

GREENPEACE



argill

COUNTDOWN TO EXTINCTION

What will it take
to get companies
to act?



CONSUMER GOODS COMPANIES FAILING TO END DEFORESTATION

- ✗ NONE
- PARTIAL
- ✓ FULL

Companies were assessed on the commitments and supply chain information published on their websites, informed by their correspondence with Greenpeace offices. No assessment was made of the quality of the companies' forest protection policies.

Companies were held to have committed to forest protection if they were members of the Consumer Goods Forum, or signatories to the New York Declaration on Forests, or had a cross-commodity forest protection policy, or had expressed on their websites an ambition, goal or commitment to eliminate deforestation

from their supply chains. Companies whose commitments only apply to specific biomes or some but not all of the commodities they source received partial credit.

Companies received full credit for publishing the plantations, farms or point of harvest for their commodities, and partial credit for disclosing an intermediate tier of their supply chain.

As the companies were unable to demonstrate that they knew where all of their commodities were produced, let alone by whom, they were all deemed unable to demonstrate deforestation-free supply chains.

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free?
Bahlsen	✗		✗	✗	✗	✗	✗	✗
Cavendish & Harvey	✓		✗	✗	✗	✗	✗	✗
Colgate-Palmolive	✓	—			—	✗	✗	✗
Danone	✓			✗	—	✗	✗	✗
Develey	✓	✗		✗		✗	✗	✗
Dr Oetker	✓	✗	✗	✗	✗	✗	✗	✗
Dr Wolff	✓				✗	✗	✗	✗
Freiberger	✓	✗		✗	✗	✗	✗	✗
General Mills	✓	✗	—	✗	—	✗	✗	✗
Henkel	✓				—	✗	✗	✗
Hershey	✓	✗	✗	✗	—	✗	✗	✗
IKEA	✓	✗	✗	✗	✗	✗	✗	✗
Johnson & Johnson	✓				—	✗	✗	✗
Kellogg	✓		—	✗	—	✗	✗	✗
KraftHeinz	✓	✗	✗	✗	—	✗	✗	✗
L'Oréal	✓				—	—	—	✗
Lambertz	✓	✗	✗	✗	✗	✗	✗	✗
Mars	✓	—	✗	✗	—	—	—	✗
Mondelez	✓	✗	✗	✗	—	✗	✗	✗
More than Meals/Abbelen	✓	✗		✗		✗	✗	✗
Nestlé	✓	—	—	✗	—	—	—	✗
PepsiGo	✓		✗	✗	—	✗	✗	✗
Procter & Gamble	✓				—	✗	✗	✗
Reckitt Benckiser	✓	✗	✗	✗	—	—	✗	✗
Revlon	—		✗		✗	✗	✗	✗
Ritter Sport	✓		✗	✗	✗	✗	✗	✗
Smuckers	—	✗	✗	✗	✗	✗	✗	✗
Unilever	✓	✗	✗	✗	—	✗	✗	✗
Upfield	✓				✓	✗	—	✗



EXECUTIVE SUMMARY: CLEAN UP OR CLEAR OUT

'[T]here are many policies and technologies that will limit global temperature rise and address the conservation and sustainable use of biodiversity. These will also offer our last, best chance to limit human-induced climate change and preserve the greatest amount of biodiversity possible. The way we produce and use energy, and farm, use our soils, protect coastal ecosystems and treat our forests will make or break our future, but it can also help us have a better quality of life.

We still have time – though very limited – to turn things around. It won't be easy. It requires massive changes, from removing subsidies that lead to the destruction of nature and future warming of the Earth, to enacting laws that encourage the protection of nature; from reducing our growing addiction to fossil-fuel energy and natural resource consumption, to rethinking the definition of a rewarding life.

Our current agricultural system is broken. If we keep producing food using current unsustainable agricultural practices, we will undermine future food production. But we already have more than enough food to go around. Today 815 million people go to bed hungry, 38 million more than in 2015. Yet, if food waste were a country, its emissions would rank third in the world, after China and the US, producing 8% of man-made emissions.

We need to redirect government subsidies towards more sustainable and regenerative farming. This will not only contribute towards absorbing carbon and reducing the emissions of other greenhouse gases, it can also halt a frightening trajectory where farmland is so overloaded that eventually it just stops growing crops.

***We simply cannot afford the cost of inaction. Change of the magnitude required will mean a different life for everyone, but the costs of doing nothing will be much higher.'*¹**

Professor Sir Robert T. Watson FRS, Chair of IPBES



©Beltrá/Greenpeace



©Beltrá/Greenpeace



©Katz/Greenpeace



©Swansborough/Greenpeace



©Funari/Lineair/Greenpeace

**'Nature's Dangerous Decline 'Unprecedented'
Species Extinction Rates 'Accelerating'
Current global response insufficient;
'Transformative changes' needed to restore and protect nature;
Opposition from vested interests can be overcome for public good
Most comprehensive assessment of its kind;
1,000,000 species threatened with extinction'²**

**Intergovernmental Science-Policy Platform
on Biodiversity and Ecosystem Services (IPBES)**

1 January 2004,
Itacoatiara, Brazil.
©Rudhart/Greenpeace

December 2001, Pará,
Brazil: Documentation
of 126 slave labourers
on an illegal farm in the
Amazon. Human rights
abuses including slavery
and landgrabbing are
endemic in much of the
agribusiness sector.
©Ripper/Imagens
Humanas/Greenpeace

2 June 2019,
Jakarta, Indonesia:
Overconsumption of
meat and dairy is driving
climate and ecological
breakdown.
©Sukarno/Greenpeace



Climate change and the world's sixth mass extinction event – both the result of humanity's overconsumption of natural resources – are the two greatest threats humanity faces. Scientists warn that we are already feeling the impacts of anthropogenic climate change,³ and around 1 million species are now at risk of extinction.⁴

Ecological and climate breakdown share many of the same drivers: notably, the destruction of forests and other natural ecosystems by industrial agriculture. Some 80% of global deforestation is a result of agricultural production,⁵ which is also the leading cause of habitat destruction.⁶ Animal agriculture – livestock and animal feed – is a significant driver of deforestation,⁷ and is also responsible for approximately 60% of direct global greenhouse gas (GHG) emissions from agriculture.⁸

Halting deforestation and restoring the world's forests is the cheapest and fastest way to reduce GHG emissions and ensure rapid carbon uptake.

At the 2010 United Nations Climate Change Conference in Cancun, members of the Consumer Goods Forum (CGF) committed to eliminate deforestation by 2020 through the responsible sourcing of the commodities most linked to forest destruction: cattle, palm oil, pulp and paper and soya.⁹

Yet despite these commitments, global commodity production remains a leading cause of forest destruction. Analysis by Greenpeace International¹⁰ suggests that by the start of 2020, some 50 million hectares of forest – an area the size of Spain¹¹ – are likely to have been destroyed for global commodity production since those promises were made in 2010.¹²

Meanwhile, the trade in high-risk commodities has boomed: since 2010, the area planted with soya in Brazil has increased by 45%,¹³ Indonesian palm oil production is up 75%¹⁴ and Côte d'Ivoire's cocoa footprint has grown by 80%.¹⁵ And the trend is set to continue: by 2050, global meat consumption (and hence production) is forecast to rise by 76%,¹⁶ soya production by nearly 45% and palm oil production by nearly 60%.¹⁷

In early 2019, Greenpeace challenged more than 50 traders, retailers, producers and consumer goods companies to demonstrate their progress towards

ending deforestation by disclosing their cattle, cocoa, dairy, palm oil, pulp and paper and soya suppliers.

Not a single company was able to demonstrate meaningful effort to eradicate deforestation from its supply chain. Data from the handful of companies that did disclose their commodity suppliers indicate that they all source from traders or producer groups involved in forest destruction.

Overconsumption of meat and dairy is an underlying driver of forest destruction, both for grazing land and for crops for industrial animal feed. Yet brands do not even know the volume or origin of the animal feed in their meat and dairy supply chains – a huge oversight, as soya is the second most significant driver of global deforestation¹⁸ and 90% of soya produced worldwide is used for animal feed.¹⁹ Further, many food giants are aggressively expanding into new markets and regions where meat and dairy consumption is below the global average,²⁰ pushing junk food and meat-rich diets that nutritionists warn are a disaster for our health.²¹

We have just over a decade to get GHG emissions under control if we are to limit global warming to below 1.5°C.²² Preventing climate and ecological breakdown will require transformative changes to the way forests are managed and agricultural commodities are produced, dramatic reductions in meat and dairy consumption and the phasing out of crop-based biofuels²³ and bioplastics.

The onus is on brands that use high-risk commodities like beef, palm oil and soya to demonstrate that their supply chains are free from deforestation. Brands must also slash their use of meat and dairy, leading to a more than 70% reduction in *per capita* consumption in high-consuming areas such as North America and Europe by 2030.²⁴ This means replacing industrially produced milk, pork, beef and poultry products with healthy and affordable plant-based foods.

We are experiencing a climate and ecological emergency. Companies that are unwilling or unable to do what is needed to fix the global commodity trade and keep forest destroyers out of their supply chains must instead avoid high-risk commodities entirely.

Halting deforestation and restoring the world's forests is the cheapest and fastest way to reduce greenhouse gas emissions and ensure rapid carbon uptake. In conjunction with phasing out fossil fuels, such action is essential if we are to limit global temperature rises to 1.5°C.²⁵ Some 80% of global deforestation is a result of agricultural production,²⁶ concentrated in tropical countries whose forests store enormous amounts of carbon²⁷ and are most urgent to protect. The destruction of forests and other natural ecosystems by industrial agriculture is also wiping out the earth's biodiversity: around 1 million species are now at risk of extinction.²⁸

Preventing climate and ecological breakdown requires 'transformative changes' to the way forest and agricultural commodities are produced, traded and consumed, producing and consuming less meat and dairy and phasing out crop-based biofuels²⁹ and bioplastics. Such changes would also deliver major gains for human health and the health of our planet. Companies face a stark choice: clean up the industrial food system or clear out of the global commodities trade.

CONTENTS

EXECUTIVE SUMMARY: CLEAN UP OR CLEAR OUT

**ROTTEN TO THE CORE:
HOW THE GLOBAL
COMMODITY TRADE
DRIVES ECOLOGICAL AND
CLIMATE BREAKDOWN** 4

THE PLANET IS IN CRISIS 8

**INDUSTRIAL AGRICULTURE
IS DESTROYING THE PLANET** 12

**MEAT AND DAIRY ARE
OUT OF CONTROL** 18

**'NO DEFORESTATION'
COMMITMENTS:
JUST HOT AIR?** 22

**COMPANIES STILL
DRIVE FOREST
DESTRUCTION** 24

**BRANDS ARE SELLING
OVERCONSUMPTION** 32

**THE TRUE COST OF
INDUSTRIAL AGRICULTURE** 38

CASE STUDIES: THE VESTED INTERESTS DRIVING FOREST DESTRUCTION

 42

**THE BRAZILIAN AMAZON:
THE CONTINUED BATTLE
FOR PROTECTION** 46

**THE CERRADO:
AN ECOSYSTEM
UNDER SOYA THREAT** 52

**THE GRAN CHACO FORESTS:
FRONTIER FOR SOYA
AND CATTLE EXPANSION** 60

**Zoned out – government
collusion with deforestation
in Argentina** 62

**INDONESIAN FORESTS
AND PEATLANDS:
A TICKING
CARBON BOMB** 64

**'In the national interest'
– how Indonesian government
ministers shield the palm oil
industry from scrutiny** 68

Hiding in plain sight 70

Still trading in destruction 72

**CONGO BASIN:
FOREST GRAFT DRIVES
DEFORESTATION
AND INJUSTICE** 74

**Republic of Congo:
what a carve-up** 76

**Cameroon:
the reckless expansion
of the rubber sector** 78

**Côte d'Ivoire and Ghana:
the cocoa frontier** 82

**BOREAL:
THE PULP INDUSTRY'S
THREAT TO THE GREAT
NORTHERN FOREST** 84

Pulping the Sámi way of life 87

**THE UNITED STATES:
PLOUGHED PRAIRIES,
DEAD WATERS** 88

VISION: LAND, FORESTS AND FOOD SYSTEMS FOR A HEALTHY PLANET

 92

NO DEFORESTATION 94

**REGREENING THE PLANET:
NATURE-BASED SOLUTIONS** 96

NO EXPANSION 100

**HEALTHY DIETS FOR
PEOPLE AND PLANET** 102

**System change – healthy
farming for healthy food** 105

DEMANDS

TIME FOR ACTION 106

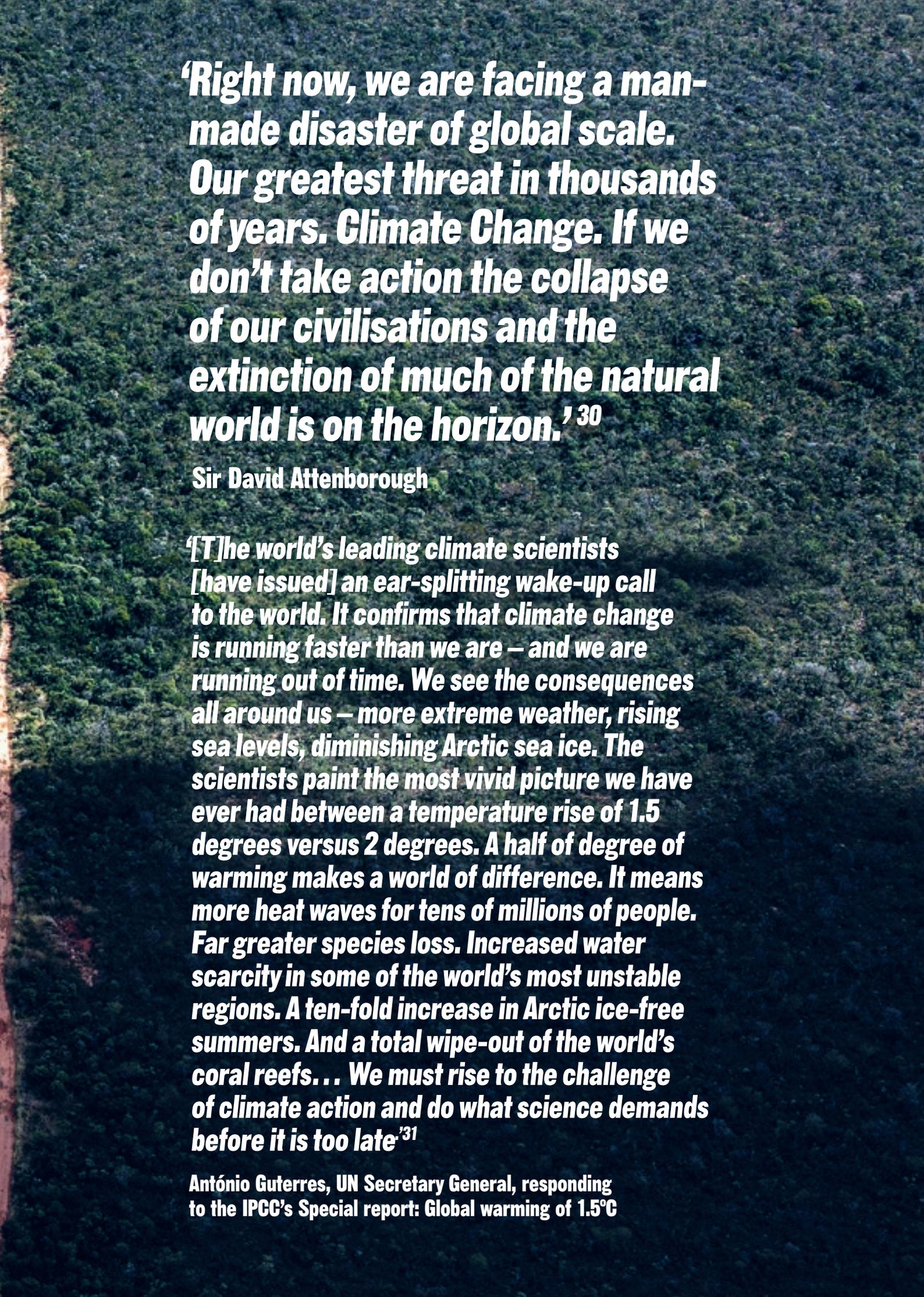
ENDMATTER

**APPENDIX:
DEFORESTATION AND
TREE COVER LOSS DATA** 110

ENDNOTES 112

REFERENCES 121





'Right now, we are facing a man-made disaster of global scale. Our greatest threat in thousands of years. Climate Change. If we don't take action the collapse of our civilisations and the extinction of much of the natural world is on the horizon.'³⁰

