated 4.8 million tonnes of soy directly from the Cerrado[132]. This is equivalent to 14% of all direct imports of soy into the EU and 11% of all soy exports from the Cerrado.[133]

Beef. Brazil is responsible for 13% of global beef production[134]. EU imports of beef directly from the Cerrado in 2019 were 70,000 tonnes[135], accounting for 26% of the EU's total beef imports (Figure 3). This is equivalent to 19% of beef exports from the Cerrado.[136]

4,835,184 TONNES
OF SOY IMPORTED FROM BRAZILIAN CERRADO
14% Estimated EU imports **from the Brazilian Cerrado.**

26%
OF BEEF IMPORTED FROM BRAZILIAN CERRADO
69,797 tonnes Estimated EU imports **from the Brazilian Cerrado.**



PAMPAS, ARGENTINA

Grasslands (soy)

ECOSYSTEM DESCRIPTION:
Extensive area of grasslands with scattered islands of forest in the southeast of Argentina.[137]

AREA:
82 million hectares.[138]

CONVERSION:
By 2016 almost three quarters of its area was cropland.[139] The rate of conversion is still high, and the grasslands have been shrinking at a rate of 1% a year in some areas, and 10% a year in others.[140] Soy, maize, wheat, and cattle are major drivers.[141]

BIODIVERSITY:
It hosts a rich biodiversity including 4,000 native plant, 300 bird, 29 mammal, 49 reptile and 35 amphibian species.[142] The biome is particularly important for neotropical and Nearctic birds which migrate from the Northern Hemisphere during the winter.[143]

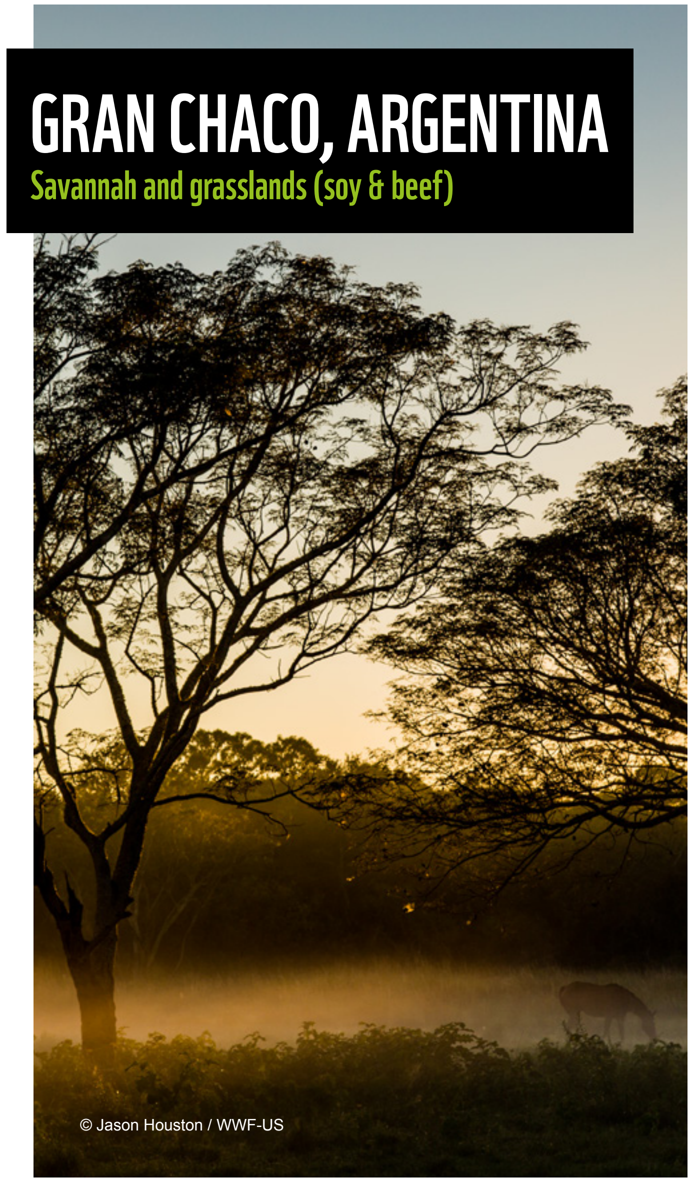
CARBON STORAGE:
It has been estimated that the Pampas grasslands store 56 tC/ha.[144]

OTHER OUTSTANDING CHARACTERISTICS:
The social organisation of the Pampas has been redefined as a result of agricultural intensification, with an employment shift towards large agribusinesses rather than small family-run farms.[145] 60% of the Pampas region is currently under annual production.[146] Even with significant changes in policy, the economic incentives of converting natural grassland to cropland is very high as profits are greater than any alternative use.[147]

EU IMPORTS OF SOY FROM THE PAMPAS, ARGENTINA

In 2019, the EU imported an estimated 3.8 million tonnes of soy directly from the Pampas[148]. This is equivalent to 10% of all direct imports of soy into the EU, and 15% of all soy exports from the biome[149].

15%
OF SOY EXPORTED FROM ARGENTINIAN PAMPA
3,813,433 tonnes
Estimated EU imports
from the Argentinian Pampa.



GRAN CHACO, ARGENTINA

Savannah and grasslands (soy & beef)

ECOSYSTEM DESCRIPTION:
The Gran Chaco stretches across subtropical to temperate regions creating two broad ecoregions; the Dry Chaco to the west and the Humid Chaco to the east[150]. Much of the Dry Chaco is forested but there are also important areas of natural grassland, savannahs, scrublands and wetlands.[151]

AREA:
108 million hectares.[152]

CONVERSION:
Between 2010 and 2017, agricultural and pasture lands expanded by around 3.7 million hectares in the Gran Chaco region, with corresponding declines in forest cover and grasslands.[153,154] An estimated 14% of the Argentine Chaco was converted to agriculture during the 2000s.[155] Soy is the main driver.[156]

BIODIVERSITY:
The grasslands and savannahs of the Dry and Humid Chaco provide critical habitat for a distinctive component of Chaco biodiversity.[157] Many species of the Chaco - including several that are of conservation concern - are strongly associated with areas of open savannah rather than forest; for example, the vulnerable giant anteater, the near-threatened greater rhea, and the near-threatened maned wolf.[158]

CARBON STORAGE:
Carbon stocks in these natural grasslands and savannahs are poorly understood, however the above ground carbon stock is arount 60tC/ha.[159]

OTHER OUTSTANDING CHARACTERISTICS:
Historically, people used the Gran Chaco area for subsistence cattle rearing, with relatively minimal impacts on the habitat. However, this low-intensity production has been rapidly replaced with large-scale commercial agriculture and cattle ranching.[160]

EU IMPORTS OF SOY AND BEEF FROM THE GRAN CHACO

Soy. Argentina is responsible for 16% of global soy production[161]. The EU imported nearly 600,000 tonnes of soy from the Chaco biome in 2019, which is 24% of the total soy exports from the biome[162].

Beef. Argentina is responsible for 4% of global beef production[163]. The EU imported an estimated 7,500 tonnes of beef from the Chaco biome in 2019, which is 3% of total imports[164]. However, this estimate should be considered provisional due to a paucity of data (see Appendix 1).

24%
OF SOY EXPORTED FROM ARGENTINIAN CHACO
592,101 tonnes
Estimated EU imports
from the Argentinian Chaco.

7,500 TONNES
OF BEEF IMPORTED FROM ARGENTINIAN CHACO
3% Estimated EU imports
from the Argentinian Chaco.

ORINOQUÍA, COLOMBIA

Savannahs (palm oil)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ECOSYSTEM DESCRIPTION:

Characterised by large, open savannah vegetation[165] but has high habitat diversity with three distinct types of savannah ecosystem, each supporting different species assemblages[166], as well as 55% of Colombia's wetland habitats.[167]

AREA:

35 million hectares.[168]

CONVERSION:

Around 12% of the Orinoquía has been converted for agricultural use[169]. Around 30% of Colombia's palm oil is produced in the Orinoquía region[170]. The total area of palm oil plantations in Colombia more than doubled between 2002 and 2012, to 452,000 ha[171], making it the largest producer of palm oil in South America[172] and the fourth largest in the world[173].

BIODIVERSITY:

It is one of the most biodiverse places on the planet,[174,175] with over 300 mammal species,[176] 4,800 plant species, 1,300 bird, 119 reptile and amphibian and around a thousand different fish species.[177] However, only 4% of the area is protected.[178]

CARBON STORAGE:

The total carbon content of the Orinoquía area is estimated to be equivalent to around 3.7 billion tonnes CO_2 in the topsoil alone.[179] This is equivalent to approximately 20 times the size of Colombia's total emissions in 2018 (184 million tonnes CO_2 eq).[180]

OTHER OUTSTANDING CHARACTERISTICS:

The Orinoquía contains 40% of Colombia's subterraneous water[181]. It is home to several indigenous peoples, who rely heavily on fish for subsistence and income.