Sir David Attenborough

'[T]he world's leading climate scientists [have issued] an ear-splitting wake-up call to the world. It confirms that climate change is running faster than we are – and we are running out of time. We see the consequences all around us – more extreme weather, rising sea levels, diminishing Arctic sea ice. The scientists paint the most vivid picture we have ever had between a temperature rise of 1.5 degrees versus 2 degrees. A half of degree of warming makes a world of difference. It means more heat waves for tens of millions of people. Far greater species loss. Increased water scarcity in some of the world's most unstable regions. A ten-fold increase in Arctic ice-free summers. And a total wipe-out of the world's coral reefs... We must rise to the challenge of climate action and do what science demands before it is too late'³¹

António Guterres, UN Secretary General, responding to the IPCC's Special report: Global warming of 1.5°C

ROTTEN TO THE CORE: HOW THE GLOBAL COMMODITY TRADE DRIVES ECOLOGICAL AND CLIMATE BREAKDOWN



12 August 2008, Pará, Brazil. © Beltrá/Greenpeace



14 November 2017, Zaragoza, Spain. ©Armesre/Greenpeace



23 September 2017, Western Cape, South Africa. ©Sawyer/



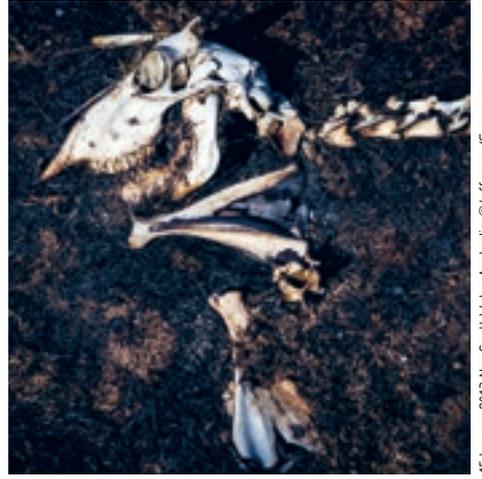
11 May 2012, Philippines. ©Cruz-Sy/Greenpeace



23 June 2013, Sumatra, Indonesia. ©Ifansasti/Greenpeace



23 June 2016, California, USA. © US Forest Service



15 January 2013, New South Wales, Australia. © Jefferson/Greenpeace



16 January 2017, Hamburg, Germany. © Reher/Greenpeace



10 February 2018, Paris, France. © Gideon Mendel



7 May 2017, Port Vila, Vanuatu. © Armestre/Greenpeace



29 December 2015, York, UK. © Caton/Greenpeace



5 November 2011, Bangkok, Thailand. © Penwongmehta/Greenpeace



11 April 2015, Mindanao, Philippines. ©Manlypig/Greenpeace



29 September 2018, Lake Baikal, Russia. ©Sinyakov/Greenpeace



2 August 2018, Africa, Greece. ©Stathias/Greenpeace



24 October 2015, Kuala Kapuas, Indonesia. © Rante/Greenpeace



10 June 2013, Ordo, China. ©Oiu Bo/Greenpeace



Kenya



17 August 2008, Pará, Brazil. ©Beltrá/Greenpeace



27 October 2005, Pará, Brazil. ©Beltrá/Greenpeace

THE PLANET IS IN CRISIS





12 October 2009, Manila, Philippines: Residents await aid after typhoons leave hundreds dead. Millions of people around the world are already affected by climate change. ©Villafranca/Greenpeace

We are living in a time when humankind is seen by many as the defining influence on the planet and its environment, leading to it being called the Anthropocene epoch.³² Climate change and what is being referred to as the world's sixth mass extinction event – both the result of our overconsumption of natural resources – are the two greatest threats humanity faces. How we respond will determine the future of life on earth.

In 2014, the Intergovernmental Panel on Climate Change (IPCC) warned that the consequences of failing to prevent global warming are serious and irreversible.³³ Extreme weather events, including heat waves, droughts, floods, cyclones and wildfires, will likely become more frequent and more severe.³⁴ Even very moderate temperature rises will make agricultural land less productive; wipe out fisheries; increase the risk of heat-related injury, disease and death; significantly impact global biodiversity; and increase water scarcity.³⁵ In turn, these changes will have a profound effect on human society, forcing millions from their homes, fuelling violent conflict and civil war, wiping out low-lying and coastal communities and increasing famine, poverty and disease.³⁶

In its October 2018 *Special report: Global warming of 1.5°C*, the IPCC warned that we are already feeling the impacts of anthropogenic climate change and

have just over a decade to get greenhouse gas (GHG) emissions under control if we are to limit the global temperature rise to below this level.³⁷ One of the report's authors confirmed that 'we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice'.³⁸

Equally serious is the biodiversity crisis. In May 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) warned of an 'unprecedented' decline in nature and that species extinction rates were 'accelerating'.³⁹ According to IPBES, 'around 1 million animal and plant species are now threatened with extinction, many within decades, more than ever before in human history'.⁴⁰ The UN body called for 'transformative changes' to restore and protect nature and stressed that it was in the public interest for policymakers to overcome opposition from 'vested interests'.⁴¹

Summarising the twin threats humanity faces, IPBES Chair Sir Robert Watson warned that 'The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide'.⁴²





INDUSTRIAL AGRICULTURE IS DESTROYING THE PLANET

‘Civilisation is in crisis. We can no longer feed our population a healthy diet while balancing planetary resources. For the first time in 200 000 years of human history, we are severely out of synchronisation with the planet and nature. This crisis is accelerating, stretching Earth to its limits, and threatening human and other species’ sustained existence. . . . The dominant diets that the world has been producing and eating for the past 50 years are no longer nutritionally optimal, are a major contributor to climate change, and are accelerating erosion of natural biodiversity. Unless there is a comprehensive shift in how the world eats, there is no likelihood of achieving the Sustainable Development Goals (SDGs) – with food and nutrition cutting across all 17 SDGs – or of meeting the Paris Agreement on climate change.’⁴³

EAT-Lancet Commission on Food, Planet, Health

2 February 2017, Lower Saxony, Germany. ©Wresch/Greenpeace

2001, United Kingdom: The outbreak of foot-and-mouth disease caused a crisis in British agriculture and tourism. Involving 2,000 cases of the disease in farms across most of the British countryside. Over 10 million sheep and cattle were killed in an attempt to halt the disease. ©Murdo Macleod





10 June 2017,
MATOPIBA, Brazil.
©Cruppe/Greenpeace

10 July 2017,
Dedelow, Germany.
©Langrock/Greenpeace

Ecological and climate breakdown share many of the same drivers: notably, the destruction of forests and other natural ecosystems by industrial agriculture. If global temperature rises are to be limited to below 1.5°C, and if we are to return ecosystems to health, then restoring and protecting forests, peatlands, savannahs, wetlands and other natural ecosystems is an imperative.

The current situation is bleak. According to Global Forest Watch, global tree cover loss stood at 24.8 million hectares (ha) in 2018⁴⁴ – an area larger than the UK.⁴⁵ This figure was slightly down from the record high of 2016 but still above the annual average for the period since 2001.⁴⁶ World Resources Institute data indicate that nearly half of this loss was in tropical forests, including 3.6 million ha of primary rainforest.⁴⁷ Annual net emissions from deforestation for conversion to agriculture and to tree plantations in tropical countries alone averaged 2.6 gigatonnes of carbon dioxide (GtCO₂) in the 2010–2014 period⁴⁸ – equivalent to the combined total emissions of Japan, Germany and the UK.⁴⁹

The production of agricultural commodities for food and biofuels is the leading cause of deforestation⁵⁰ and habitat destruction worldwide.⁵¹

During 2010–2015, agriculture and the production of other commodities were responsible for the destruction of 30 million ha of forests⁵² – equivalent to the size of Italy.⁵³ This is a consistent average of around 5 million ha per year, or roughly 25% of global tree cover loss; over 95% of this took place in Latin America and Southeast Asia.⁵⁴

Reliable data on drivers of deforestation are not yet available for the period since 2015, but if

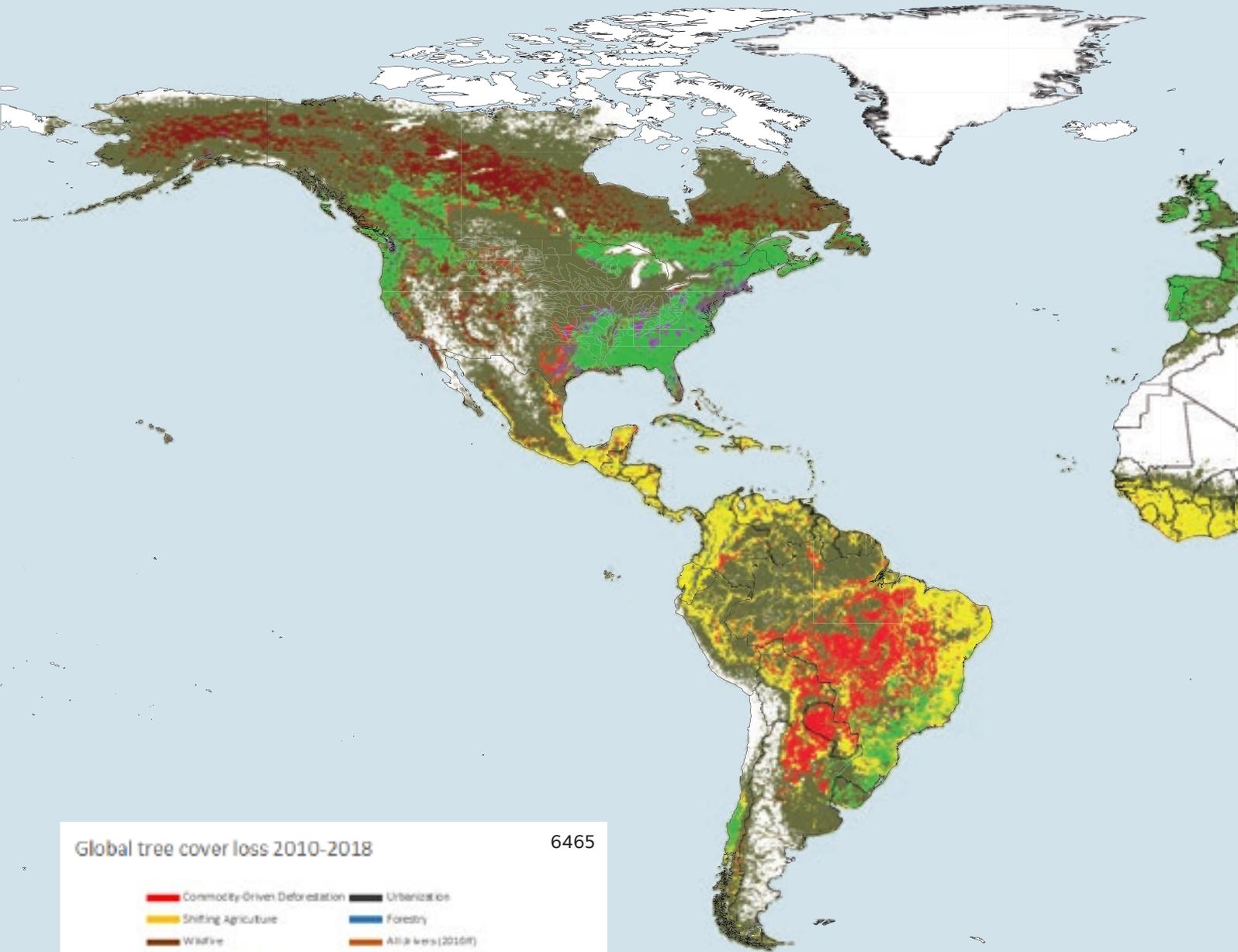
deforestation for commodities has continued at a similar rate it will have accounted for the loss of 50 million ha of forests⁵⁵ – an area the size of Spain⁵⁶ – between 2010 and the start of 2020.

To make matters worse, what available data do show is that annual tree cover loss has increased since 2015: 2016, 2017 and 2018 each broke the record for the highest tree cover loss in the 2010–2015 period.⁵⁷ This means the myriad commitments from companies that produce, trade or use agricultural commodities have had no discernible impact on overall rates of forest loss.