EU IMPORTS OF PALM OIL FROM COLOMBIA

Around 50% of the palm oil produced in Colombia is exported[182] and Europe is the destination for around 60% of these exports, with the Netherlands and Spain being the main destination countries.[183]

The EU imported an estimated 981,000 tonnes of palm oil, palm kernel oil, palm kernel meal and palm oil derivatives from Colombia in 2019[184], which is 7% of total EU imports of oil palm products of 14.7 million tonnes. There is no up-to-date data on the quantity of palm oil exported from the Orinoquía region to the EU, but it has been estimated that 30% of Colombia's palm oil production is from the Orinoquía region,[185] implying that a significant proportion of the EU's imports from Colombia are likely to originate from this biome.

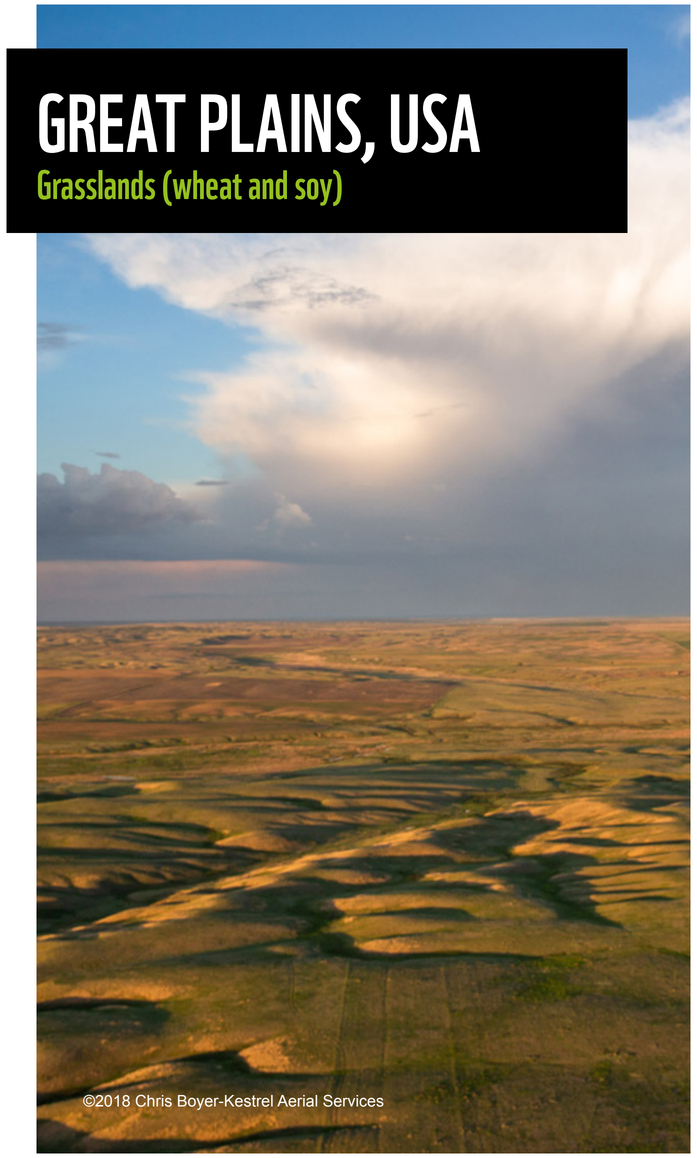
7%

OF PALM OIL, PALM KERNEL AND PALM KERNEL MEAL IMPORTED FROM COLOMBIA

980,732 tonnes
Estimated EU imports **from Colombia.**

GREAT PLAINS, USA

Grasslands (wheat and soy)


©2018 Chris Boyer-Kestrel Aerial Services

ECOSYSTEM DESCRIPTION:

The Great Plains region is predominantly grassland, constituting 48% of the total area.[186] The east is characterised by tallgrass and medium grass vegetation (prairies), whereas the west contains more shortgrass and bunchgrass vegetation (steppes).[187]

AREA:

252 million hectares.[188]

CONVERSION:

Today only 53% of Great Plains grassland ecosystems remain intact.[189] Between 2018 and 2019, an estimated 1.1 million hectares (2.6 million acres) of grassland were converted into cropland.[190] The leading cause of grassland loss in the Great Plains region is conversion to croplands, and around 70% of the conversion between 2018-2019 was for three crops: maize (25%), soy (22%), and wheat (21%)[191].

BIODIVERSITY:

The Great Plains are home to tens of millions of grassland birds, bison, elk, pronghorn antelope and deer and their predators.[192] However, grassland conversion has already resulted in the decline of species; for example, since the 1960s, the number of grassland songbirds in the Great Plains has declined by 80%, and species like the Chestnut-collared Longspur are under notable threat.[193]

CARBON STORAGE:

Although no dedicated studies on the Great Plains exist, the carbon stock in North American grasslands is estimated at 156tC/ha.[194] Conversion of grasslands to crop production in this region reduces soil organic carbon stocks by approximately 30%.[195]

OTHER OUTSTANDING CHARACTERISTICS:

The remaining grasslands provide important ecosystem services for human populations - 1.1 million live in the Northern Great Plains alone[196] - including water filtering and flood protection;[197] conversion to agriculture leads to phosphorus and nitrogen runoff into water sources and increased costs treating drinking water.

EU IMPORTS OF SOY AND WHEAT FROM THE USA

Soy. The USA is responsible for 28% of global soy production[198]. The EU imported an estimated 7.6 million tonnes of soy from the USA in 2019[199], which is 22% of total EU soy imports. There is no up-to-date data on the quantity of soy exported from the Great Plains to the EU, but approximately 10-15% of USA soy production is from the Great Plains[200], implying that around 2-3% of all EU imports of soy are likely to originate within the biome.

Wheat. The USA is responsible for nearly 6% of global wheat production.[201] The EU imported an estimated 829,000 tonnes of wheat from the USA in 2019,[202] which is 18% of total EU wheat imports of 4.6 million tonnes. There is no up-to-date data on the quantity of wheat exported from the Great Plains to the EU, but approximately 64% of USA wheat production is from the Great Plains,[203] implying that around 11% of all EU imports of wheat may originate from within the biome.

22%

OF SOY IMPORTED FROM THE USA

7,589,005 tonnes
Estimated EU imports **from the USA.**

828,739 TONNES

OF WHEAT IMPORTED FROM THE USA

18% Estimated EU imports **from the USA.**

SUMATRA, INDONESIA

Peatlands (palm oil and rubber)

ECOSYSTEM DESCRIPTION:
Two types of peat swamp forests can be found on Sumatra; mixed peat swamp forest and pole forest.[204]

AREA:
7.2 million hectares[205]

CONVERSION:
Only 6% of Sumatra's peatland remains unconverted or degraded with the main drivers being palm oil, plantation forest for pulp production, and rubber.[206,207,208] Around 19% (1.2 million hectares) of Sumatra's peatland area has been converted to palm oil plantations.[209] Natural rubber is also a significant driver of land clearing in Sumatra,[210] which is the primary rubber cultivation area in Indonesia.

BIODIVERSITY:
While the peat swamps of Sumatra do not support any endemic mammal species,[211] they are the last remaining refuge for a number of critically endangered species such as the Sumatran tiger and rhino – species that would otherwise prefer areas with mineral soil.[212]

CARBON STORAGE:
The carbon storage within tropical peat soils is significant, ranging from 250 to 750 tonnes of carbon per hectare, which is greater than the above-ground carbon storage of tropical rainforests[213].

OTHER OUTSTANDING CHARACTERISTICS:
More than 10 million people live and depend directly on Indonesian peatlands for a range of products and income sources including fishing, providing fuel and other non-timber products.[214,215] While rubber production has the potential to increase the income of smallholder farmers under the right institutional arrangements,[216] the substantial costs associated with drainage[217] means that income opportunities could likely be further increased if rubber was planted on mineral soils rather than degraded peatlands.

EU IMPORTS OF PALM OIL AND NATURAL RUBBER FROM SUMATRA

Palm oil. Indonesia is the largest producer of palm oil in the world and is responsible for around 60% of the world's palm oil production.[218] The EU imported an estimated 6.7 million tonnes of palm oil, palm kernel oil, palm kernel meal and palm oil derivatives from Indonesia in 2019[219], which is 46% of the total EU imports of oil palm products of 14.7 million tonnes. The most up to date information on EU imports from Sumatra (2015) suggest that over 2 million tonnes were imported in 2015 [220], implying that approximately 14% of the EU's imports could originate there. This is equivalent to 16% of Sumatra's palm oil exports.

14%
OF PALM OIL, PALM KERNEL AND PALM KERNEL MEAL IMPORTED FROM SUMATRA
2,074,864 tonnes
Estimated EU imports **from Sumatra.**

Natural rubber. Indonesia is the second largest producer of natural rubber in the world, responsible for around 22% of the world's production [221]. The EU imported an estimated 701,000 tonnes of natural rubber from Indonesia in 2019 [222], which is 28% of total EU imports of natural rubber of 2.5 million tonnes. Whilst there is no data on EU imports of natural rubber from Sumatra, the island accounts for approximately two-thirds of Indonesia's production [223], which suggests that approximately 19% of the EU's imports could potentially originate there. This is equivalent to 19% of Sumatra's exports of natural rubber.