Agriculture, forestry and other land use are responsible for a quarter of global GHG emissions.⁵⁸ If business as usual continues, by 2050 emissions from the food system are predicted to be 77% higher than they were in 2009.⁵⁹

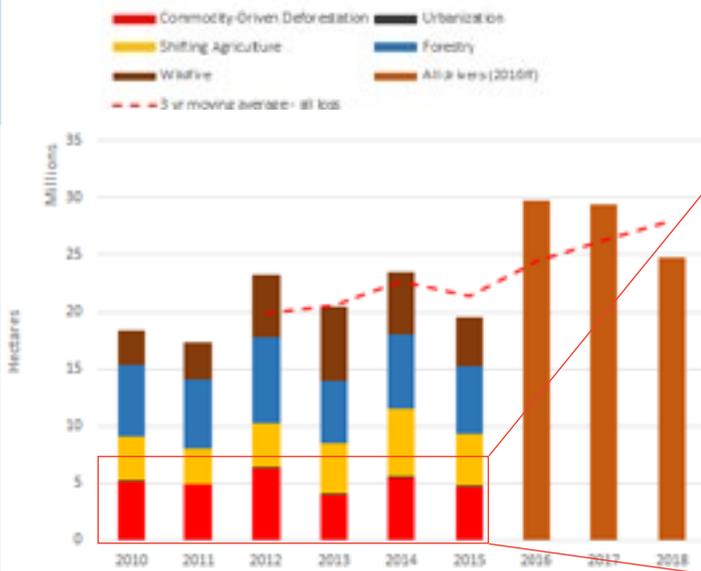
The message from the science is clear. In its October 2018 special report, the IPCC recognised that reforming the food system to ensure forests are protected is a vital part of the fight against climate change.⁶⁰ Stressing the need to end deforestation, United Nations (UN) Secretary-General António Guterres called for ‘urgent and far more ambitious action’ and ‘unprecedented changes’ to the way land is used and food and commodities are produced.⁶¹ Similarly, the IPBES report⁶² called for sweeping and immediate changes to protect the world’s flora and fauna, requiring ‘deeper engagement of all actors throughout the food system (including producers, the public sector, civil society and consumers)’.⁶³

GLOBAL FORESTS AND DEFORESTATION



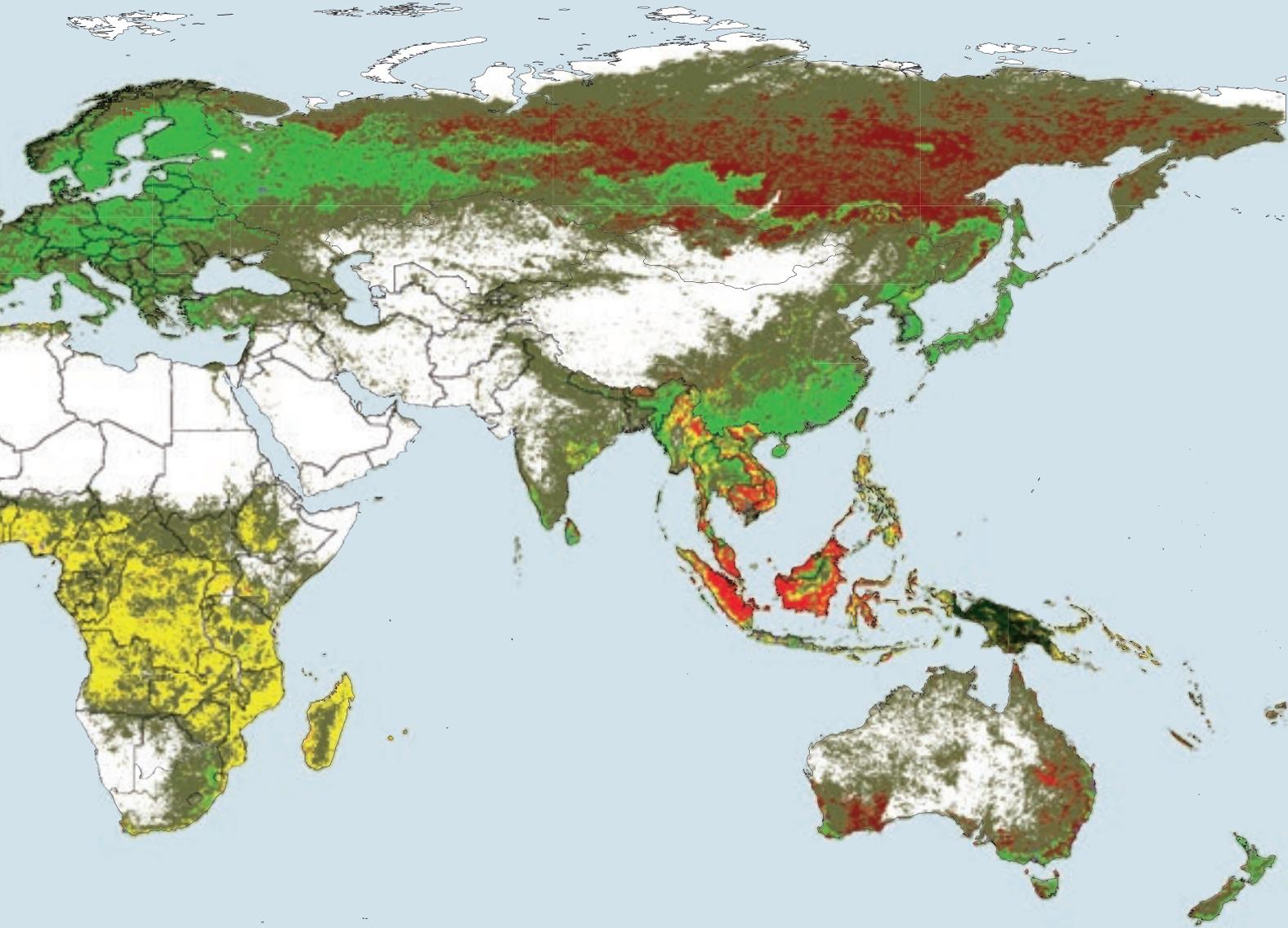
Global tree cover loss 2010-2018

6465

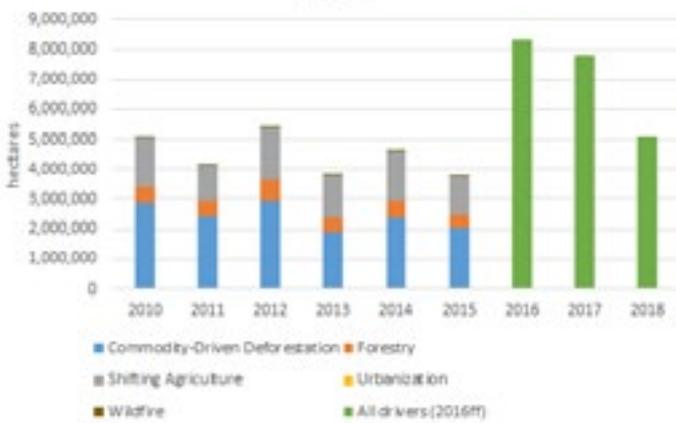


Commodity-driven deforestation

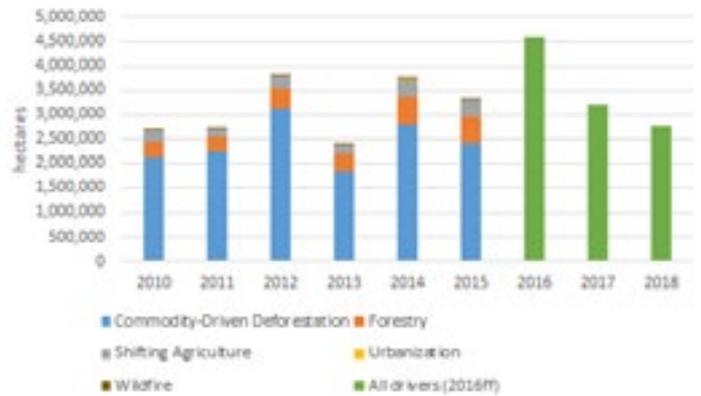




Latin America and Caribbean tree cover loss 2010-2018



Southeast Asia tree cover loss 2010-2018



MEAT AND DAIRY ARE OUT OF CONTROL

Of all of the things we eat, meat and dairy products have the greatest damaging effects upon our environment. Animal agriculture – livestock and animal feed – is responsible for approximately 60% of food-related climate emissions⁶⁹ and is the most significant driver of deforestation.⁷⁰

Much of this forest conversion occurs in South America, particularly in the Amazon⁷¹ but also in dry woodland biomes such as the Gran Chaco – South America's second-largest forest – and the Cerrado.⁷² Cattle ranching is a major driver of deforestation in these areas, but the overwhelming majority of Brazilian beef is consumed within Brazil,⁷³ and the same is true for Argentina.⁷⁴ This makes soya – which is widely traded and used mainly for animal feed – a more significant component of many countries' deforestation footprint.⁷⁵

Almost half of the world's soya is produced in Brazil and Argentina.⁷⁶ In Brazil, soya production has more than quadrupled in the past two decades.⁷⁷ This rapid expansion has come at the expense of some of the most biodiverse environments on earth. Having cleared large areas of the Amazon rainforest, the soya industry is now converting substantial tracts of the savannah and forest of the Brazilian Cerrado, which has already lost half of its original vegetation to agricultural expansion.⁷⁸ The Gran Chaco is also suffering high rates of conversion.⁷⁹

Global soya production has more than doubled since 1997,⁸⁰ facilitated by the introduction of genetically modified (GM) herbicide-tolerant seeds

in the 1990s,⁸¹ and driven by growing demand for animal feed to supply the ever fewer, larger farms that produce much of the world's meat and dairy.⁸² According to figures from the Institute for Agriculture and Trade Policy (IATP), an estimated 90% of soybeans are used as a protein source in animal feed.⁸³ Globally, just under half of all animal feed made from soybeans and other oilseed crops is consumed by poultry.⁸⁴ GHG emissions from livestock rearing are also a significant contributor to global emissions, accounting for an estimated 14.5% of all human-generated emissions.⁸⁵

Based on FAO figures⁸⁶ it is estimated that global meat consumption will rise 76% by 2050, including a doubling in the consumption of poultry, a 69% increase in beef, and a 42% increase in pork⁸⁷ – putting further pressure on forests and the other natural ecosystems already threatened by the cattle and soya industries' expansion.

Health professionals are raising the alarm about the impact our meat-rich diet is having on our health. The World Health Organisation,⁸⁸ the World Cancer Research Fund⁸⁹ and numerous other health organisations and scientists have warned that our current levels of meat consumption are increasing the risk of diabetes,⁹⁰ heart disease⁹¹ and cancers. The European Public Health Association, an umbrella organisation for public health associations and institutes in Europe, has called for 'increasing the consumption of more plant-based diets ... as well as decreasing the consumption of animal-origin foods' to improve health.⁹²

Danish pigs

Denmark is the biggest meat producer *per capita* in the world, notably of pork, producing 33 million pigs a year.⁶⁶ 90% of these are exported, either as raw and processed meat or as live animals, according to the trade association the Danish Agriculture & Food Council (DAFC).⁶⁷ Almost three-quarters of Danish pork is exported to other EU countries; Germany is the biggest market.⁶⁸

16 April 2018, Thuringia,
Germany: Sow with her
piglets on a factory farm.
©Greenpeace





1 April 2009, Mato Grosso, Brazil: A worker in a Marfrig slaughterhouse. A Greenpeace investigation exposed that the company was sourcing cattle from Amazon deforestation. Cattle ranching is a major driver of deforestation in South America.
©Funari/Lineair/Greenpeace

CHICKEN BURGER*
99p

CHEESEBURGER 99p

FRIES 99p REGULAR

SOFT DRINK
99p SMALL



M&M'S® KING FUSION*



BLACK COFFEE

HAMBURGER

AERO® KING FUSION®

OREO® KING FUSION®

SUNDAE

*Product is cooked in the same oil as fish and chicken products.
Nestlé and Aero® are registered Trademarks of Societe des Produits Nestlé S.A. Oreo® is a registered Trademark of Mondelez®. *Product is cooked in the same oil as fish and chicken products. Subject to availability. Available at participating restaurants only. Check participating restaurants on our website at www.burgerking.co.uk. 'Coca-Cola' and the Dynamic Ribbon device are registered trademarks of The Coca-Cola Company. Burger King Corporation. © 2016 Burger King Europe GmbH. All rights reserved.

Food companies are pushing meat- and dairy-rich diets that are bad for the planet and our health, using discounts, competitions, limited editions and promotions aimed specifically at children.

'NO DEFORESTATION' COMMITMENTS: JUST HOT AIR?

'[C]ollectively we commit to doing our part to achieve the following outcomes in partnership, including by ensuring that strong, large-scale economic incentives are in place commensurate with the size of the challenge:

At least halve the rate of loss of natural forests globally by 2020 and strive to end natural forest loss by 2030.

Support and help meet the private-sector goal of eliminating deforestation from the production of agricultural commodities such as palm oil, soy, paper and beef products by no later than 2020, recognizing that many companies have even more ambitious targets.

Significantly reduce deforestation derived from other economic sectors by 2020. Support alternatives to deforestation driven by basic needs (such as subsistence farming and reliance on fuel wood for energy) in ways that alleviate poverty and promote sustainable and equitable development.

Restore 150 million hectares of degraded landscapes and forestlands by 2020 and significantly increase the rate of global restoration thereafter, which would restore at least an additional 200 million hectares by 2030.⁹³

New York Declaration on Forests, September 2014



In an open letter published ahead of the United Nations Framework Convention on Climate Change (UNFCCC) COP24 in Katowice, the Alliance of CEO Climate Leaders – which includes heads of companies that finance, trade or consume forest and agricultural commodities – told world leaders that they ‘stand ready to fast-track solutions to help you deliver on an enhanced and more ambitious action plan to tackle climate change’.⁹⁴

Companies and governments have long promised to deliver ‘a prosperous, inclusive and low-carbon world’,⁹⁵ including specific commitments to halt and reverse the conversion of forests and other natural ecosystems to cropland, pasture and plantations. In 2010, at COP16 in Cancun, members of the Consumer Goods Forum (CGF) committed to eliminate deforestation by 2020 through the responsible sourcing of cattle, palm oil, pulp and paper and soya products – the four commodities most closely associated with large-scale forest destruction.⁹⁶



12 August 2008, Pará, Brazil: Cattle graze beneath the smoke rising from fires used to clear further land for cattle ranching. ©Beltrá/Greenpeace

In 2011, the Government of Germany and the International Union for Conservation of Nature (IUCN) launched the Bonn Challenge, with the aim of restoring 150 million ha of deforested land globally by 2020. It was presented not as a new commitment, but ‘a practical means of realizing many existing international commitments’, including the Convention on Biological Diversity (CBD) Aichi Target 15, the UNFCCC’s goal of reducing emissions from deforestation and forest degradation (REDD+) and the Rio+20 land degradation neutrality goal.⁹⁷

The 2014 New York Declaration on Forests (NYDF) was ‘a partnership of governments, multinational companies, civil society and indigenous peoples’.⁹⁸ It confirmed ‘the private-sector goal of eliminating deforestation from the production of agricultural commodities such as palm oil, soy, paper and beef products by no later than 2020, recognizing that many companies have even more ambitious targets’ as part of an overarching pledge to halve **all** deforestation by

2020 and end it by 2030. Further, the NYDF reaffirmed the substance of the Bonn Challenge, with signatories pledging to restore 150 million ha of degraded land by 2020 and a further 200 million ha – 350 million ha in total – by 2030.⁹⁹

Technological advances have removed many barriers to cleaning up supply chains and protecting forests and other natural ecosystems. The continuing development of satellite monitoring now makes it possible to accurately identify the location, pace and scale of deforestation – and to attribute the destruction to specific commodities.¹⁰⁰ Technologies such as blockchain have made supply chains more transparent and traceable.¹⁰¹ Such advances mean that it has never been easier for companies to understand who produced their commodities and whether those suppliers are destroying forests. Similarly, it is easier than ever for governments to monitor forests and ensure that they are being protected and restored.

COMPANIES STILL DRIVE FOREST DESTRUCTION

“In total, net emissions of 2.6 GtCO₂ per year were attributed to loss of forests due to expansion of agriculture and tree plantations in the period 2010–2014. More than half of these emissions were associated with cattle and oilseed products alone. ... [A] large share of the deforestation-related carbon emissions – 29–39% – was embodied in international trade, especially to Europe and China. Notably, in many developed countries, deforestation carbon emissions embodied in consumption rival or exceed emissions from domestic agriculture, and deforestation emissions constitute a sixth of the carbon footprint of the average EU diet. ... [I]f emissions from deforestation are to be effectively reduced[,] domestic policy measures can benefit from being complemented by efforts targeting actors in international supply chains.”¹⁰²

Pendrill F et al (2019), ‘Agricultural and forestry trade drives large share of tropical deforestation emissions’

1 April 2018,
Papua, Indonesia.
©Ifansasti/Greenpeace



The test of whether companies and governments have been true to their forest protection and restoration promises is simple: there should be more forests in 2020 than there were in 2010. Moreover, forest and agricultural commodities – notably cattle, cocoa, palm oil, pulp and paper, rubber and soya products – should no longer be driving forest destruction or expanding into other natural ecosystems.

Instead, the global commodities trade continues to drive deforestation, and companies that have committed to end forest destruction exploit non-transparent supply chains to hide their links to it.