19%
OF NATURAL RUBBER IMPORTED FROM SUMATRA
469,529 tonnes
Estimated EU imports **from Sumatra.**

KALIMANTAN, INDONESIA Mangroves (shrimp) and peatlands (palm oil)

MANGROVES

ECOSYSTEM DESCRIPTION:
The mangroves of Kalimantan have high species richness, and 17 different species of mangroves have been identified in East Kalimantan.[224]

AREA:
Mangroves fringe much of the Kalimantan coast covering 274,029 hectares across East, West and Central Kalimantan, amounting to around 8% of the total mangrove area in Indonesia[225].

CONVERSION:
In the period 2000-2016, commodity-driven conversion was by far the biggest driver of mangrove loss in Indonesia and has been especially concentrated on Kalimantan.[226] It has been estimated that 40% of mangrove losses in Indonesia have occurred due to aquaculture.[227]

BIODIVERSITY:
Borneo mangroves are among the most species-rich in the world and are a major habitat of proboscis monkeys and[228] other vertebrates. They are highly valuable for coastal protection and fish breeding refuges.[229]

CARBON STORAGE:
Mangroves in Kalimantan are a particularly effective carbon store; soil carbon stocks in the Tanjung Puting area are among the highest ever surveyed in mangroves, at around 1,060 tonnes of carbon per hectare.[230]

OTHER OUTSTANDING CHARACTERISTICS:
While mangroves provide a source of wood for local populations, wood removal is rarely the main cause of mangrove loss.[231]

PEATLANDS

ECOSYSTEM DESCRIPTION:
The peat swamps on the island of Kalimantan have similar characteristics to those of Sumatra, and the peat soil is mainly organic matter that has developed from sediments behind mangroves, deposited as a result of river drainage to the coast.[232]

AREA:
Peatlands cover 4.8 million ha of Kalimantan[233], much of which is naturally forested, but includes areas of very low canopy forest under 1.5m high.[234]

CONVERSION:
About 404,000 hectares (8%) of the total peatland area of Kalimantan is now converted to palm oil plantations,[235] with the area of industrial palm oil and pulp wood plantations more than doubling between 2010 and 2015.[236]

BIODIVERSITY:
Whilst the peatlands of Kalimantan have relatively low levels of biodiversity, they contain a high proportion of threatened species, such as orangutan and the clouded leopard.[237]

CARBON STORAGE:
Peatlands within Kalimantan store around 12.2 Gt carbon.[238]

OTHER OUTSTANDING CHARACTERISTICS:
Kalimantan is also home to a growing population of over 16 million people[239] who make their living predominantly through agriculture, forestry, fishing, mining and quarrying[240]. Approximately 3.4 million people were employed in the palm oil industry in Indonesia in 2011.[241]

EU IMPORTS OF PALM OIL AND SHRIMP FROM KALIMANTAN

Shrimp. Indonesia is responsible for around 8% of the world's shrimp production[246]. The EU imported an estimated 8,800 tonnes of shrimp from Indonesia in 2019[247], which is 1.5% of total EU imports of shrimp of 597,000 tonnes. This is equivalent to approximately 6% of Indonesia's total shrimp exports. There is no up-to-date data on the quantity of shrimp produced in or exported from Kalimantan.

6%
OF SHRIMP EXPORTED FROM INDONESIA TO THE EU
8,803 tonnes
Estimated Indonesia exports **to EU.**

Palm oil. Indonesia is the largest producer of palm oil in the world and is responsible for around 60% of the world's palm oil production,[242] with approximately 48% originating from Kalimantan.[243] The EU imported an estimated 6.7 million tonnes of palm oil, palm kernel oil, palm kernel meal and palm oil derivatives from Indonesia in 2019[244], which is 46% of the total EU imports of oil palm products of 14.7 million tonnes. The most up to date information on EU imports from Kalimantan (2015) suggest that 329,000 tonnes were imported in 2015[245], implying that approximately 2% of the EU's imports could originate there (1% of Kalimantan's palm oil exports).

329,182 TONNES
OF PALM OIL, PALM KERNEL AND PALM KERNEL MEAL IMPORTED FROM KALIMANTAN
2% Estimated EU imports **from Kalimantan.**

SABAH AND SARAWAK, MALAYSIA

Peatlands (palm oil)

ECOSYSTEM DESCRIPTION:
The vegetation is characterised by swamp forest with variation in species and height; in some areas vegetation is open, with most species small in structure or shrub-like and under 7m high.[248]

AREA:
The area of peatlands in Sarawak is approximately 1.7 million hectares, amounting to almost 70% of Malaysia's total peatland areas[249,250]. Sabah contains approximately 117, 000 hectares of peatlands[251].

CONVERSION:
Approximately one-third (almost 800,000 ha) of Malaysia's peatlands are under oil palm plantations. The bulk of Malaysia's oil palm plantations on peatlands are located in Sarawak where rates of conversion are the highest. Almost no undisturbed peatland remains in Sabah[252] and around 41% of Sarawak's peatlands have been converted to oil palm plantations[253].

BIODIVERSITY:
The peatlands of Sabah and Sarawak contain a significant proportion of rare and endangered species including the Proboscis monkey, flying foxes and orangutans[254]. In Peninsular Malaysia, 10% of all fish species are found only in peat swamps, and the proportion may be even higher in Borneo[255].

CARBON STORAGE:
Malaysia's peatland contains 10% of global carbon stored in peatland;[256] approximately 9.1 Gt.[257] Around 60% of the total soil carbon stored in Malaysian forests is stored in peat.[258]

OTHER OUTSTANDING CHARACTERISTICS:
Peatlands have generally supported a low level of human activity due to the high water levels in peat soils which make it difficult to cultivate. The production of products including pineapple, fish and honey is possible, but the markets for such products tend to be small and local[259].

EU IMPORTS OF PALM OIL FROM SABAH AND SARAWAK

Malaysia is the second largest producer of oil palm products, responsible for around 24% of the world's production[260]. The EU imported an estimated 3.7 million tonnes of palm oil, palm kernel oil, palm kernel meal and palm oil derivatives from Malaysia in 2019,[261] which is 25% of total EU imports of palm oil products of 14.7 million tonnes. Whilst there is no data on EU imports of palm oil from Sabah and Sarawak, the states account for approximately 26% and 27% of Malaysia's palm oil area. respectively[262], which suggests that approximately 13% of the EU's imports could potentially originate there.

13%

OF OIL PLAM PRODUCTS IMPORTED FROM SABAH AND SARAWAK

1,947,772 tonnes
Estimated EU imports
from Sabah and Sarawak.


© Christian Mpassi / WWF-DRC

CUVETTE CENTRALE, CONGO BASIN, DRC

Peatlands (timber)

ECOSYSTEM DESCRIPTION:
Characterised by a range of vegetation types, including swamp forest, palm-dominated swamp and some savannah.[263]

AREA:
The Cuvette Centrale is a region of 36 million hectares of wetland area covering 10% of the central Congo Basin, falling partly within the Republic of Congo and the remainder in the Democratic Republic of Congo. It contains the world's largest peatland complex of 14.5 million hectares or 40% of the region.[264]

CONVERSION:
The peatlands are threatened by a potential rise in deforestation for wood and palm oil production in the region. Most of the region is covered by proposed or current concessions for logging, mining and oil and gas development, including the expansion of the road network which could increase access to previously remote locations[265].

BIODIVERSITY:
The Congo Basin contains over 10,000 plant species, 3,000 of which are endemic.[266] The biodiversity of the peatlands is poorly studied but 14 species are currently listed as globally threatened by the IUCN, as well as 10 species that are prioritised nationally and/or regionally.[267]

CARBON STORAGE:
The peatlands store 30.6 billion tonnes of carbon below ground, a quantity similar to the above-ground carbon stocks of the tropical forests of the entire Congo Basin, whilst the peat covers only 4% of the whole Congo Basin.[268]

OTHER OUTSTANDING CHARACTERISTICS:
People live throughout the Cuvette Centrale, mainly in villages or small towns along rivers and roads; there are few roads within the Cuvette Centrale, with the rivers acting as the main transport network[269]. Across the area, people rely in part on peat forest resources for their livelihoods[270]. There is currently a low level of human intervention in this area,[271] local people often leading a subsistence livelihood focused on fishing and small-scale farming of crops such as manioc and banana and limited numbers of livestock including goats and chickens.

EU IMPORTS OF TIMBER PRODUCTS FROM DRC

The Democratic Republic of Congo exports approximately 46,000 m^3 WRME (Wood Raw Material Equivalent) of timber products each year to the EU, which is approximately 1% of the EU's imports. However, this represents nearly 20% of the DRC's exports of timber products, making the EU a significant driver of the timber industry in the country.

20%

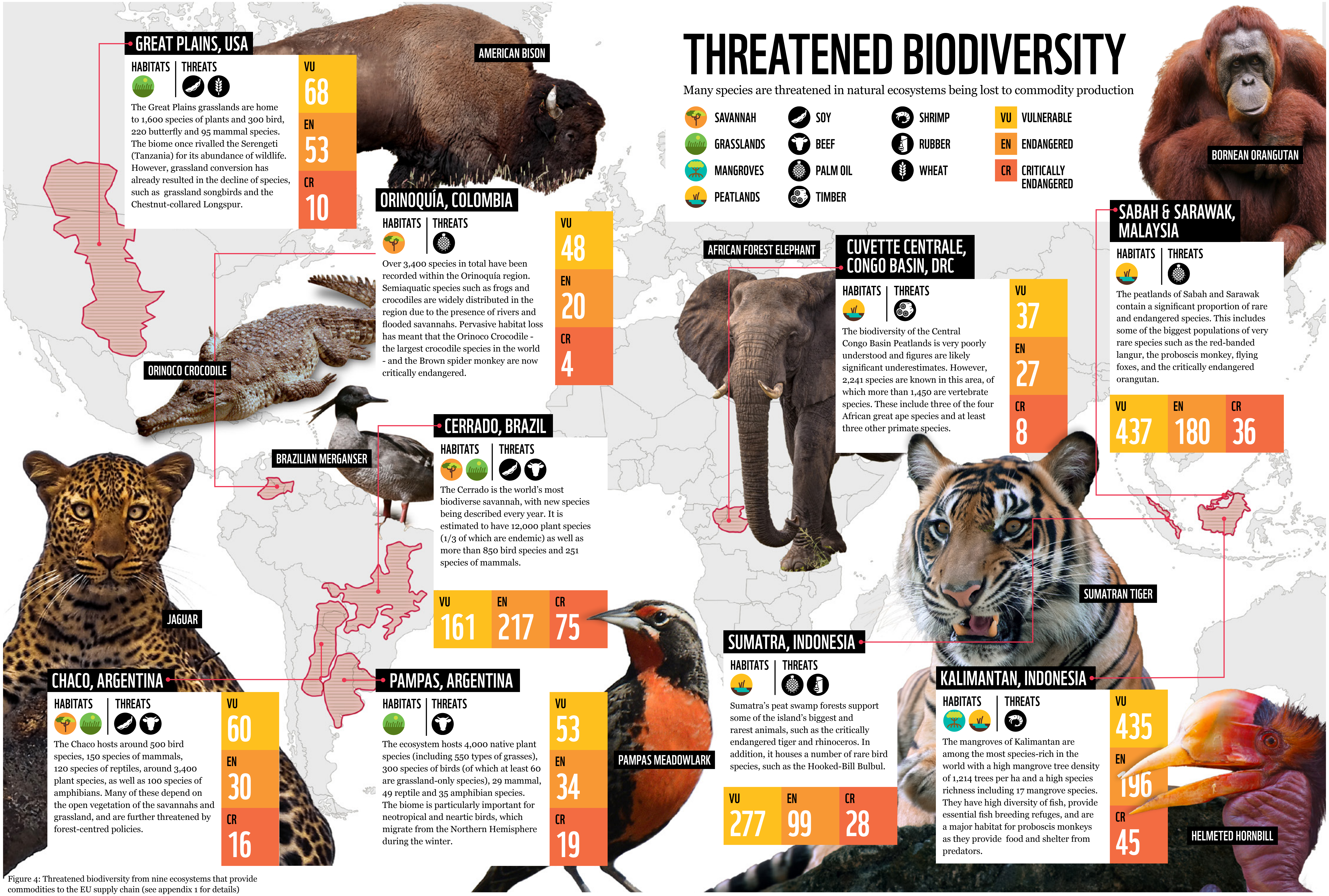
OF TIMBER PRODUCTS EXPORTED FROM DRC(WRME, M³)

46,097 tonnes
Estimated RDC exports **to EU.**

THREATENED BIODIVERSITY

Many species are threatened in natural ecosystems being lost to commodity production

SAVANNAH	SOY	SHRIMP	VU VULNERABLE
GRASSLANDS	BEEF	RUBBER	EN ENDANGERED
MANGROVES	PALM OIL	WHEAT	CR CRITICALLY ENDANGERED
PEATLANDS	TIMBER		



GREAT PLAINS, USA

HABITATS: Grasslands | THREATS: Soy, Wheat

The Great Plains grasslands are home to 1,600 species of plants and 300 bird, 220 butterfly and 95 mammal species. The biome once rivalled the Serengeti (Tanzania) for its abundance of wildlife. However, grassland conversion has already resulted in the decline of species, such as grassland songbirds and the Chestnut-collared Longspur.

VU	EN	CR
68	53	10

ORINOQUÍA, COLOMBIA

HABITATS: Savannah | THREATS: Palm oil

Over 3,400 species in total have been recorded within the Orinoquía region. Semiaquatic species such as frogs and crocodiles are widely distributed in the region due to the presence of rivers and flooded savannahs. Pervasive habitat loss has meant that the Orinoco Crocodile - the largest crocodile species in the world - and the Brown spider monkey are now critically endangered.

VU	EN	CR
48	20	4

CERRADO, BRAZIL

HABITATS: Savannah, Grasslands | THREATS: Soy, Beef

The Cerrado is the world's most biodiverse savannah, with new species being described every year. It is estimated to have 12,000 plant species (1/3 of which are endemic) as well as more than 850 bird species and 251 species of mammals.

VU	EN	CR
161	217	75

CHACO, ARGENTINA

HABITATS: Savannah, Grasslands | THREATS: Soy, Beef

The Chaco hosts around 500 bird species, 150 species of mammals, 120 species of reptiles, around 3,400 plant species, as well as 100 species of amphibians. Many of these depend on the open vegetation of the savannahs and grassland, and are further threatened by forest-centred policies.

VU	EN	CR
60	30	16

PAMPAS, ARGENTINA

HABITATS: Grasslands | THREATS: Beef

The ecosystem hosts 4,000 native plant species (including 550 types of grasses), 300 species of birds (of which at least 60 are grassland-only species), 29 mammal, 49 reptile and 35 amphibian species. The biome is particularly important for neotropical and neartic birds, which migrate from the Northern Hemisphere during the winter.

VU	EN	CR
53	34	19

CUVETTE CENTRALE, CONGO BASIN, DRC

HABITATS: Peatlands | THREATS: Timber

The biodiversity of the Central Congo Basin Peatlands is very poorly understood and figures are likely significant underestimates. However, 2,241 species are known in this area, of which more than 1,450 are vertebrate species. These include three of the four African great ape species and at least three other primate species.

VU	EN	CR
37	27	8

SABAH & SARAWAK, MALAYSIA

HABITATS: Peatlands | THREATS: Palm oil

The peatlands of Sabah and Sarawak contain a significant proportion of rare and endangered species. This includes some of the biggest populations of very rare species such as the red-banded langur, the proboscis monkey, flying foxes, and the critically endangered orangutan.

VU	EN	CR
437	180	36

SUMATRA, INDONESIA

HABITATS: Peatlands | THREATS: Palm oil, Rubber

Sumatra's peat swamp forests support some of the island's biggest and rarest animals, such as the critically endangered tiger and rhinoceros. In addition, it houses a number of rare bird species, such as the Hooked-Bill Bulbul.