At the start of 2018, Greenpeace International¹⁰³ challenged leading brands to demonstrate their progress towards eliminating deforestation from their palm oil supply chains by publishing the details of mills that produced their palm oil and the names of the producer groups¹⁰⁴ that controlled those mills.¹⁰⁵ Over the course of the year, many brands and traders complied with this request. Every company that opened its supply chain to public scrutiny was sourcing from palm oil producers that are known to be responsible for recently clearing rainforests, exploiting their workers and/or embroiled in land conflicts with local communities.¹⁰⁶

If companies do not know who is producing the

commodities they use or trade, or where those producers operate, they cannot know whether the producers are operating responsibly or destroying forests. Given the seriousness of the situation, and the threat posed to the earth's climate and wildlife, brands must adopt a zero-tolerance approach to commodity sourcing. They must assume high-risk commodities from untraced or undisclosed sources are driving deforestation and ecosystem conversion, and exclude them completely from their supply chains. Brands must also suspend trade with suppliers that are shown to be in any way involved with forest destruction, regardless of whether the specific items they are purchasing are affected.

In early 2019, Greenpeace issued another transparency challenge, this time across multiple commodities. More than 50 traders, retailers, producers and consumer goods companies were asked to demonstrate their progress towards ending deforestation by making their supply chains for cattle, cocoa, dairy, palm oil, pulp and paper and soya products transparent, including disclosing the names of the producer groups to which they were linked.

Not a single company was able to demonstrate meaningful effort to eradicate deforestation from its supply chain.

25 March 2019,
Bahia, Brazil.
©Moriyama/Greenpeace



CONSUMER GOODS COMPANIES FAILING TO END DEFORESTATION

- ✗ NONE
- PARTIAL
- ✓ FULL

Companies were assessed on the commitments and supply chain information published on their websites, informed by their correspondence with Greenpeace offices. No assessment was made of the quality of the companies' forest protection policies.

Companies were held to have committed to forest protection if they were members of the Consumer Goods Forum, or signatories to the New York Declaration on Forests, or had a cross-commodity forest protection policy, or had expressed on their websites an ambition, goal or commitment to eliminate deforestation

from their supply chains. Companies whose commitments only apply to specific biomes or some but not all of the commodities they source received partial credit.

Companies received full credit for publishing the plantations, farms or point of harvest for their commodities, and partial credit for disclosing an intermediate tier of their supply chain.

As the companies were unable to demonstrate that they knew where all of their commodities were produced, let alone by whom, they were all deemed unable to demonstrate deforestation-free supply chains.

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free?
Bahlsen	✗		✗	✗	✗	✗	✗	✗
Cavendish & Harvey	✓		✗	✗	✗	✗	✗	✗
Colgate-Palmolive	✓	—			—	✗	✗	✗
Danone	✓			✗	—	✗	✗	✗
Develey	✓	✗		✗		✗	✗	✗
Dr Oetker	✓	✗	✗	✗	✗	✗	✗	✗
Dr Wolff	✓				✗	✗	✗	✗
Freiberger	✓	✗		✗	✗	✗	✗	✗
General Mills	✓	✗	—	✗	—	✗	✗	✗
Henkel	✓				—	✗	✗	✗
Hershey	✓	✗	✗	✗	—	✗	✗	✗
IKEA	✓	✗	✗	✗	✗	✗	✗	✗
Johnson & Johnson	✓				—	✗	✗	✗
Kellogg	✓		—	✗	—	✗	✗	✗
KraftHeinz	✓	✗	✗	✗	—	✗	✗	✗
L'Oréal	✓				—	—	—	✗
Lambertz	✓	✗	✗	✗	✗	✗	✗	✗
Mars	✓	—	✗	✗	—	—	—	✗
Mondelez	✓	✗	✗	✗	—	✗	✗	✗
More than Meals/Abbelen	✓	✗		✗		✗	✗	✗
Nestlé	✓	—	—	✗	—	—	—	✗
PepsiCo	✓		✗	✗	—	✗	✗	✗
Procter & Gamble	✓				—	✗	✗	✗
Reckitt Benckiser	✓	✗	✗	✗	—	—	✗	✗
Revlon	—		✗		✗	✗	✗	✗
Ritter Sport	✓		✗	✗	✗	✗	✗	✗
Smuckers	—	✗	✗	✗	✗	✗	✗	✗
Unilever	✓	✗	✗	✗	—	✗	✗	✗
Upfield	✓				✓	✗	—	✗

FAST FOOD COMPANIES FAILING TO END DEFORESTATION

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free?
Burger King	✓	✗	✗	✗	✗	✗	✗	✗
Dunkin' Donuts	✓	✗	✗	✗	✗	✗	✗	✗
McDonald's	✓	✗	✗	✗	✗	✗	✗	✗
Starbucks	✓	✗	✗	✗	✗	✗	✗	✗
Subway	✓	✗	✗	✗	✗	✗	✗	✗
Yum! Brands	✓	✗	✗	✗	✗	✗	✗	✗



July 2017, Ghana. ©Ashley Gilbertson/VII

RETAILERS FAILING TO END DEFORESTATION



©Greenpeace

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free? Publishes
Ahold Delhaize	✓	✗	✗	✗	✗	✗	✗	✗
Carrefour	✓	✗		✗	✗	✗	✗	✗
Casino	✓	✗		✗	✗	✗	✗	✗
Costco	✓	✗	✗	✗	✗	✗	✗	✗
DM-Drogerie Markt	✓	✗	✗	✗	✗	✗	✗	✗
Kroger	✓	✗	✗	✗	✗	✗	✗	✗
METRO	✓	✗	✗	✗	✗	✗	✗	✗
REWE	✓	✗	✗	✗	✗	✗	✗	✗
Spar International	✓	✗	✗	✗	✗	✗	✗	✗
Tesco	✓	✗	✗	✗	✗	✗	✗	✗

MEAT PRODUCERS FAILING TO END DEFORESTATION



1 April 2009, Mato Grosso, Brazil. ©Funari/Linear/Greenpeace

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free? Publishes
2 Sisters	✗	✗	✗	✗	✗	✗	✗	✗
Danish Crown	✗	✗		✗	✗	✗	✗	✗
JBS	—	✗		✗	✗	✗	✗	✗
Marfrig	—	✗		✗	✗	✗	✗	✗
Minerva	—	✗		✗	✗	✗	✗	✗
Moy Park	✗	✗	✗	✗	✗	✗	✗	✗
Tyson	✓	✗		✗	✗	✗	✗	✗

COMMODITIES TRADERS FAILING TO END DEFORESTATION



May 2019, Brazil. ©Greenpeace

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free?
AAK	—	×	×	×	—	×	×	×
ADM	✓		×		—	×	×	×
Bunge	✓		×	×	—	×	×	×
Cargill	✓	×	×	×	—	×	×	×
Cofco	✓	×	×	×	×	×	×	×
GAR	✓				—	×		×
Louis Dreyfus	—		×	×	—	×	×	×
Olam	—	×	×	×	—	×	×	×
Wilmar	—	×	×	×	—	×	×	×

DAIRY PRODUCERS FAILING TO END DEFORESTATION



©Shutterstock

	Forest protection commitment?	Publishes cattle / meat producers?	Publishes cocoa producers?	Publishes dairy producers?	Publishes palm oil producers?	Publishes pulp and paper producers?	Publishes soya producers?	100% forest destruction free?
Arla	—		×	×	×	×	×	×
DairyCrest	×		×	×	×	×	×	×
DMK	✓		×	×	×	×	×	×
FrieslandCampina	✓		×	×	✓	—	—	×



8 August 2008,
Agua Boa, Brazil.
©Beltrá/Greenpeace

Just a handful of companies chose to disclose some or all of their suppliers. The majority of the companies contacted by Greenpeace failed to provide this information, hiding behind claims of commercial confidentiality.¹⁰⁷ What limited information was disclosed revealed significant issues with the implementation of corporate ‘no deforestation’ commitments. These help explain why the global commodities trade remains a leading driver of forest destruction and why the proliferation of corporate commitments has not translated into meaningful change on the ground.

For example, soya is the second most significant driver of global deforestation (after beef),¹⁰⁸ and about 90% of it is used for animal feed.¹⁰⁹ Yet not a single brand contacted by Greenpeace was able to demonstrate that it was tracking the amount of soya consumed as animal feed in its supply chain – including by meat and dairy producers or their customers – let alone whether the supply of soya-based animal feed was contributing to forest destruction. At best, companies were estimating their consumption of soya for animal feed based on industry averages – and this only when

challenged by Greenpeace. Palm oil and its derivatives are also a growing component of animal feed,¹¹⁰ yet companies were similarly unable to calculate their footprint of animal feed derived from palm oil.

In other words, when it comes to the use of high-risk commodities in animal feed, companies appear to know neither the volumes they use nor the producer groups from which they source. Although animal feed is a significant share of manufacturers’, retailers’ and fast food companies’ deforestation footprints, it appears brands have yet to enforce – or even communicate to their meat and dairy suppliers – their ‘no deforestation’ commitments.

Approximately half of the companies contacted by Greenpeace now publish details of their palm oil suppliers. All of these companies report sourcing from producer groups known to have recently been clearing rainforests in Southeast Asia.¹¹¹ A handful of companies disclose their soya suppliers, although none of these disclosures takes account of soya in animal feed. Each of the companies that makes its soya supply chain transparent reports sourcing from ADM, Bunge



11 June 2017,
MATOPIBA, Brazil.
©Cruppe/Greenpeace

and Cargill, all of which have been trading with farms responsible for recent conversion of forests or other natural ecosystems in the Cerrado.¹¹² Supply chain information published by these traders also links them to deforestation for palm oil.¹¹³ Only two companies make any disclosure regarding their cocoa suppliers, which reveal that they have been sourcing cocoa from Barry Callebaut, Cargill and Olam, which are all linked to deforestation in Côte d'Ivoire or Ghana.¹¹⁴ Investigations by civil society organisations continue to link global brands to forest destruction for other commodities (see case studies below).

Despite these findings, consumer brands – and the sustainability consultants hired to assist them – are claiming significant progress towards ending forest destruction linked to the production of cattle, cocoa, palm oil, pulp and paper, rubber and soya. For example, many companies claim to be sourcing sustainable palm oil. However, this is an industry term that refers to palm oil that has been certified by the Roundtable on Sustainable Palm Oil (RSPO) – an organisation that nongovernmental organisations

(NGOs) have repeatedly accused of having weak standards that are poorly enforced.¹¹⁵ Likewise, there have been some high-profile initiatives to transform the cocoa¹¹⁶ and rubber¹¹⁷ sectors, but these have yet to translate into real change on the ground.

In April 2019, Nestlé announced that three-quarters of its agricultural commodities were 'verified as deforestation-free'.¹¹⁸ Greenpeace analysis of this announcement revealed that the food giant had arrived at this figure by omitting its supply of some commodities, including cocoa and any soya used as animal feed (which accounts for about half its total soya footprint).¹¹⁹ Further, it was found to be classifying commodities as 'deforestation-free' even if the producer was clearing forests, provided the deforestation was not in the plantations from which Nestlé was sourcing. Finally, Nestlé confirmed to Greenpeace that it lacked a comprehensive set of concession maps and other data necessary to undertake a proper analysis. In other words, it appears to have been cherry-picking data to give the impression of progress without the evidence to back these claims up.

BRANDS ARE SELLING OVERCONSUMPTION

KFC, McDonald's and other fast food companies are expanding rapidly into countries with below average meat consumption, pushing meat-rich Western-style diets.

'While chicken has always been a large part of our menu, 2016 is the year that we have refocused on our core, as a result all the big ticket launches so far have been driven by chicken. ... We feel that it is just the right juncture to reiterate what we stand for – chicken.'¹²⁰

Lluis Ruiz Ribot, Chief Marketing Officer, KFC India

'In markets like Indonesia, the Philippines and some markets in the Middle East where the category and the brand are still growing, where awareness and penetration are growing, chocolate is something where you need disposable income. ... We're spending more time in those markets focusing on "glass and a half" [of milk], the very foundational credentials of the brand.'¹²¹

Ben Wicks, Global Brand Director, Cadbury

'At the moment [2015] it's around an \$18 billion infant formula market in China. By 2018, that'll be around \$33 billion. ... [N]ot only is the growth absolutely huge but it's the quality of the growth that is also giving people the confidence to invest.'¹²²

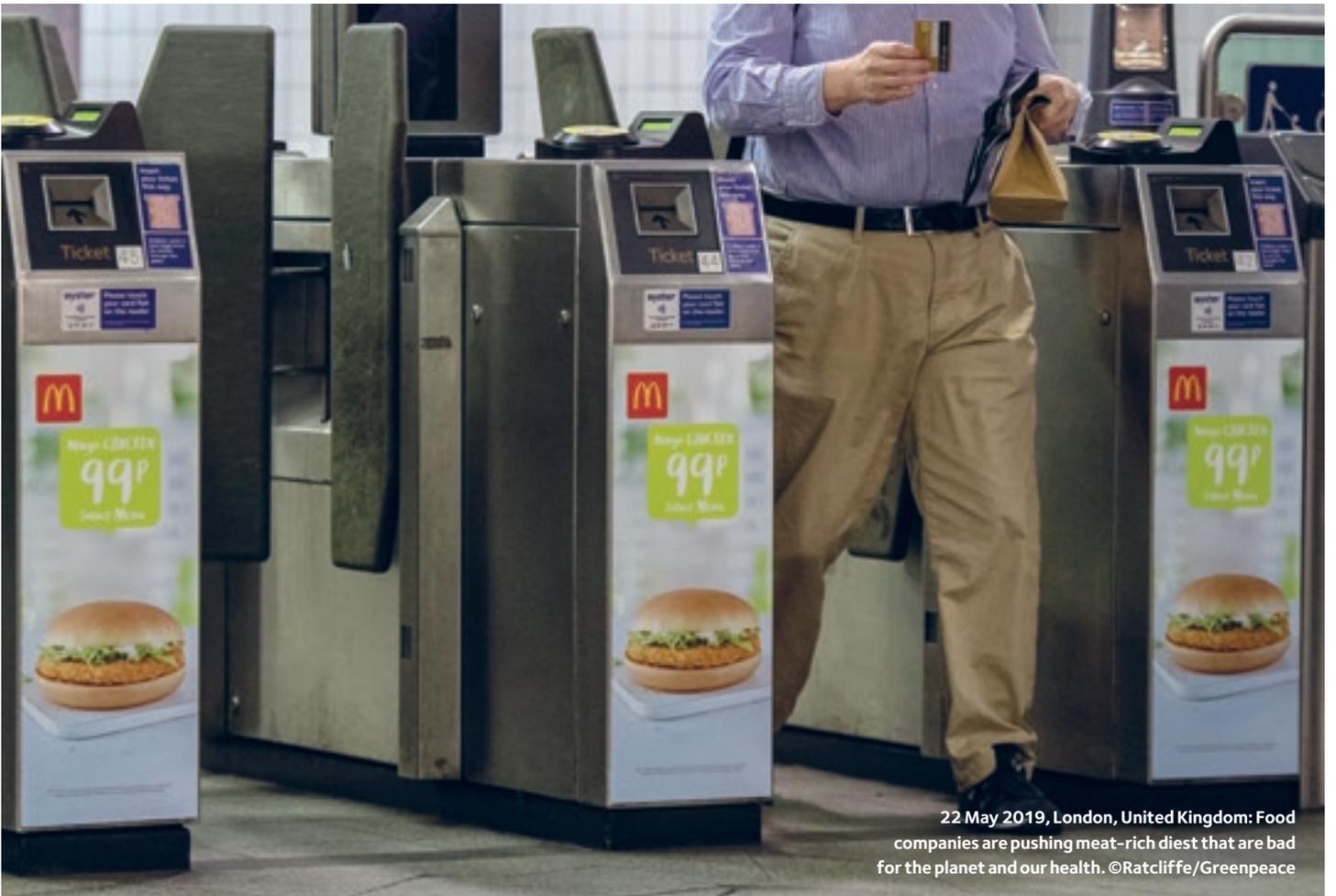
Judith Swales, Australian managing director, Fonterra