VU	EN	CR
277	99	28

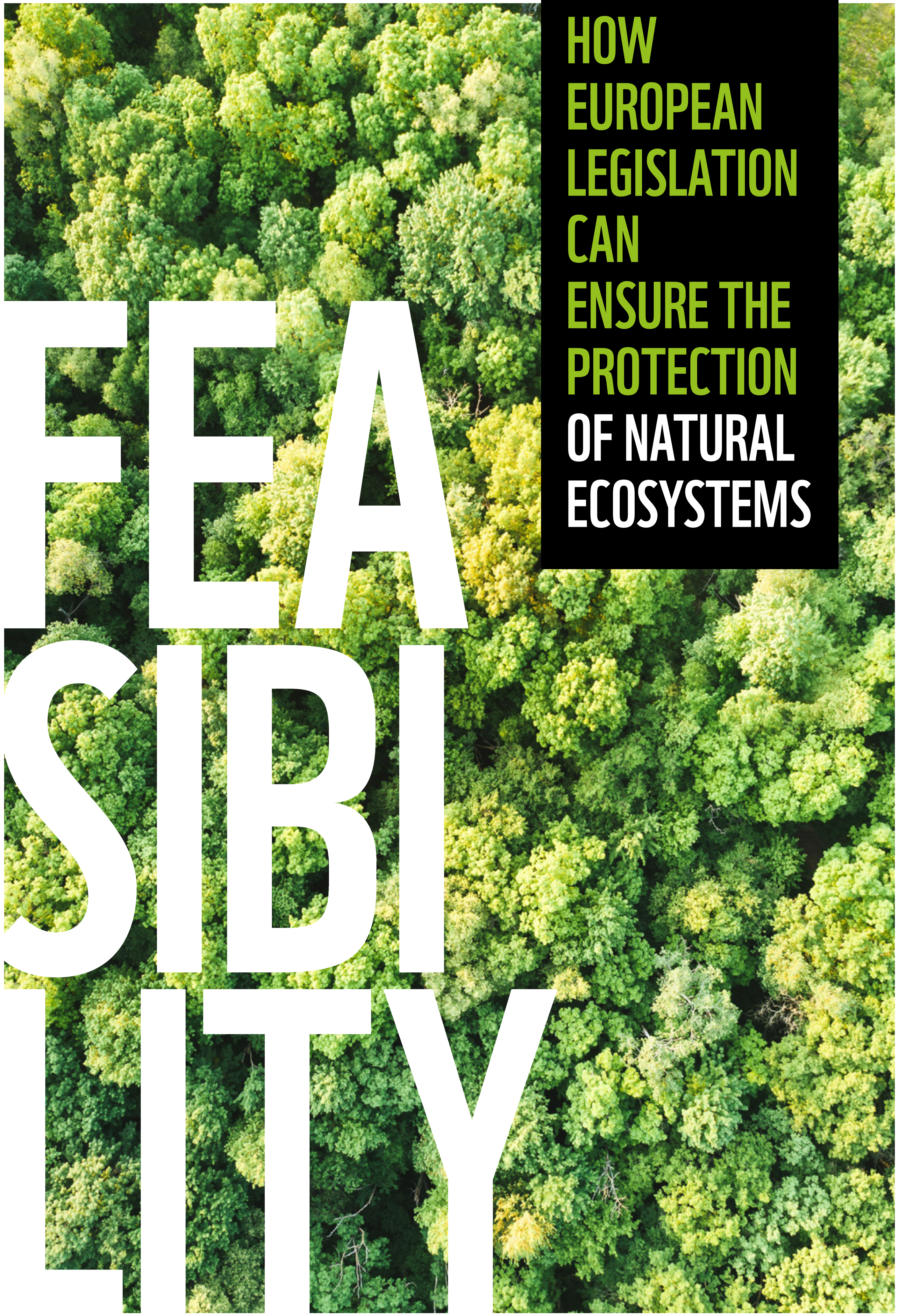
KALIMANTAN, INDONESIA

HABITATS: Mangroves, Peatlands | THREATS: Shrimp

The mangroves of Kalimantan are among the most species-rich in the world with a high mangrove tree density of 1,214 trees per ha and a high species richness including 17 mangrove species. They have high diversity of fish, provide essential fish breeding refuges, and are a major habitat for proboscis monkeys as they provide food and shelter from predators.

VU	EN	CR
435	196	45

Figure 4: Threatened biodiversity from nine ecosystems that provide commodities to the EU supply chain (see appendix 1 for details)



HOW EUROPEAN LEGISLATION CAN ENSURE THE PROTECTION OF NATURAL ECOSYSTEMS

NATURAL ECOSYSTEMS BEYOND FORESTS CAN BE INCLUDED IN THE REGULATION

Natural ecosystems beyond and in addition to forests urgently need protection from the impacts of EU agricultural imports – and the EU needs to reduce its impacts on these ecosystems if it is to meet its climate and biodiversity commitments. But is it feasible for the EU to include protection for these ecosystems in the regulation, which as currently proposed, provides protection only for forests.

A number of EU and member-state policies and regulations already make provision for protecting ecosystems beyond forests, and the regulation can build upon these.

The EU Renewable Energy Directive[272] includes a provision that biofuels and bioliquids can only qualify for incentives if the raw materials do not originate from "highly biodiverse grasslands, both temperate and tropical, including highly biodiverse savannahs, steppes, scrublands and prairies".

At a national level, the Dutch Bill on Responsible and Sustainable International Business Conduct, the German Due Diligence Act and the French Duty of Vigilance Law all include provisions for broad environmental risks and impacts, no matter the origin. The latter requires large companies to develop and publish a due diligence plan, which must outline measures the company is taking related to both human rights and environmental risks and adverse impacts.

The proposed regulation already requires companies to produce geo-localisation coordinates, the latitude and longitude of all plots of land where the relevant commodities and products were produced, as well as the date or time range of production (Article 9). Once this information is already held, only a few adjustments will be required to include other ecosystems in the due diligence process required by the regulation. This section demonstrates how companies can do this and therefore gives an indication of how the regulation could be formulated to require these steps.

COMPANIES CAN IMPLEMENT DUE DILIGENCE FOR NATURAL ECOSYSTEMS BEYOND FORESTS

Companies can be expected to carry out due diligence to prevent the conversion of other ecosystems, just as they are expected to do so to prevent deforestation, before bringing products to the EU market. There are a range of existing tools which will facilitate the process, and examples of companies already using them to do just that. There is plenty of evidence that companies will be able to implement such requirements without undue difficulty.

DUE ✔ DILIGENCE IS NORMAL CORPORATE PRACTICE

Companies routinely conduct due diligence processes of one form or another and implement a range of mandatory or voluntary due diligence processes across a wide range of complex issues. Due diligence is part of day-to-day corporate practice, under regulations such as the European Union Timber Regulation (EUTR), the EU Conflict Minerals Regulation, for food safety, to eliminate modern slavery, or to fulfil their own voluntary commitments (e.g. fight deforestation and reduce carbon emissions).

Some major companies that sell ecosystem-risk commodities within the EU are already taking and implementing, individually or pre-competitively, specific voluntary commitments to exclude the conversion of natural ecosystems beyond forests from their supply chains. These include members or users of the Retail Soy Group, the SOS Cerrado Manifesto, the Consumer Goods Forum Forest Positive Coalition, the Finance Sector Roadmap,[273] among many others.

Even smaller companies without the capabilities to launch big projects themselves are capable of coming together to develop due diligence systems.

For example, the Book Chain Project, established by Carnstone in 2006, has managed to convene 28 book and journal publishers, 400 print suppliers, and 400 paper manufacturers to leverage their collective commercial influence to reduce deforestation risks associated with timber for paper production.[274]

However, despite many actors working to do so on a voluntary basis, these voluntary measures still lack a significant scale of impact and they do not exist for all conversion-risk commodities. EU regulation is urgently needed to ensure that all importers are conducting due diligence to remove natural ecosystem conversion from their supply chains. The fact that some companies have voluntarily sought to reduce or remove conversion of ecosystems beyond forests from their supply chain is further evidence that this would not be an insurmountable challenge for companies to do so in response to regulation.

GUIDANCE IS AVAILABLE FOR COMPANIES TO INCLUDE NATURAL ECOSYSTEMS BEYOND FORESTS WITHIN A DUE DILIGENCE PROCESS

The European Commission's proposed legislation requires companies to implement a due diligence process to ensure the traceability of their products. The proposal would require companies to carry out three key steps in their due diligence: (1) gather information, (2) identify and assess the risks of possible non-compliance, and (3) mitigate such risks to a negligible level. These steps will be recognised by those familiar with the essential components of any due diligence process, and some companies are already using such processes to implement voluntary commitments to exclude conversion of forests and other natural ecosystems from their supply chains.

For each of these steps, a range of tools, guidance, toolkits and other services are available to make it practical and feasible for them to include natural ecosystems beyond forests. A range of these are outlined, with links provided, in Figure 5. Importantly, companies are capable of influencing due diligence in all parts of their supply chains, as IKEA has done with IWAY. This system reaches past IKEA's first-tier (direct suppliers) by requiring that IKEA suppliers conduct due diligence on their own suppliers in accordance with IWAY.[275]

With regards to beef, soy, and leather produced in the Amazon and Cerrado in Brazil, and the Gran Chaco in Argentina and Paraguay, WWF has developed a 'Deforestation and Conversion Free (DCF) Implementation Toolkit' to help companies move from commitment to action in alignment with the Accountability Framework. The toolkit contains activities and materials to support companies to achieve DCF supply chains. More than 50 global companies are already actively engaged in WWF's DCF Toolkit process.[276] Many other initiatives and roadmaps exist to support companies to avoid conversion associated with specific commodities.

A wide array of technology is also now available which can support the tracing of a product and evaluating the risk of it having been produced at the expense of ecosystem conversion – from macro, landscape-scale data available from precise and accessible satellite technology, to molecular level isotopic analysis. A note is made below of some of the tools relevant to each stage of the process. However, due diligence is fundamentally about companies understanding their supply chain and the risks associated in it, and this can be accomplished using fairly basic procedures. Advanced technologies can be useful in fine tuning some of these details but these are not always necessary.

Even if certain tools or technologies could be further developed, this should not be an impediment for companies to implement comprehensive due diligence systems. Fundamentally, due diligence entails understanding one's supply chain and the risks associated with it, and this can be accomplished using either manual procedures or by using advanced technologies.

WHAT THE PROPOSED REGULATION COVERS

The proposed regulation[277] applies to 'operators', meaning any natural or legal person who, in the course of a commercial activity, places relevant commodities and products on the Union market or exports them from the Union market. In this report we have used the term 'companies' in place of operators.

It prohibits companies from bringing to the EU market, products which have (or might have) been produced on land that was deforested (or where forest has been degraded) since December 31, 2020. Products must also have been produced legally in the country of origin. It applies currently to cattle, cocoa, coffee, oil palm, soya and wood (the "relevant commodities") and some products that contain, have been fed with or have been made using relevant commodities (the "relevant products"). The terms commodity and product are used interchangeably in this report to refer to both categories.
It also specifies a set of steps through which companies must exercise due diligence to ensure that products are compliant, before they are imported to (or exported from) the EU. These must include:

- collecting information and documents needed to fulfil the requirements;
- assessment of the risk that products intended for the EU might be non-compliant with the requirements of the regulation, based on a set of ten-plus indicators of the likely scale of risk; and
- risk mitigation - requiring additional information, data or documents, undertaking independent surveys or audits or other measures until there is no or only 'negligible risk' that each specific product is linked to deforestation.

The information companies need to provide includes:

- geo-localisation coordinates - the latitude and longitude of all plots of land where products were grown, and the date of production; and
- "adequate and verifiable information that the relevant commodities and products are deforestation-free"

Companies must demonstrate - through a 'due diligence statement' - that they have completed this process, can produce the necessary documentation and are annually reviewing this process, for each product they wish to place on the EU market.

The following is an illustration of – rather than a manual for – how some of the tools, guidance and support that is available can support companies to conduct due diligence on FERC in their supply chains. The process is visualised with links to a range of supporting tools and guidance for each step in the infographic below (Figure 5) and summarised in the following paragraphs. Many of these tools were designed to support companies with voluntary commitments and to some extent the language used here reflects that. Where relevant, the equivalent step under the proposed regulation is noted, using the phrases from the regulation or the explanatory memorandum to the regulation.

TAKING STOCK

The first step is for companies to take stock: to understand how the regulation applies to their business; to evaluate their current systems of supply chain knowledge and engagement; and to identify where there are gaps. A number of tools are available which can help companies to do this in relation to ecosystems beyond forests and links to these can be found in Figure 5.

For example, the Accountability Framework Initiative's (AFi) Self Assessment Tool supports companies to create an action plan for how to set up an effective due diligence system for sustainable supply chains, and supports companies to develop 'no-conversion' as well as 'no-deforestation' supply chains, making provision for the inclusion of natural ecosystems beyond forests.

MAPPING THE SUPPLY CHAIN - "GATHER INFORMATION" IN THE REGULATION

In order to understand the level of deforestation and conversion risk associated with a product, companies need to understand where their products come from and whether there are any existing risk mitigation processes in place. For many companies this has been prompted by the introduction of legislation, such as the EUTR. The proposed regulation would require full traceability – companies will be required to collect the geographic coordinates of the land where the commodities they place on the market are produced.

Once companies have established in detail where their products originate, they are well placed to deliver due diligence, regardless of the criteria that has been set. Changing requirements from 'avoid deforestation' to 'avoid deforestation and conversion' does not change the basic business requirement to know, and be able to prove, where the crops have been grown.

Third-party systems and supply chain mapping tools are available to support companies to do this. The Supply Chain Mapping Tool was developed in response to the introduction of the requirements placed on companies by the EUTR and provides a supply chain mapping template which companies can send out to traders to collect information; this can be readily adapted for supply chain mapping of other commodities. IT Solutions for due diligence from the European Commission gives a list of pay-to access tools to conduct due diligence. It is targeted at due diligence on raw materials and minerals associated with conflict zones but contains many tools which can be used to investigate and manage global supply chains for other commodities. TRASE provides a degree of supply chain transparency for some commodities in certain (largely South American) geographies. Figure 5 provides links to these and other tools for gathering information on the supply chain.

Technological approaches, such as isotopic analysis and metabolomics[278] which enable genetic analysis of materials, can be employed to verify material provenance to a level of certainty that is accepted by courts of law. These are commonly used in certain supply chains (e.g., fresh meat) and could be used for any conversion-risk commodity.

More generally, there are many service providers that support companies to collect, collate and analyse information through the multiple levels of their commodity supply chains.

CONDUCTING RISK ASSESSMENT - "IDENTIFY AND ASSESS THE RISKS OF POSSIBLE NON-COMPLIANCE"

Companies need to conduct risk assessments to identify risks of non-compliance with regulatory (or voluntary) requirements before a product is placed on the market, and also to rate the significance and severity of these risks. Figure 5 notes a range of tools and resources that companies can use to support them to assess the risk of conversion of natural ecosystems beyond forests. Many companies are using services based on satellite imagery to assess the occurrence and/or risk of deforestation and conversion in the locations identified by their supply mapping.

Reliable, detailed, and satellite-based technologies and tools, such as MapBiomas and Global Forest Watch Pro, are available – and are being used by a range of companies – to provide near real-time information that allow identification of whether and where conversion has occurred within a supply base[279]. These are, in principle and often in practice, able to work on conversion of any and all ecosystems including but not limited to forests.

MITIGATING AND REMEDIATING RISKS - "MITIGATE SUCH RISKS TO A NEGLIGIBLE LEVEL"

When companies have identified risks in their commodity supply chains – this could be the prevalence of ecosystem conversion in the country, region and area of production of the relevant commodity, but could also be a lack of information about product origin – they need to assess the significance of the issue and determine appropriate responses. These responses may include collecting additional evidence, engaging with the supplier to prevent further conversion, refraining from putting the product on the EU market, and in some cases, terminating the contract with the supplier. Figure 5 notes a range of tools and guidance materials which are available to help companies do this with regard to the impacts of their suppliers on natural ecosystems beyond forests.

REPORTING - "PUBLICLY REPORT AS WIDELY AS POSSIBLE"

The proposed regulation requires companies, on an annual basis, to report publicly and as widely as possible on their due diligence systems. This is no surprise as public reporting is now common good practice for many if not all companies. Internal and business-to-business reporting is also an essential part of functional due diligence systems. Guidance and tools are available to support companies in reporting on progress towards compliance and outcomes or impacts of company operations and supply chains on conversion and ecosystem protection as well as deforestation and human rights.

Figure 5 gives a number of resources which can support companies in publicly reporting on their due diligence operations within their supply chains.

REGULAR REVIEW OF DUE DILIGENCE SYSTEMS - "REVIEW AT LEAST ONCE A YEAR"

The proposed regulation will require effective due diligence to have been carried out before relevant products can be placed on the EU market - companies cannot use an approach of 'continuous improvement' towards reducing the risks associated with their products. However, the proposed regulation does require that companies' due diligence system shall be reviewed at least once a year, and if necessary adapted to and account for new developments affecting the exercise of due diligence. Companies may also want to use the process of review alongside their own ambition for continuous improvement and voluntary commitments they may have made. Existing guidance is also available to support them do this.

Where it is deemed that certain risks are due to systemic challenges within the sector, companies can engage in collaborative initiatives to mitigate these risks. Figure 5 gives links to some of the tools available to support companies to do this with regard to natural ecosystems beyond forests.

DUE DILIGENCE

Due diligence is a process that many companies are already using to address their impacts on natural ecosystems, and tools exist to make this feasible every step of the way.