'A rapidly growing share of global agricultural areas is devoted to the production of biomass for non-food purposes. The expanding non-food bioeconomy can have far-reaching social and ecological implications ... [The EU is] a major processing and the biggest consuming region of cropland-based non-food products, while at the same time relying heavily on imports. Two thirds of the cropland required to satisfy the EU's non-food biomass consumption are located in other world regions, particularly in China, the US and Indonesia, giving rise to potential impacts on distant ecosystems.'¹²³

Bruckner M et al (2019), 'Quantifying the global cropland footprint of the European Union's non-food bioeconomy'



22 July 2017, Accra, Ghana: KFC has been expanding its presence in Ghana as a growing middle class and changing diets are changing the country's eating habits – changes bringing with them an epidemic of obesity and diabetes. ©Ashley Gilbertson/VII



22 May 2019, London, United Kingdom: Food companies are pushing meat-rich diets that are bad for the planet and our health. ©Ratcliffe/Greenpeace

Fuelling destruction

Global biodiesel production leapt by over 10% between 2017 and 2018 alone, with biodiesel expected to have accounted for 17% of global vegetable oil and fat consumption in that year.¹²⁴ About a fifth of the soya and palm oil produced worldwide in 2018 was used in biodiesel.¹²⁵ The US also devotes a significant area of land to the production of biofuels, accounting for more than a third of its maize harvest¹²⁶ and a small share of soya production.¹²⁷



4 January 2016, Berlin, Germany.
©Langrock/Greenpeace

Throw-away culture – the last straw

Public concern over the toxic effects of plastic pollution has pushed companies to shift wholesale to bio-based plastics or paper for single-use products. Companies including Nestlé,¹²⁸ Starbucks¹²⁹ and Dunkin' Donuts¹³⁰ have announced switches from plastic to paper for products such as straws and cups.



In mid-2018, Starbucks committed to eliminate plastic straws. Shown here, individual 'candy straws' wrapped individually in plastic 'for hygiene reasons'.



22 May 2019, London, United Kingdom: Inside a McDonald's.
©Ratcliffe/Greenpeace

Companies have long held that there is no conflict between ending deforestation and increasing production and consumption of high-risk commodities. The idea was to use corporate procurement policies to protect forests by shifting new production to so-called 'degraded land' that is less critical for wildlife or climate change mitigation. This logic underpinned companies' willingness to adopt 'no deforestation' policies, as these did not challenge the fundamentals of their business model. The Tropical Forest Alliance 2020 described this approach as a 'win-win opportunity' – a way to clean up the supply chain without threatening the unfettered growth of commodities.¹³⁹

This approach has failed. It has yielded some success in specific geographical areas – notably, the moratorium protecting the Brazilian Amazon from the soya industry.¹⁴⁰ However, global consumption and production of high-risk commodities has boomed since 2010, when the CGF promised to end deforestation, with dramatic increases in land area dedicated to cattle, palm oil, soya and more. The area planted with soya in Brazil has increased by 45% since 2010.¹⁴¹ Indonesian palm oil production has increased by three-quarters over the same time period,¹⁴² and the palm oil industry has also expanded in countries in South America, Southeast Asia and West Africa with significant forest cover. The area planted with cocoa in Côte d'Ivoire has increased by 80% since 2010¹⁴³ – in the same period, the country lost 14% of its tree cover, with 2017 the worst year on record.¹⁴⁴

Worryingly, both companies and governments are operating

on the basis that the growth of demand for high-risk commodities will continue. By 2050, according to the Food and Agriculture Organization of the United Nations (FAO), global soya production is forecast to rise by nearly 45% to 377 million tonnes and palm oil production by nearly 60% to 82 million tonnes.¹⁴⁵ Global meat consumption is also forecast to rise 76% by 2050.¹⁴⁶ Such dramatic increases cannot be delivered without huge environmental cost, including massive amounts of chemical inputs and the conversion of natural vegetation into farms, ranches and plantations. This is incompatible with companies' and governments' commitments to protect biodiversity, end deforestation and restore forests.

In fact, companies and governments seem to be actively working to increase demand for high-risk commodities. Much of the recent growth in palm oil consumption has been driven by government bioenergy policies. Indonesia and Malaysia, for example, have steadily increased domestic biodiesel consumption to expand the market for palm oil.¹⁴⁷ Likewise, the European Union's biofuels mandate has fuelled phenomenal demand for this commodity: palm oil imports into the EU increased by over 40% between 2010 and 2017,¹⁴⁸ with over half of the imported palm oil now being used as biodiesel.¹⁴⁹ The trend is set to continue: the Indonesian government is exploring whether it is possible to run vehicles on diesel derived solely from palm oil,¹⁵⁰ and oil, energy and commodity trading companies, including Cargill,¹⁵¹ Total¹⁵² and Neste Oil,¹⁵³ are constructing new



3 May 2017, Manila, Philippines: Plastics from global brands are polluting the world's rivers and oceans. ©Müller/Greenpeace

False fixes to the plastic problem

Companies are increasingly looking to replace fossil-based plastics with 'bioplastics' that use agricultural food crops such as maize or sugarcane as feedstock.¹³¹ Production capacity for these products reached 2.1 million tonnes globally in 2018 and is expected to grow by 25% by 2023.¹³² Several companies, including Coca-Cola,¹³³ Danone¹³⁴ and Nestlé,¹³⁵ are replacing some portion of the traditional fossil-derived plastics in some of their beverage bottles with bioplastics. Yet some bioplastics are chemically indistinguishable from,¹³⁶ or can pollute as much as, fossil-based plastics,¹³⁷ and not all bioplastics are biodegradable.¹³⁸



©Shutterstock

EU biodiesel smells fishy

Used cooking oil (UCO) receives preferential treatment as a feedstock for so-called 'sustainable' biofuels in the European Union. EU regulations have massively increased demand for UCO being imported from as far away as China. It has also led to widespread fraud: a recent investigation in the Netherlands uncovered scams in which a proportion of UCO is mixed with other oils, including animal fats and fresh oil, and sold with sustainability certificates.¹⁷³ Several biodiesel traders and processors – including Greenergy, the UK's leading supplier of road fuel¹⁷⁴ – are now under investigation by fraud authorities¹⁷⁵ in the UK, the Netherlands and Belgium.¹⁷⁶





27 May 2019, Bahia, Brazil:
Bunge silo in the Cerrado.
©Cruppe/Greenpeace



7 December 2005, North Yorkshire,
United Kingdom: The Drax Power
Station. ©Morgan/Greenpeace

biofuel refineries or converting oil refineries to produce biodiesel in Europe and Southeast Asia. The rapid growth in demand for palm oil has sustained the so-called 'leakage market':¹⁵⁴ palm oil producer groups that have been excluded from global trade for clearing forests, such as the South Korean conglomerate Korindo, are reportedly eyeing up biofuels as a route back to market.¹⁵⁵

Mature hardwood forests in the US are being cut down to make wood pellets to be burnt in European power stations, including by energy suppliers such as Drax in the UK.¹⁵⁶ Drax used 7.1 million tonnes of wood pellets in 2018¹⁵⁷ – over 90% of the UK's total imports.¹⁵⁸ Almost two-thirds of this came from the US.¹⁵⁹ A report for the UK government in 2014 found that using the wood from mature forests for electricity generation is likely to generate greater emissions than electricity from coal,¹⁶⁰ with Canadian scientists estimating that it will take over 100 years for the emission balance from burning 75-year-old trees to become positive – if ever.¹⁶¹ Meanwhile, Drax received £986m (\$1,262m) in subsidies for renewable electricity generation in 2018.¹⁶²

Despite their 'no deforestation' commitments, brands are actively creating demand for high-risk commodities by marketing and advertising products made from those commodities to new markets and audiences.

While people ultimately decide what they eat, it is the large food and agriculture companies and commodities traders who decide upon most of the ingredients, how they are produced and where

they come from. For example, the growth in soya is being fuelled by rising meat and dairy consumption (and commensurate demand for animal feed), especially in emerging markets where multinational food companies are expanding their operations.¹⁶³ Fast food giant McDonald's plans to almost double its presence in China by opening 2,000 new restaurants by 2022.¹⁶⁴ KFC, the first global fast food giant to move into India, now has 380 stores in the country;¹⁶⁵ it initially planned to promote its vegetarian menu but abandoned these marketing plans in 2016 to focus on expanding sales of chicken.¹⁶⁶

Similarly, the cocoa industry's expansion goes hand-in-hand with food companies' aggressive promotion of chocolate-based snack foods¹⁶⁷ – even as policymakers restrict brands' ability to promote those products in their home countries on public health grounds.¹⁶⁸ Mondelez recently opened a new factory in Bahrain to increase its presence in the Middle East and Africa, both 'priority growth markets'.¹⁶⁹ Barry Callebaut, one of the world's largest manufacturers of chocolate and cocoa products, plans to build two new plants in China over the next five years; according to the president of Barry Callebaut Asia Pacific, 'the Chinese market is very open to new concepts ... [and has] a long way to go in terms of consumption'.¹⁷⁰

Recent moves by brands like Nestlé¹⁷¹ and Unilever¹⁷² to reduce their plastics footprints by shifting to pulp-based packaging can only increase demand for pulpwood – directly or indirectly fuelling even more deforestation, forest degradation and habitat loss.



THE TRUE COST OF INDUSTRIAL AGRICULTURE

29 May 2013, Germany: Synthetic pesticides and fertilisers are considered to be a leading cause of the collapse of populations of some insects. ©Dott/Greenpeace

‘European firms are among those behind the record levels of hazardous use of pesticides in Brazil, despite many of these chemicals being prohibited in the EU. In 2016 alone Brazil registered 4,208 cases of intoxication by exposure to pesticides and 355 deaths by agricultural chemicals.’¹⁷⁷

European Network of Scientists for Social and Environmental Responsibility



21 July 2016, Lake Biel, Switzerland: A helicopter sprays fungicides on a vineyard. ©Bieri/Greenpeace

It's not just the climate: the way we produce and consume food is a disaster for our health and our environment. As the FAO stated in 2017:

*Gains in productivity and technological advances [in agriculture] have contributed to more efficient resource use and improved food safety. But major concerns persist. Some 795 million people still suffer from hunger, and more than two billion from micronutrient deficiencies or forms of overnourishment. In addition, global food security could be in jeopardy, due to mounting pressures on natural resources and to climate change, both of which threaten the sustainability of food systems at large. Planetary boundaries may well be surpassed, if current trends continue.*¹⁹⁴

If anything, this understates the problem – specifically, agribusiness's impact on planetary boundaries. There are nine of these boundaries that together define the 'safe operating space for humanity': climate change, ocean acidification, stratospheric ozone depletion, biogeochemical nitrogen and phosphorus cycles, global freshwater use, land system change, biodiversity loss, chemical pollution and atmospheric aerosol loading.¹⁹⁵

In 2017, scientists found unequivocal links between agriculture and environmental degradation:

'Two planetary boundaries have been fully

*transgressed ... biosphere integrity and biogeochemical flows, and agriculture has been the major driver of the transgression. Three are in a zone of uncertainty ... with agriculture the major driver of two of those, land-system change and freshwater use, and a significant contributor to the third, climate change. Agriculture is also a significant or major contributor to change for many of those planetary boundaries still in the safe zone.'*¹⁹⁶

Industrial agriculture is rapidly destroying habitats and jeopardising wildlife.¹⁹⁷ The threats are even greater when translated to the highly biodiverse regions that comprise the agricultural frontiers, including the Amazon rainforest, the Brazilian Cerrado, the Congo Basin, South America's Gran Chaco biome and the Southeast Asian island of New Guinea. WWF's 2018 Living Planet Report notes that '[w]hile climate change is a growing threat, the main drivers of biodiversity decline continue to be the overexploitation of species, agriculture and land conversion'.¹⁹⁸ In 2018, the IUCN concluded that increased production of palm oil was affecting at least 193 species classified as 'threatened' on the IUCN Red List; it estimated that 'oil palm expansion could affect 54% of all threatened mammals and 64% of all threatened birds globally'.¹⁹⁹

Brazil's pesticide habit

Scientists are concerned about the environmental impacts of Brazil's political situation, including the weakening of environmental legislation: as a recent report warns, 'Brazil already has the world's highest consumption of agrochemicals and weakening legislation will worsen the health of the population and endanger ecosystem services.'¹⁷⁸ In 2015, an estimated 899 million litres of pesticides were sprayed on crops in Brazil. Soya was the most intensively treated crop, accounting for nearly two-thirds of the total volume. The broad-spectrum herbicide glyphosate was the most intensively used,¹⁷⁹ and the cultivation of glyphosate-resistant GM soya, which constitutes 90% of the soya crop in Brazil, has led to a substantial increase in overall herbicide use.¹⁸⁰ The emergence of glyphosate-resistant weeds in the US and Latin America¹⁸¹ has resulted not only in the application of increasing quantities of the product, but in some areas in applications of older, more toxic herbicides such as paraquat and 2,4-D,¹⁸² which glyphosate was expected to replace. In 2018, a Brazilian appeal court overturned a provisional ban on glyphosate use imposed by a lower court pending an evaluation of the safety of the herbicide by the country's own health agency, ANVISA.¹⁸³

More than a third of the pesticides currently permitted in Brazil are reportedly not licensed for use in the EU,¹⁸⁴ and the government of President Jair Bolsonaro has already issued nearly 200 new pesticide approvals since taking office



28 November 2015, Mato Grosso, Brazil. ©Kelly/Greenpeace

at the start of 2019.¹⁸⁵ Moreover, a bill drafted by Blairo Maggi¹⁸⁶ – owner of the Amaggi Group, the world's largest private soya producer¹⁸⁷ – is set to deregulate the approval process for pesticides, removing powers from government bodies focused on defence of health or the environment.¹⁸⁸ With both the executive and legislative branches of the Brazilian federal government now controlled by the 'bandada ruralista' agribusiness lobby, PL 6299/2002 – called the 'Poison Package' by the Brazilian Association of Public Health (Abrasco) and the Brazilian Association of Agroecology (ABA)¹⁸⁹ – could be approved by definitive vote of parliament this year with little chance of effective opposition. The current rate of pesticide approval in Brazil is the highest in the country's history, with an increase of over 900% compared to the same period in 2010.¹⁹⁰



10 May 2016, Frankfurt, Germany. ©Varnhorn/Greenpeace

Poisoning Europe's rivers

Synthetic pesticides and fertilisers are considered to be a leading cause of the collapse of populations of some insects, together with land-use change and habitat destruction.¹⁹¹ Pesticides, moreover, appear to be ubiquitous environmental contaminants. For example, a recent study by Greenpeace Research Laboratories, based at the University of Exeter, found traces of over 100 different pesticides (including herbicides, insecticides and fungicides) in a sample of 29 small waterways across 10 EU countries, including the UK; one sample from Belgium contained 70 different pesticides.¹⁹² This mirrored the findings of other published work on soils, which reported 76 different pesticides in a total of 317 EU agricultural soils, with 83% of samples containing one or more pesticide residues.¹⁹³