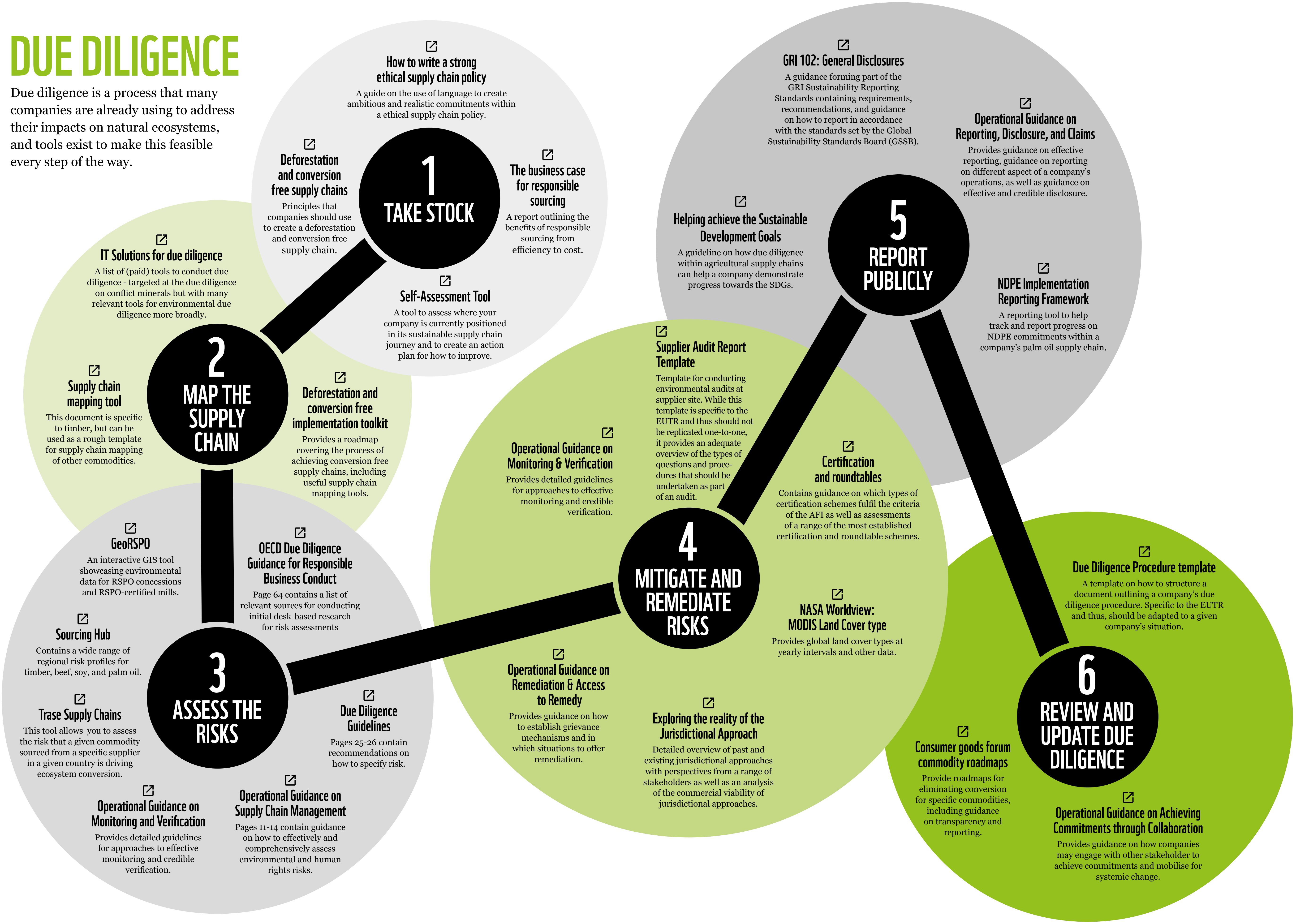


Figure 5: Key steps in the due diligence process, with tools, guidance and support available for companies to include natural ecosystems beyond forests within the process (see Appendix 1 for details).

OUR RECOMMENDATIONS

The findings of our report show that ambitious EU legislation is both necessary and feasible. We call on the EU Member States and the European Parliament to adopt a law that retains the useful provisions foreseen by the Commission and fills the gaps identified so far. WWF identifies three main principles for a legislation that is ambitious and effective in reducing deforestation and other negative environmental and human rights impacts of the EU's consumption:

ENSURING THAT PRODUCTS PLACED ON THE EUROPEAN MARKET ARE LEGAL AND ALSO NOT LINKED TO DEFORESTATION, FOREST DEGRADATION, ECOSYSTEM CONVERSION OR DEGRADATION, NOR TO HUMAN RIGHTS VIOLATIONS.

ELEMENTS TO KEEP

The proposed legislation calls for products placed on the EU market to be legal by the producing country's standards and free from deforestation and forest degradation. Measures to work in partnership with producing countries in addressing the underlying drivers of nature destruction are proposed and combined with engagement at international level.

ELEMENTS TO IMPROVE

As laid out in the report, addressing climate change and biodiversity loss requires a holistic approach: other ecosystems besides forests, such as savannahs, grasslands, wetlands, peatlands and mangroves should be included without delay. A focus on forests omits the ongoing pressure for conversion e.g. of savannahs, which could increase even more, if only forests are protected.

The current product scope should be enlarged to include relevant commodities and derived products based on scientific and objective criteria, including rubber and maize, as well as poultry and dairy as part of livestock. A clear reference to international human rights standards respecting particularly the rights of Indigenous Peoples and local communities, including requirements to respect customary tenure rights and the right to Free, Prior and Informed Consent.

PROVIDING A DUE DILIGENCE SYSTEM WITH CLEAR REQUIREMENTS FOR COMPANIES, ENSURING THEIR SUPPLY CHAINS ARE TRACEABLE AND TRANSPARENT.

ELEMENTS TO KEEP

Due diligence has to be carried out before a product is placed on the market and clear traceability requirements to the place where a commodity or product was harvested/produced are introduced. Certification and third party systems are identified as supporting tools but cannot replace the responsibility of an operator to carry out due diligence.

ELEMENTS TO IMPROVE

Country benchmarking should supplement due diligence and enforcement efforts, but should not modify due diligence obligations. A major potential gap in the regulation is the "de facto exemption" of companies sourcing from "low risk" countries from risk assessment and risk mitigation measures. Not only will it disadvantage companies that are putting measures in place to source from high-risk regions, it might also shift product sourcing towards low-risk countries. The same due diligence framework should be used by all companies to ensure a level playing field, without any loopholes for rogue companies.

The low risk category in the country benchmarking should be deleted, determining all countries to be "standard risk", which could become a "high" risk if the application of criteria laid out in Article 27 leads to the conclusion that a higher risk exists. Risk assessment criteria and procedures for the country benchmarking should be clear, objective and based on science.

SUPPORTING A STRONG, HARMONIZED AND ROBUST ENFORCEMENT OF THE LEGISLATION, PROVIDING NATIONAL AUTHORITIES WITH THE NECESSARY MEASURES AND TOOLS TO IMPLEMENT THE LAW.

ELEMENTS TO KEEP

Clear enforcement measures and penalties are put forward, providing stringent standards for application of the legislation. This has been combined with a good basis for harmonization across the enforcement chain within and between EU Member States. The introduction of an EU-wide database to register operators and traders together with due diligence statements will lead to more transparency and therefore improve enforcement of the new law. Substantiated concerns by third parties are properly taken into account, supporting the Competent Authorities in their work.

ELEMENTS TO IMPROVE

Interim and corrective action such as confiscation should not replace penalties for companies, in order to dissuade non-compliance with the regulation. Reporting requirements are not stringent enough, excluding SMEs and introducing the possibility to also fulfil reporting under other legislation. As reporting on due diligence systems is an important tool to analyse the compliance with the regulation, all companies should have the same reporting requirements under the new legislation. Civil liability and access to justice for serious non-compliance should be introduced to offer the possibility to seek redress in case of harm caused.

APPENDIX

CORPORATE FEASIBILITY

The following guidelines have been central in assembling and contextualising the process and tools demonstrated in Figure 5:

- **Accountability Framework Initiative Operational Guidance documents**
- **Accountability Framework Initiative Definitions**
- **Preferred by Nature Due Diligence Guidelines (for EUTR)**
- **OECD Due Diligence Guidance for Responsible Business Conduct**
- **OECD Pilot project on agricultural supply chains**
- **The WWF Deforestation and Conversion Free (DCF) Implementation Toolkit**
- **Sedex (2020) A guide to risk assessment in supply chains**

The foundation for this research to demonstrate corporate feasibility is the guidance provided by the Accountability Framework Initiative (AFi), and several AFi resources were cited in order to show that these resources are actionable and can be integrated into corporate due diligence processes. The process included:

1. **Examining the main guidelines**
2. **Identifying and assessing the usefulness of relevant tools**
3. **Consulting due diligence experts**
4. **Ensuring alignment with AFI and WWF requirements**
5. **Developing the due diligence process with tools (Figure 5).**

CONVERSION FIGURES

The figures used in the infographic "Conversion of 5 natural ecosystems" have been obtained from various sources. See table 1 for details.

To produce these figures for the infographic, four case studies were chosen, largely dependent on availability of data. Due to the historical paucity of data and lack of monitoring of non-forest ecosystems around the world, it was not possible to obtain data with consistent time frames, and this has been indicated in the infographic. For example, while a 9.3% loss of grasslands in the Cerrado does not seem as dramatic as the 53.2% loss seen in Kalimantan, as the former happened over a 10-year period, whereas the latter happened over a 24-year period, they are both concerning figures.

TABLE 1

REGION		CERRADO	GREAT PLAINS	SUMATRA	SOUTH AND SOUTHEAST ASIA	TOTAL
COUNTRY		Brazil	USA & Canada	Indonesia	N/A	
ECOSYSTEM		Savannah, grass-land, and forest	Grassland	Peatland	Mangrove	
BEFORE	YEAR	1985	2009	1990	1990	
	AREA (HA)	128,862,102	169,563,284	481,000	6,117,000	
AFTER	YEAR	2017	2019	2014	2020	
	AREA (HA)	102,778,905	153,870,789	225,000	5,330,000	
LOSS (HA)		**26,083,197**	**15,692,495**	**256,000**	**787,000**	**42,818,692**
LOSS (%)		20.2%	9.3%	53.2%	12.9%	
MAIN DRIVERS		Soy and beef	Corn (25%), soy (22%) and wheat (21%)	Palm oil	Shrimp	
NOTES		Includes forest, savannah, and grassland vegetation.	Includes only intact grasslands	Only undisturbed peat forest	Data: data for South and Southeast Asia was used, as no publicly available time series data was found for Kalimantan. • Main driver: for Southeast Asia only	
SOURCE		• Data: Souza at. al. (2020) - Reconstructing Three Decades of Land Use and Land Cover Changes in Brazilian Biomes with Landsat Archive and Earth Engine - Remote Sensing, Volume 12, Issue 17, 10.3390/rs12172735. • "Main drivers": TNC (2019) https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_IncentivesforSustainableSoyinCerrado_Nov2019.pdf	After and "Main drivers": WWF (2021) https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/5yrd3g00ig_PlowprintReport_2021_Final_HiRes_b.wwpdf?6596451.959007292.1633604721-1073773772.1626769338 • Before: WWF (2016) https://c402277.ssl.cf1.rackcdn.com/publications/947/files/original/plowprint_AnnualReport_2016_Final_REV09192016.pdf	Data: World Bank (2018) https://documents1.worldbank.org/curated/en/280931564033874140/pdf/Pilot-ecosystem-account-for-Indonesian-peatlands-Sumatra-and-Kalimantan-islands.pdf • Main driver: Lee et al (2013), https://www.cifor.org/publications/pdf_files/articles/AObidzinski1301.pdf	Data: FAO (2020) https://www.fao.org/3/ca9825en/ca9825en.pdf * Main driver: Richards and Friess (2016) https://www.pnas.org/content/113/2/344	

IMPORT AND EXPORT DATA

The trade links between each biome and the EU were assessed by calculating the proportion of EU imports derived from that area and the proportion of the area's production that is exported to the EU. The first is an indicator of how important the area is to the EU. The second is an indicator of how important trade with the EU is to the area, and has been provided in those cases where this gives a different perspective on the relationship than the first indicator alone. All data is from 2019, the latest date for which the most comprehensive data is available.