Large-scale conversion of natural habitat to modern industrial agriculture goes hand-in-hand with heavy reliance on chemical pesticides.²⁰⁰ This further contributes to biodiversity loss.²⁰¹ A recent study of global insect populations found that 40% of some insect groups may face extinction in the next few decades; it laid the blame mainly on habitat loss through land conversion to intensive agriculture and urbanisation, followed by pollution with synthetic pesticides and fertilisers.²⁰²

Despite the large number of potentially harmful agrochemicals in routine use, regulatory action is relatively slow and relatively rare. In 2018, for example, the European Union voted to ban just three of the pesticides most toxic to bees after scientific research identified the risks.²⁰³ However, use of these and other harmful chemicals in high volumes remains common throughout global agribusiness, including in countries where high-risk commodities are grown.²⁰⁴ Indeed, concern about the impact of our agriculture and food systems on wildlife and the need for action were emphasised in the 2019 IPBES report.²⁰⁵

With soya and other agricultural commodities,²⁰⁶ some agrochemical use – principally of herbicides – is linked inextricably to the use of genetically modified (GM) seeds designed to be tolerant to these specific chemicals. While approximately 50% of global soya production is GM,²⁰⁷ over 95% of the soya grown in Brazil and Argentina is of GM varieties.²⁰⁸ The technologies behind the various GM soya varieties belong to a handful of multinationals, dominated by Bayer (which took over the US giant Monsanto in June 2018).²⁰⁹ Of the GM soya planted in Brazil, 40% is herbicide tolerant (predominantly Monsanto/Bayer's Roundup Ready® GM soya, which is tolerant to glyphosate) and 60% is Monsanto's Intacta™ (genetically modified to be both glyphosate tolerant and insect resistant).²¹⁰ Similarly, in Argentina, 83% of GM soya is herbicide tolerant (again, predominantly to glyphosate) and 17% is Monsanto's Intacta.²¹¹ Since the introduction of GM crops in the mid-1990s, pesticide use per unit area has increased by more than 170% in both Argentina and Brazil.²¹²

In addition to pesticides and GM technology, industrial agriculture is dependent on the use of nitrogen-based fertiliser, itself a major source of nitrous oxide,²¹³ a greenhouse gas with up to 300 times the global warming potential of carbon dioxide.²¹⁴ Synthetic fertiliser is responsible for

12% of emissions from agriculture.²¹⁵ Fertiliser runoff contributes to the growth of coastal 'dead zones' – areas of low oxygen levels in estuaries and seas that suffocate and ultimately kill fish and much marine animal life.²¹⁶ The Western Hemisphere's largest (and world's most notorious) dead zone, which can cover some 2.2 million ha, is in the Gulf of Mexico; it is the direct result of nitrogen pollution from industrial animal agriculture as well as from sewage discharges and urban runoff draining into the Mississippi River and ultimately into the sea.²¹⁷

Agrochemicals and industrial agriculture are also contributing to an alarming decline in soil fertility, which is further exacerbated by deforestation and climate change. A recent UN report found persistent declining trends in productivity 'in 20% of cropland ... and 27% of rangeland' between 1998 and 2013.²¹⁸

Furthermore, intensive livestock production contributes to poor air quality due to emissions of fine dust particles, largely derived from organic material such as manure, straw, feathers, skin flakes and hair. Livestock farming also makes a considerable contribution to anthropogenic fine PM (PM_{2.5}) pollution, due to the significant ammonia emissions from animal-rearing operations.²¹⁹ Resistance of various microbes to antibiotics is growing too, in part due to the routine prophylactic use of antibiotics in industrial farms on healthy animals.²²⁰ Antibiotic resistance has been identified as one of the biggest global public health concerns of the twenty-first century.²²¹

The history of agribusiness can be seen as one of systematic expropriation of land from local people and indigenous communities. In 2016, GRAIN documented a new wave of land grabbing by governments, companies and financial institutions, concentrated in Africa, South America and Southeast Asia and driven by palm oil, soya and beef.²²² Such conflicts often involve violence against already marginalised communities. Over 200 land and environmental defenders were killed in 2017, with agribusiness being the industry most associated with the killings.²²³ Even in Europe and North America, the trend towards mergers and consolidation is destroying the livelihoods of small-scale farmers while concentrating land and power in ever fewer hands.²²⁴



THE VESTED INTERESTS DRIVING FOREST DESTRUCTION





‘Political corruption takes place at the highest levels of political authority. It involves politicians, government ministers, senior civil servants and other elected, nominated or appointed senior public office holders. Political corruption is the abuse of office by those who decide on laws and regulations and the basic allocation of resources in a society (i.e. those who make the “rules of the game”). Political corruption may include tailoring laws and regulations to the advantage of private sector agents in exchange for bribes, granting large public contracts to specific firms or embezzling funds from the treasury. The term “grand corruption” is often used to describe such acts, reflecting the scale of corruption and the considerable sums of money involved.’²²⁵

UK Government, Department for International Development

‘Since current structures often inhibit sustainable development and actually represent the indirect drivers of biodiversity loss, such fundamental, structural change is called for. By its very nature, transformative change can expect opposition from those with interests vested in the status quo.’²²⁶

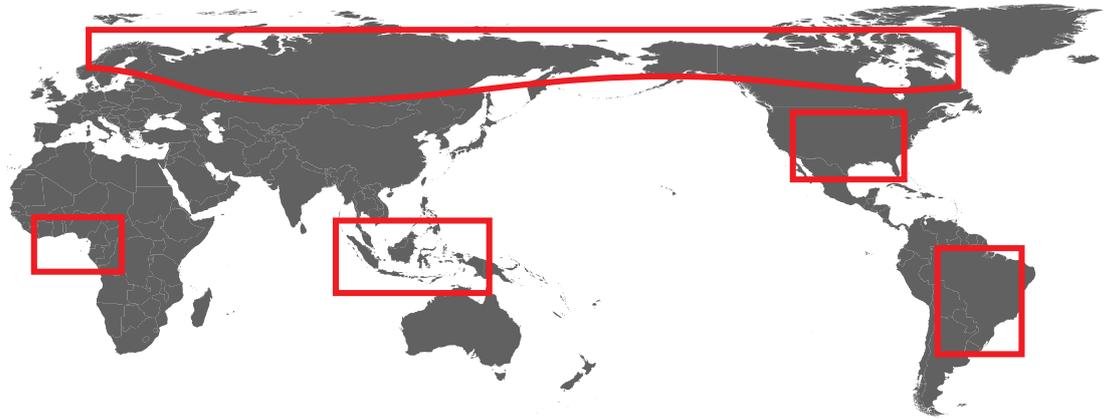
IPBES Global Assessment Report on Biodiversity and Ecosystem Services, Summary for Policymakers

‘[W]e don’t see a national interest in [making information on the location of palm oil companies publicly available], we want to protect the national interest. Because the national interest is the palm oil industry.’²²⁷

Sofyan Djalil, Indonesian Minister for the National Land Agency

29 December 2016, Zhangjiagang, China: Mukula logs in a timber yard. *Pterocarpus tinctorius*, or Mukula tree, is a rare and slow-growing hardwood unique to southern and Central Africa. Mukula has been illegally logged and traded from Zambia and DRC to China for the last decade, feeding the increasing demand ‘rosewood’ in the Chinese market.
©Lu Guang/Greenpeace

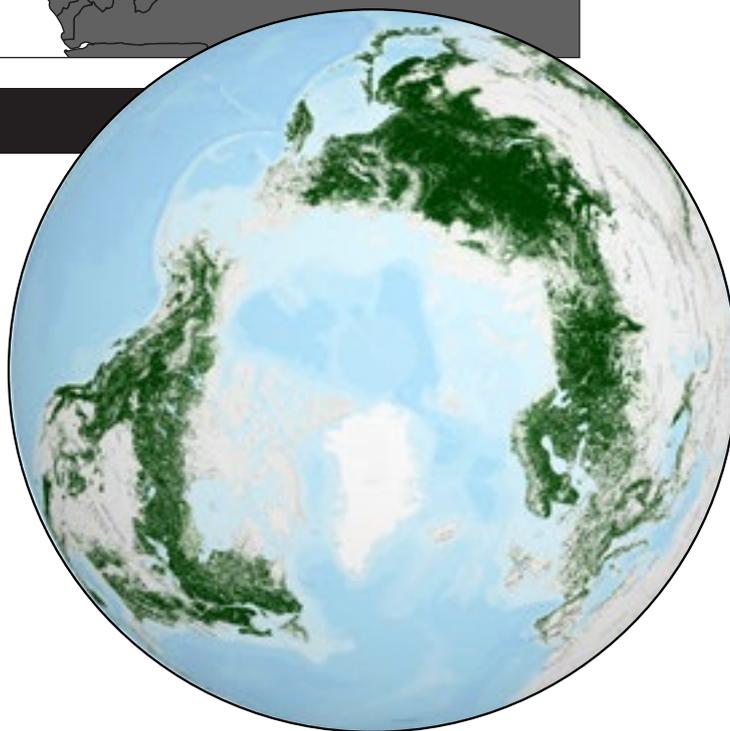
CASE STUDIES



THE CONGO BASIN AND WEST AFRICA



THE BOREAL

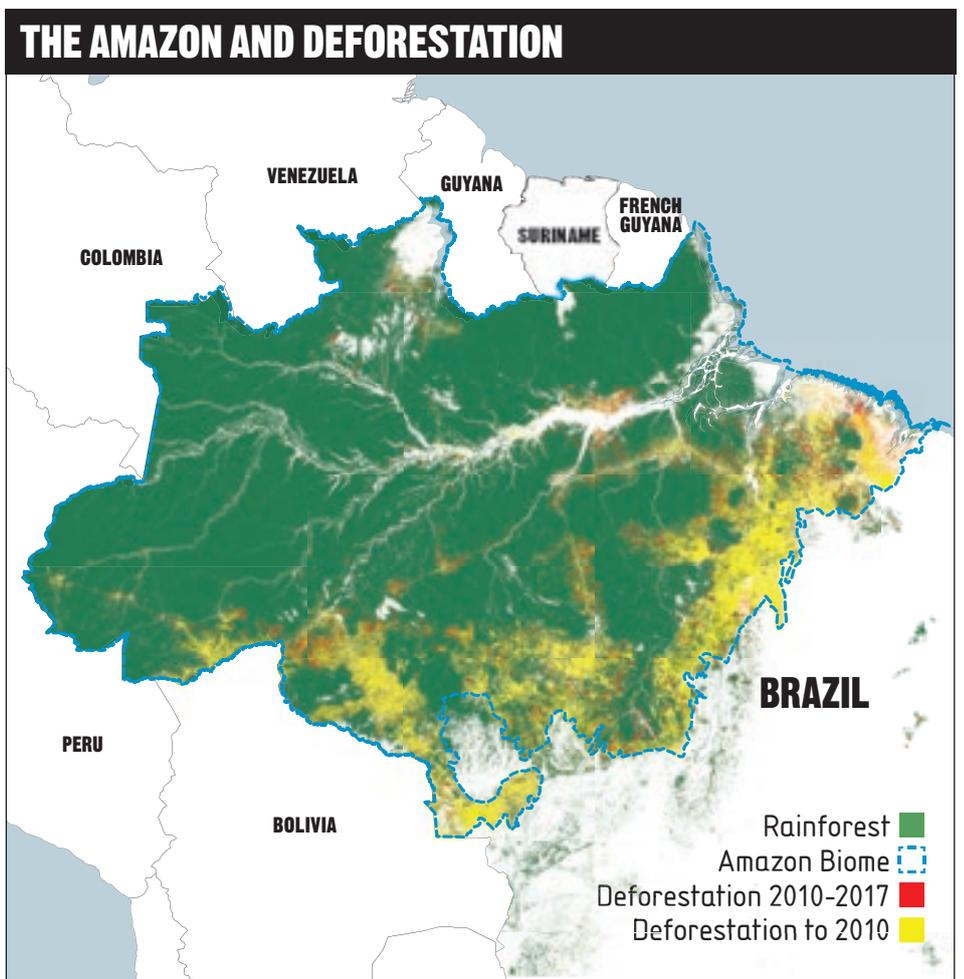


USA



THE BRAZILIAN AMAZON: THE CONTINUED BATTLE FOR PROTECTION

4 February 2017,
Amapá, Brazil.
©Beltrá/Greenpeace



Fifteen years ago, the Brazilian Amazon was in a full-blown deforestation crisis. The cattle industry was the leading driver, with the area of pasture quadrupling between 1985 and 2004.²²⁸ As of 2017, 44.4 million ha²²⁹ of the Brazilian Amazon biome²³⁰ were classified as pasture, representing a further increase of 18% since 2004²³¹ (although the total area has been largely stable since 2009²³²). A detailed study in 2017 found that 71% of all deforestation in the Brazilian Legal Amazon²³³ during the period 2000–2013 was for grazing land.²³⁴

The soya industry has also been a significant direct and indirect driver of deforestation. Almost 30% of the soya expansion in the Amazon during 2004–2006 came at the direct expense of rainforest rather than through conversion of pasture or other previously cleared lands.²³⁵

In 2006, a Greenpeace campaign exposed the links between deforestation in the Amazon and soya expansion.²³⁶ In response, the major soya traders, civil society organisations led by Greenpeace Brazil, and the Brazilian government agreed to implement the Soy Moratorium:²³⁷ a voluntary commitment not to purchase soya from farms within the Brazilian Amazon that had cleared forests after July 2006 (revised to July 2008 in 2014).²³⁸ Following multiple temporary extensions, the

moratorium was renewed indefinitely in 2016.²³⁹

In 2009, investigations by Greenpeace Brazil and a series of interventions by Brazil's Federal Public Prosecutor exposed the links between the cattle sector and deforestation in the Amazon. The four largest slaughterhouses in Brazil agreed not to buy animals from farms involved in Amazon deforestation or human rights abuses. Despite initial progress, including monitoring of direct cattle suppliers, the initiative was weakened by a number of significant loopholes. The slaughterhouses were subsequently caught up in a series of scandals including corruption.²⁴⁰ JBS – the largest slaughterhouse – was also caught up in illegal deforestation, following which Greenpeace Brazil ceased engaging with the initiative in June 2017.²⁴¹

The Soy Moratorium has largely been successful in limiting soya as a direct driver of deforestation in the Brazilian Amazon. The average annual deforestation rate in the relevant municipalities has fallen to less than one-fifth of what it was prior to the implementation of the moratorium.²⁴² Soya production has been directly responsible for less than 2% of deforestation in the Amazon biome since 2008.²⁴³

Nonetheless, the soya industry has continued to expand in the Brazilian Amazon: the area planted with

13 August 2008,
Altamira, Brazil.
©Beltrá/Greenpeace





20 February 2006, Pará, Brazil.
©Beltrá/Greenpeace



22 February 2006, Pará, Brazil.
©Beltrá/Greenpeace

1 May 2004, Pará, Brazil:
Close to 800 people from social organisations in the Santarém region of Pará State march towards the police station in support of Greenpeace activists who were arrested in a protest against the soya facility built by the US multinational Cargill. The protest, held on Brazil's Labour Day, exposed how Cargill's presence in the Amazon increases deforestation and brings few social benefits to the Amazon region. The expansion of industrial agriculture goes hand-in-hand with land grabbing and other human rights abuses. ©Pettersson/Greenpeace



12 January 2001, Mato Grosso do Sul, Brazil: Slave labourers receiving food on a farm in the Amazon. Human rights abuses including slavery and landgrabbing are endemic in much of the agribusiness sector. ©Ripper/Imagens Humanas/Greenpeace



soya has increased by 3.5 million ha since 2006, with new plantings mainly on land previously used to graze cattle.²⁴⁴ Given the scale of this displacement, soya remains an important indirect driver of deforestation as cattle ranchers move to develop new, often forested land to replace that which is now being cultivated with soya.²⁴⁵

And despite its successes, the Soy Moratorium itself is not secure. During his 2018 election campaign, Brazil's President Jair Bolsonaro repeatedly promised to weaken the Brazilian government environmental agencies and to open up protected areas and indigenous lands to farming and mining. He also repeatedly threatened to withdraw from the Paris Agreement should international efforts be made to restrict agricultural expansion in the Brazilian Amazon.²⁴⁶

The influence of Brazil's agribusiness sector is increasing under Bolsonaro's government. Flavio Bolsonaro, senator and son of the president, has submitted a bill that would remove the legal requirement for landholders in the Amazon to leave 80% of their land undeveloped and forested.²⁴⁷ There have been repeated amnesties for landholders that violate this requirement in the past,²⁴⁸ but if the bill passes an area almost the size of the Amazonas and Pará states combined – the equivalent to an area the size of France, Spain, Germany, Italy, the UK, Sweden, Switzerland, Greece and Austria together – would be opened up for legal deforestation.

While the Brazilian soya traders' association, ABIOVE, has pledged to maintain the Soy Moratorium, Bolsonaro's moves to weaken environmental protections have been welcomed by Aprosoja, the association of soya growers.²⁴⁹

In addition, Bolsonaro's new Infrastructure Minister,

Tarcísio Freitas, is pushing ahead with major infrastructure projects in the Amazon. Brazil's Amaggi Group and the world's big four agriculture traders are reportedly considering a joint bid to operate the BR-163, a highway connecting the Brazilian grain belt to northern ports, as well as an investment in a parallel railway.²⁵⁰ Expanding infrastructure in the Brazilian Amazon would expose new areas to development, increasing the risk of deforestation and worsening conflicts between land grabbers and indigenous peoples and other local communities.

In May 2019, eight of Brazil's former environment ministers stated their concern that social and environmental governance in Brazil were being dismantled. In a joint letter, they warned that:

*'We are witnessing a series of unprecedented actions that deplete the Ministry of the Environment's capacity to formulate and implement public policies – among them, the elimination of the National Water Agency, the transfer of the Brazilian Forest Service to the Department of Agriculture, the extinction of the Department of Climate Change and the threat of dismantling protected areas, the disempowerment of the National Environmental Council, and the extinction of the Chico Mendes Institute (ICMbio). ... We are facing a real risk of uncontrolled deforestation in the Amazon. The frequent contradictory signs in the fight against environmental crime can convey the idea that deforestation is essential for the success of Brazilian agriculture. Science and the country's own recent political history fully demonstrate that this is a fallacy and a mistake that will cost us all, dearly.'*²⁵¹



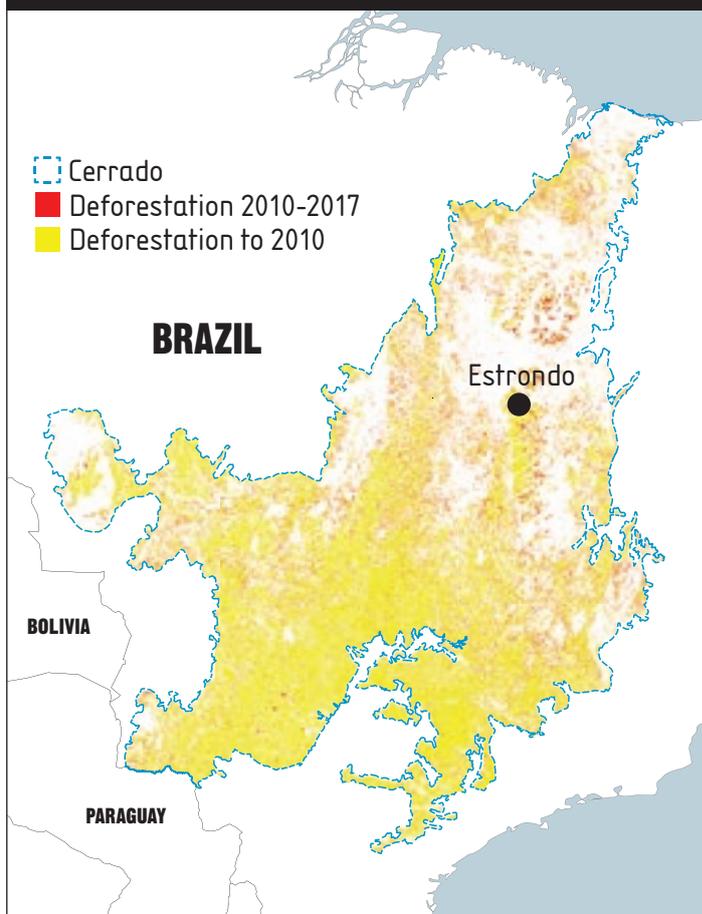
Alto Xingu, Brazil. The way of life of indigenous communities across the world is threatened by the expansion of industrial agriculture. ©Sebastiao Salgado/Amazonas Images/nbpictures



THE CERRADO: AN ECOSYSTEM UNDER SOYA THREAT

26 June 2018,
Maranhão, Brazil.
©Cruppe/Greenpeace

DEFORESTATION IN THE CERRADO



The 200 million ha of the Brazilian Cerrado are home to 5% of the planet's plant and animal species,²⁵² over 4,800 of which are found nowhere else.²⁵³ In addition to being the most biodiverse savannah in the world²⁵⁴ the region is known as a 'cradle of waters', because it is critical to eight of the 12 Brazilian river basins; it contains the headwaters of nearly all of the southern tributaries of the Amazon River as well as several rivers in the states of Maranhão and Piauí.²⁵⁵

Yet despite its ecological value, the Cerrado is being rapidly cleared: it lost 2.8 million ha of natural forest and 1.8 million ha of natural grassland between 2010 and 2017,²⁵⁶ with the main threats coming from soya farms and cattle ranches.²⁵⁷ It is estimated that nearly half of its natural vegetation (about 88 million ha,²⁵⁸ an area the size of Venezuela²⁵⁹) has already been destroyed. The remaining area holds an estimated carbon store equivalent to 13.7 GtCO₂.²⁶⁰ As with the Brazilian Amazon, cattle has been the leading direct driver of conversion: just under a quarter of the Cerrado – some 48.5 million ha, an area almost twice the size of the UK²⁶¹ – was pasture as of 2017.²⁶² A further 24 million ha has been converted to cropland, often after previously being used for pasture.²⁶³

The area of the Cerrado known as 'Matopiba'

is currently at the heart of agribusiness expansion, and is particularly threatened. Matopiba, which covers nearly 74 million ha in the Brazilian states of Maranhão, Tocantins, Piauí and Bahia,²⁶⁴ is being hailed as the 'new frontier' for soya and other agricultural commodities.²⁶⁵ Between 2007 and 2014, nearly two-thirds of agricultural expansion in Matopiba came at the expense of the Cerrado's savannah, forests and other native vegetation.²⁶⁶

Analysis by Trase, an NGO focused on increasing the transparency of agricultural commodity supply chains, indicates that between 2010 and 2015 just five traders – including ADM, Bunge and Cargill, all signatories of the Soy Moratorium²⁶⁷ – were responsible for more than three-quarters of total soya exports from Matopiba.²⁶⁸ Trase data also indicate that these three traders were the biggest soya exporters from the Cerrado in 2017, with combined exports of 13 million tonnes.²⁶⁹

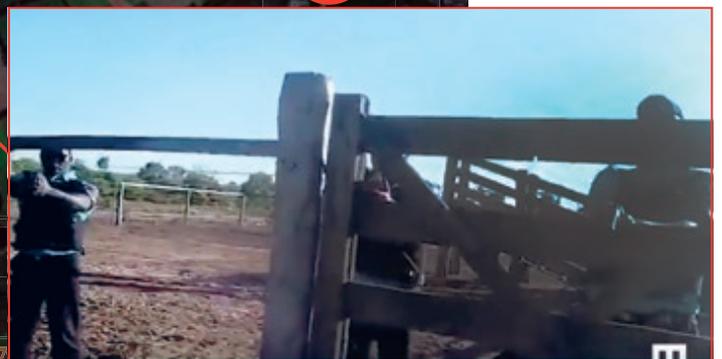
In other words, traders that play a positive role as parties to the Soy Moratorium in the Amazon have nonetheless been contributing to the destruction of the Cerrado. Indeed, in 2018 the Brazilian government's environmental agency, IBAMA, fined both Bunge and Cargill for trading soya from illegally deforested areas in Matopiba.²⁷⁰

23 March 2019, Bahia, Brazil. ©Moriyama/ Greenpeace

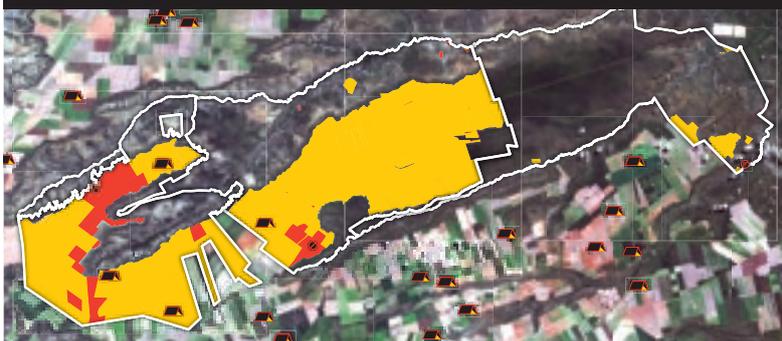


Trading away the Cerrado





DEFORESTATION: BEFORE 2010, 2010–2017



 **IBAMA embargo**

 **Soya grain silos**

 **Communities**

0 3 6 9 KM



0 3 6 9 M

Source data: Properties boundaries SICAR (Sistema Nacional de Cadastro Ambiental Rural) 2017, Deforestation data (hill 2017); <http://terrabrasilis.dpi.inpe.br/app/map/deforestation?hl=pt-br>
Silos: CONAB June 2019, Embargoes: IBAMA April 2019



Top left: Ronald Guimarães Levinsohn, head of the Delfin group. Source Agência O Globo.

March 2019, Bahia, Brazil. ©Moriyama/ Greenpeace



Silo pictures are a screengrab from the Estrondo website, 9 June 2019, showing the location of the Bunge and Cargill facilities within the Estate.



March 2019, Bahia, Brazil. ©Moriyama/ Greenpeace

Greenpeace Brazil recently investigated one estate in western Bahia, Agronegócio Estrondo, which claims to cover 305,000ha²⁷⁴ – an area larger than Rio de Janeiro and São Paulo cities combined.²⁷⁵ Land registry documents show that in 1978 the Delfin group – owned by Ronald Guimarães Levinsohn²⁷⁶ – acquired an estate covering some 444,000ha.²⁷⁷ The National Institute of Colonisation and Agrarian Reform (INCRA) states that the estate was founded on a land grab of more than 444,000ha.²⁷⁸

The Delfin group and Levinsohn are notorious in Brazil as the result of a huge financial banking scandal starting in the 1980s involving allegations of fraud and collusion of various ministers within the then dictatorship,²⁷⁹ and reports of money laundering scandals involving Levinsohn continue.²⁸⁰

According to 2018 Bahia state court documents, the Estrondo estate is now ultimately controlled by four companies: Delfin Rio S/A Crédito Imobiliário, Colina Paulista S/A, Cia Melhoramentos do Oeste da Bahia and União de Construtoras S/A²⁸¹ – although only two of them are acknowledged on the Agronegócio Estrondo website as part of the consortium that administers the estate.²⁸² Public registry profiles show that two of the four companies are controlled by Levinsohn or his family; the other two are registered offshore,²⁸³ one of which has changed its name.²⁸⁴ Three of the companies are named in a lawsuit over community land rights.²⁸⁵ The Bahia state prosecutor considers all of these companies to be interlinked and associated with Levinsohn's Delfin. The case documents note 'the number of spin-offs, mergers and re-mergers, and transfers of areas between the legal entities União de Construtoras S/A; Delfin Rio S/A – Crédito Imobiliário; Colina Paulitsta [sic] S/A; and Cia Melhoramentos do Oeste da Bahia' and that 'any land registry entries that have different rights holders are

owned by Delfin Rio S/A – Crédito Imobiliário'; they also state the prosecutor's conclusion based on his analysis of various documents that 'Colina Paulista S/A and Cia Melhoramentos do Oeste da Bahia are the result of a partial spin-off of Delfin Rio S/A – Crédito Imobiliário ... [designed to facilitate] the concealment of irregularities behind an enormous amount of bureaucracy.'²⁸⁶

Well over a third of the estate's land has been deforested since 2000²⁸⁷ to grow soya, cotton and maize. In the 2000s IBAMA repeatedly investigated Agronegócio Estrondo for illegal land clearance,²⁸⁸ including allegations that deforestation permits covering 49,000ha in the estate were fraudulently obtained.²⁸⁹ In April 2019, Greenpeace Brazil documented the harvesting of soya illegally cultivated in an area that IBAMA had excluded from commercial activity.²⁹⁰

In addition to these environmental illegalities, Agronegócio Estrondo has a history of human rights abuses. In 2005, use of forced labour was identified in two separate parts of the estate,²⁹¹ and there have been multiple incidents of intimidation and violence against the long-established local communities, known as the *geraizeiros do Alto Rio Preto* – the brave people of the Preto River.

Recently, the Association of Lawyers for Rural Workers of the State of Bahia has described how an armed private security force known as Estrela Guia – Guiding Star – has been engaged in a series of intimidatory acts against the *geraizeiro* community 'with illegal support from [local] police officers'.²⁹² Injustices they identify include breaking into people's homes, illegally detaining or abducting members of the community, planting weapons and accusing people of illegal possession of and/or discharging of firearms, seizing community cattle, restricting movement on the roads and engaging in various intrusive surveillance operations.²⁹³





31 January 2019, Bahia, Brazil:
Still from a video made available by the Pastoral Land Commission which documents the moment a geraizeiro community member was shot by the Estrela Guia private security force while trying to retrieve his cows from estate corrals.

24 May 2019, Bahia, Brazil: Estrela Guia checkpoint on the Estrondo estate. While the rights of the local geraizeiro Cachoeira community to pursue their traditional way of life in this area have been recognised by the courts, their ability to exercise these rights is blocked by armed security guards, deep trenches and security fences.
©Cruppe/Greenpeace



‘If anyone gets sick here at night he is bound to die because they will not let us get through [their roadblocks].’²⁷¹

Guilherme Ferreira de Sousa, geraizeiro community member

‘I believe this was only an excuse to incriminate me, as they [Estrondo] are being defeated in court. I know I’m targeted, but this won’t intimidate me.’²⁷²

Adam, geraizeiro community member

‘The violent actions by Estrondo are commonly tied to the court calendar. If they lose a legal action, they tend to act more violently against the people.’²⁷³

Mauricio Correa, a member of the Association of Lawyers of Rural Workers

Supporting the findings of others,²⁹⁴ 2019 investigations by Greenpeace Brazil have documented security perimeter fences, armed manned watchtowers and trenches some 3 metres deep obstructing free passage over community land, effectively isolating the communities from one another and impeding their grazing rights.