Where data is available on exports from a specific biome to the EU, this data is used to determine exports. The biomes and commodities for which this data is available are the Cerrado (Brazil), Chaco and Pampa (Argentina) for soy, and the Cerrado and Chaco for beef.[280]

Where data is available for the sub-national jurisdiction, but not the specific biome within that jurisdiction, the jurisdiction is used to approximate exports to the EU. This approach was used for palm oil (Sumatra & Kalimantan, Indonesia; Sabah & Sarawak, Malaysia).[281]

Where biome or jurisdictional exports to the EU are not available, national export and import data is used[282]. Where available, this is modified by existing estimates in the literature of the proportion of national production from a biome. This data was available for soy from the Great Plains. In all other cases, only a national-level estimate could be used. Total EU imports of each commodity from all countries outside the EU were enumerated to allow proportions of imports and exports to the EU to be estimated.

For all commodities, only direct imports of the commodities were assessed, excluding their imports as ingredients or components of traded products (e.g., palm oil used as an ingredient in manufactured foods), or their embedded use in the production process used to create the traded product (e.g., soy used as feed for imported chicken).

EUROPEAN CONSUMPTION OF CONVERSION RISK COMMODITIES

This section provides an analysis of the commodities that are the main drivers of conversion of the natural ecosystems beyond forests considered in this report. The commodities are described and the main uses and sectors that drive demand for them in the EU are identified. Projected future trends in EU demand are also evaluated, to consider the likely future threat posed by EU imports to natural ecosystems beyond forests.

DATA USED IN THE "THREATENED BIODIVERSITY" INFOGRAPHIC

Endangered species figures were obtained using the 'Advanced' search function of the IUCN Red List database, and polygons were then drawn to define a given region on the maps, using one or more maps of the region from a Google search. Once the polygon was defined, IUCN Red List data was downloaded, and the statistics were obtained from the resulting webpage, including total species number, Red List species categories, and numbers of endemic species. While the method of drawing polygons is not accurate, it was deemed to be a sufficiently robust method for defining the species associated with a given biome, naturally recognising that borders are not impermeable. This method was repeated for the nine biomes in question, with the following variations:

1. Cerrado: Given the complexity of the Cerrado state, combined with the availability of sub-national information, the polygon obtained was only for the MATOPIBA region; the states of Maranhão, Tocantins, Piauí, and Bahia. This region encompasses some of the last remaining undeveloped stretches in the Cerrado region and is regarded as the newest frontier for soy development in the region.[283]
2. Kalimantan: Due to the relatively small size of Kalimantan and the difficulty of accurately drawing polygons to capture mangrove areas, a polygon was drawn around the whole of Kalimantan.
3. Sabah & Sarawak: the polygon was drawn around peatland areas in Sarawak. Sabah was not included as the area was small and the IUCN website only allowed plotting of one polygon at a time

CARBON STOCK DATA IN "ECOSYSTEM SERVICES" INFOGRAPHIC

The carbon stock data represented in the "Ecosystem Services" infographic represents global average figures; however, it should be noted that carbon stocks of a given ecosystem have significant regional variations, and the average is thus not always a good representation of carbon stocks within a given biome. As a reputable source, most data (except for mangroves) was obtained from a CBD Technical Series report from 2016.[284] However, secondary and tertiary sources were also obtained and reviewed, and all issues identified are reported in the notes section of Table 2. Note that the carbon values will often only relate to the top 1 m layer of soil

All attempts were made to obtain figures with the greatest level of comparability across the different ecosystems. However, this was not always possible, and as no attempt was made at manipulating the figures using different sources, the figures across the ecosystems are not directly comparable.

Importantly, while the infographic stipulates that figures represent above/below ground values, the data obtained in most cases represent plant/soil values (except for mangroves – see notes in Table I). However, the carbon stored in below ground biomass is often relatively negligible compared to above-ground biomass and below ground soil carbon.

Moreover, it should be noted that there is some risk of double-counting in the "Ecosystems Services" infographic between the carbon figure for peatlands and the comparator provided for tropical forests, given that tropical peatlands are often forested. Unfortunately, seeing as peatland around the world are still being discovered, and as the delineation of peatlands and tropical forests would depend on national surveys, it is not possible to state what the extent of such overlap might be.

Given the limitations of the data used for the "Ecosystem Services" infographic, the diagrams in the infographic have been produced mainly for illustrative purposes to demonstrate the significance of below-ground carbon, and thus, should not be taken as a fully accurate representation on carbon distribution in ecosystems.

TABLE 2

ECOSYSTEM	PEATLANDS	GRASSLANDS & SAVANNAHS	MANGROVES	TROPICAL RAINFOREST
AREA (HA)	423,000,000	5,250,000,000	14,717,000	940,000,000
AVERAGE ORGANIC CARBON STOCK (T C/HA)	1,450	150	856	320
TOTAL ORGANIC CARBON STOCK (GT C)	613	788	13	301
PLANT CARBON DENSITY AS A SHARE OF PLANT AND SOIL CARBON (%)	2%	20%	15%	68%
SOIL CARBON DENSITY AS A SHARE OF PLANT AND SOIL CARBON (%)	98%	80%	85%	32%
SOURCES	• Area: Xu et al (2018) • Carbon and plant/soil values: Parish et al (2008), cited in Epple (2016)	• Area: CBD (2016) • Carbon: Epple (2016) • Plant/soil values: WBGU (1988), cited in IPCC (2018)\	• Area: FAO (2020) • Carbon and above/below ground values: Kauffman et al (2020)	• Area: Joosten (2015), cited in Epple (2016) • Carbon and plant/soil values: Adams (n.d), cited in Parish et al (2008), cited in Epple (2016) • Plant/soil carbon values: Adams (n.d), cited in Parish et al (2008)
NOTES ON METHODOLOGY	• Area: Xu et al (2018) derive this figure using a range of literature from the period 1990-2013 • Carbon: estimate by Parish et al (2008) based on Gorham (1991), Botch et al. (1995), Vompersky et al. (1996), Lappalainen (1996), Sheng et al. (2004); global average of vegetation carbon is from solely moss-covered peatlands to tropical rain forest swamps with high trees, in accordance with Gorham (1991); soil estimate is based on Turunen et al (1999) and Moore and Turunen (2004)	• Area: This figure uses IGBP land cover classifications based on global satellite data at l-km resolution; the figure includes savannah, shrubland, non-woody grassland, and tundra; the quality of the data is limited by its age • Carbon: CBD (2016) provides a range of 150-200 t C/ha for grasslands and savannah; we have conservatively chosen the lower figure, which is consistent with the WBGU (1988) figures cited in IPCC (2018) for tropical grasslands and savannahs. • Plant/soil values: plant and soil carbon stock proportions have been derived from the WBGU (1988) figures for the "tropical grasslands and savannahs" category provided in IPCC (2018, 192). The "tropical grasslands and savannahs" figure was chosen over the "temperate grasslands and shrublands" figure due to closer proximity with the category used in this report of "grasslands and savannahs," and as disaggregation of the data was beyond the scope of this report. Caution should be taken in using this figure, as it does not include temperate grasslands and savannahs. Notably, 80% soil carbon is consistent with the global average figure provided in CBD (2016, 14) of soil carbon in grasslands.	• Area: based on data collected from 223 countries and territories • Carbon and above/below ground values: Mean depth was 216 cm, and the figures included are the mean values for all samples. While the authors state (p. 3) that "Belowground stocks consisted of belowground tree biomass and soil organic C to the depths of indurated horizons of marine sands or bedrock," the data provided in table 4 (p. 14) suggests that soil organic carbon accounts for 100% of below-ground carbon. This presumably implies that the carbon held in below-ground biomass is negligible. As no figures were provided for plant carbon, the figure given here reflects only above-ground plant carbon, and similar to the aforementioned argument, this seems to imply that below-ground plant carbon is negligible. The above- and below-ground figures in this publication are therefore here interpreted as plant and soil carbon figures, respectively.	• Carbon and plant/soil values: pre-anthropogenic carbon density values

NOTES

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

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