In 2017, a collective action was brought by local *geraizeiro* communities of the Alto Rio Preto – including Cachoeira, Cacimbinha/Arroz, Gatos, Aldeia/Mutamba and Marinheiro – for recognition of their right to 43,000ha of land within the Estrondo estate. However, despite various court rulings in their favour²⁹⁵ – and the finding of the Bahia state prosecutor that the evidence ‘points to irregularities that clearly render the [Estrondo] register null and void’²⁹⁶ – the estate continues to prevent them from exercising their traditional land-use rights and violence against the communities has continued.

On 31 January 2019, according to the Association of Lawyers for Rural Workers, members of the Estrela Guia private security force shot a *geraizeiro* in the leg while he was attempting to recover cattle that had been seized by the estate.²⁹⁷ A video filmed by a member of the *geraizeiro* community and passed to the Pastoral Land Commission (CPT) documents the events. Community members on horseback approach the corralled cattle. When asked if they will release the cattle, one guard refuses, saying this is the farm’s order. Shots are fired and one of the community members shouts, ‘The way you’re pointing the gun at me, you’re aiming to kill!’²⁹⁸

On 7 April 2019, according to the Association of Lawyers for Rural Workers, the president of the Cachoeira *geraizeiro* community was illegally detained by armed members of Estrela Guia while he was looking

for stray cattle. Claiming they had an arrest warrant, the guards held him at one of the security cabins manned by the estate. He was then transferred to the local police station and accused of illegal possession of a shotgun; at the station, the duty officer reportedly produced a shotgun.²⁹⁹ The *geraizeiro* community leader was released on bail five days later when the judge failed to find any ‘decisive motive for the enactment of preventive prison’.³⁰⁰

In a similar case, the Association of Lawyers for Rural Workers reports that on 25 May 2019 members of Estrela Guia stopped the vehicle of a *geraizeiro* from the Cachoeira community when he was returning home. Again, they claimed they had an arrest warrant and he was detained in one of the farm’s security checkpoint cabins on allegations of possessing a shotgun. When he was transferred to the local police station, the duty officer reportedly produced an assault rifle.³⁰¹ The prison release paperwork order shows that the detainee was held on accusations of possession of a firearm and discharge of a firearm.³⁰² In personal communications with Greenpeace, *geraizeiro* community members state that his defence lawyers requested forensic testing of the weapon, but the local police station claimed it did not have the capacity to do this.³⁰³ Although no official charges were brought, the detainee was released under conditions that included not leaving the state of Bahia and adhering to a 6pm to 6am curfew – undermining his ability to herd his cattle.³⁰⁴

Despite its dismal record, major traders appear to be happy to do business with Agronegócio Estrondo. Within or just outside its boundaries Greenpeace Brazil investigations have identified two storage silos owned by Cargill and another two owned by Bunge.



24 March 2019, Bahia, Brazil: Traditional *geraizeiro* from the Cachoeira community herding cattle.
©Moriyama/Greenpeace

THE GRAN CHACO FORESTS: FRONTIER FOR SOYA AND CATTLE EXPANSION

*'[T]he expansion of the agricultural and cattle ranching frontier ... is one of the main reasons for the loss of native forests, which are cleared to grow different agricultural crops. This phenomenon is attributed mainly to the expansion of soybean cultivation, given its high international prices and growing demand from new markets. ... This agricultural expansion in turn affects cattle ranching, an activity displaced to forest areas.'*³⁰⁵

Secretary of Environment and Sustainable Development, Argentina

DEFORESTATION IN THE GRAN CHACO



The Gran Chaco biome spans an area of more than 110 million ha covering parts of Argentina, Paraguay and Bolivia.³⁰⁶ The region holds the largest tropical dry forest in South America and the continent's second-largest forest after the Amazon.³⁰⁷ 'Chaco' comes from a Quechua word meaning 'hunting ground',³⁰⁸ and the biome, with its trees, thorny shrubs and grasses, is home to thousands of species of plants and hundreds of species of birds, reptiles and mammals, including jaguars, armadillos and giant anteaters.³⁰⁹

The Gran Chaco biome is suffering one of the highest deforestation rates in the world,³¹⁰ as a result of agricultural expansion for cattle ranching and soya.³¹¹ Satellite analysis reveals that 23% of the Gran Chaco (nearly 27 million ha) had been converted to cropland or grazing land by 2017.³¹² This includes 3.4 million ha of natural forest (5% of the total forest area) converted between 2010 and 2017

alone.³¹³ The countries that share the Gran Chaco all rank among the 12 countries worldwide with the highest total tree cover loss in the period from 2010 to 2018.³¹⁴ Continued agricultural expansion has been linked to allegations of indigenous people being forced to work in conditions of slavery,³¹⁵ as well as widespread illegality of other kinds.³¹⁶

With a cattle herd of around 54 million head in 2018,³¹⁷ Argentina is one of the world's top producers of beef.³¹⁸ It is also an increasingly significant exporter,³¹⁹ with exports for 2019 forecast to be twice those of 2017.³²⁰

The country's chief markets for beef include China and Europe.³²¹ South America accounts for the bulk of the EU's fresh beef imports – Argentina, Uruguay, Brazil and Paraguay between them provided over two-thirds of the EU's 2018. Argentina was the most important source.³²²



They were very precarious conditions.

Paraguay, 2018: A 2018 investigation by Repórter Brasil documented 35 people living in conditions of slavery in the Chaco in Paraguay. According to the investigation, reports of slave labour and illegal deforestation are on the increase as cattle ranching expands north. Handout from Paraguay Public Ministry



And the problem is that they had no water to drink.

25 January 2018, Salta, Argentina: Clearance of forests despite its zoning under Argentina's National Forest Law. ©Villalobos/Greenpeace



Zoned out – government collusion with deforestation in Argentina

Since 2010, more than 2.8 million ha of trees have been cleared in Argentina, the vast majority (2.3 million ha) in the states containing the Argentinian portion of the Gran Chaco biome.³²⁴ Nearly a quarter (18 million ha) of the Argentinian portion of the biome had been converted to cropland or grazing land as of 2017,³²⁵ much of it for cattle ranching and soya cultivation.

Investigations by Greenpeace Argentina have repeatedly exposed how the expansion of the soya and cattle sectors is linked to human rights abuses including land grabbing and modern slavery, as well as deforestation and habitat destruction.³²⁶ Further, government collusion means that those responsible sometimes go unpunished or may even be rewarded through the legalisation of land grabs.³²⁷

Between December 2007 and March 2009, some 4,000ha of forest on public land in the Argentinian Chaco were illegally cleared³²⁸ for livestock farming on the direction of businessman Alberto Verra.³²⁹ Verra serves as president and director of several companies owned by the Roggio Group, one of the leading business groups in Argentina, including Metrovías S/A, which operates the underground and metropolitan trains in Buenos Aires.³³⁰ In April

2019, in his role as president of Metrovías S/A, Verra was accused in a criminal complaint of embezzling public funds.³³¹

In 2009, the National Forestry Department issued a fine of more than ARS\$24 million (US\$6.5m) ‘to the occupier’ of the land for the unauthorised clearance of about half of the area, and ordered that some 830ha be restored.³³² However, two years later, the department reduced the fine.³³³ In January 2013, Verra lobbied the Colonisation Institute for Chaco Province – the government agency responsible for the management of public land – to regularise his land tenure so he could continue with his plans for expansion, citing his investments of ARS\$5.6 million (US\$1.13 million) in the clearance of 4,000ha and a further ARS\$4 million (US\$812,000) in land preparation.³³⁴ He stated his desire to continue expansion ‘in the very heart of the Chaco jungle, in an inhospitable and isolated place, which, however, is suitable for the implementation of a livestock plan’.³³⁵ The head of the agency, John Paris, recommended the approval of Verra’s request.³³⁶ The then governor of the province later approved the transfer of nearly 5,000ha of land to Verra.³³⁷

Despite the enactment of Argentina’s National Forest Law³³⁸



Several causes have fueled local intensification of agricultural and livestock production. Notably, the shift to industrial agriculture that [Argentina] has suffered for more than a decade has provoked an increase of cattle ranching in regions like the North West and the North East. Thirteen million hectares of pasture for cattle ranching were turned over agriculture, mostly soya, due primarily to the profitability of soya relative to the market value of beef.³²³

National Institute of Agricultural Technology, Argentina

30 April 2016, Chaco, Argentina.
©Katz/Greenpeace

in 2007, provincial governments regularly bypass the regulations, for instance by removing protected area zoning from forestland to allow clearance and development by agribusiness.³³⁹ Other ways provincial governments have thwarted regulations designed to protect forests include the granting of deforestation permits on indigenous lands,³⁴⁰ granting of the permits in direct violation of current zoning³⁴¹ or simply failing to categorise forests as forests and therefore not zoning them correctly.³⁴²

For example, Formosa Province contains over 4 million ha of forests. The provincial government failed to properly implement the National Forest Law, leaving some 3.2 million ha of forests unprotected.³⁴³ Almost 250,000ha were cleared in Formosa between 2007 and 2014 – three times the amount of land cleared in the decade prior to the introduction of the Forest Law.³⁴⁴ The advance of cattle ranching is one of the main drivers of deforestation in this region,³⁴⁵ with the number of cattle in Formosa Province reaching 1.76 million head in 2017³⁴⁶ and the provincial government announcing its aim to double production to up to 3.5 million head.³⁴⁷

In January 2017, the government of Chaco Province

rezoned more than 50,000ha of protected forest in 67 farms to allow clearance.³⁴⁸ One example documented by Greenpeace Argentina in February 2019³⁴⁹ is a 5,700ha farm located in the forested area of Chaco Province adjacent to a national park and a provincial state reserve. Despite the entire farm having been zoned for protection, in June 2017 the provincial government rezoned the land and granted development permits to the owners, registered in Buenos Aires as soya, maize and cattle farmers.³⁵⁰ In May 2019, the head of the provincial justice department temporarily suspended the deforestation permits overlapping protected areas for more than 50 large producers, pending resolution of an administrative action by the ombudsman for the enforcement of the National Forest Law.³⁵¹ In 2017, the number of cattle in Chaco Province reached 2.6 million head,³⁵² with the provincial and federal governments incentivising production in forest areas³⁵³ and the reported aim of doubling that number.³⁵⁴ In recent years, Chaco Province has seen the highest level of deforestation of any province in Argentina, with more than half of the area cleared protected under Argentina's National Forest Law.³⁵⁵

INDONESIAN FORESTS AND PEATLANDS: A TICKING CARBON BOMB

Peatland protection is a burning issue

Peatland covers just 3% of the world's land area,³⁵⁶ but holds more than 40% of all soil carbon³⁵⁷ – twice as much carbon as is stored in all the world's forests³⁵⁸ – and sequesters vast amounts of CO₂ every year.³⁵⁹ Some 15% of global peatlands have been drained, with the land being used for agriculture, livestock and forestry.³⁶⁰ While representing only 0.4 percent of the world's land, these drained peatlands emit 5% of global CO₂.³⁶¹

Forest fires Indonesia

Forest destruction and peatland drainage creates the conditions for forest fires, many set deliberately to clear land for plantation development. Less than half of Indonesia's peatlands remain forested as of 2017, according to official maps.³⁶² This destruction created the volatile conditions for the terrible peatland fires in 2015. Over the worst two months, daily GHG emissions from the fires regularly surpassed those of the United States.³⁶³ Researchers at Harvard and Columbia Universities estimate that the smoke from forest fires in 2015 may have caused 100,000 premature deaths.³⁶⁴



26 March 2013, Papua, Indonesia: Smoke rises from burning wood rows in an oil palm concession owned by the Korindo Group. ©Rante/Greenpeace

26 July 2007, Riau, Indonesia: Recently cleared peatland and drainage canal on very deep peat in a Duta Palma concession. ©Greenpeace



Commodity production is estimated to have caused 78% of tree cover loss in Southeast Asia in the period from 2001 to 2015.³⁶⁵ Palm oil and pulpwood (monoculture tree plantations for fibre) are key drivers of this destruction. In Indonesia, the palm oil industry is estimated to have caused 2.3 million ha of deforestation between 1995 and 2015, with 585,000ha cleared between 2010 and 2015 alone.³⁶⁶ Since 2013, ‘no deforestation, no peat, no exploitation’ (NDPE) policies have become commonplace in the palm oil sector, with an estimated 74% of refinery capacity in Indonesia and Malaysia governed by NDPE commitments.³⁶⁷ However, traders (and their customers) have failed to implement their policies effectively, and there has been no discernible impact on deforestation rates: during 2016 and 2017, Indonesia lost 3 million ha of natural forest.³⁶⁸

Most Indonesian plantations are on the islands of Sumatra and Borneo, where forest destruction has pushed all three species of orangutans to ‘critically endangered’ status.³⁶⁹ Expansion is increasing on the island of New Guinea, which still has large areas of primary forest including intact forest landscapes. The Indonesian government is currently constructing a 2,700-mile highway network through the provinces of Papua and West Papua, opening up new areas for agribusiness and mining and dramatically increasing the risk of deforestation and land grabbing.

Huge areas of plantation have also been established on Indonesia’s carbon-rich peatland, most of it previously forested. This peat is normally waterlogged, but when drained for cultivation



29 June 2013, Sumatra, Indonesia. Smoke rising from burning peatland in an oil palm concession linked to the RGE group. ©Ifansasti/Greenpeace





26 March 2013, Papua, Indonesia: Excavators at work among the burnt remains of debris from forest clearance in an oil palm concession owned by the Korindo Group. ©Rante/Greenpeace



it releases vast amounts of greenhouse gases; a hectare of Indonesian peatland contains around 600 tonnes of carbon per metre depth of peat.³⁷⁰ This carbon is slowly turned to CO₂ over the course of decades as long as the land is drained. As much as 20% of plantation expansion between 1995 and 2015 is estimated to have taken place on peatland, with the rate of expansion onto peatland roughly doubling over that period. 619,000ha of plantation development took place on peatland between 2010 and 2015.³⁷¹

Drained peatlands are also vulnerable to fire. In 2015 devastating forest and peatland fires, many of them started illegally to clear land, spread across over 2.6 million ha, mainly in Sumatra, Kalimantan and Papua.³⁷² Decades of wholesale forest and peatland destruction by palm oil and pulp companies combined with dry weather caused by El Niño turned the land into a tinderbox, and the resulting crisis put Indonesia and its plantation industries in the global spotlight. The Indonesian government struggled to contain the disaster and a haze spread quickly across Southeast Asia, grounding flights, closing schools and offices and forcing millions of people across the region to breathe toxic air for months. The World Bank calculated the cost of the disaster at \$16bn,³⁷³ while researchers at Harvard and Columbia universities estimate that 100,000 people died prematurely from exposure to the 'haze' air pollution.³⁷⁴ CO₂ emissions from 2015's fires in Indonesia have been estimated at 1.18 Gt, with daily GHG emissions from the fires regularly surpassing those of the United States.³⁷⁵

18 December 2017, Papua, Indonesia: A young oil palm plantation belonging to the Noble group has come at the expense of primary forest. ©Sukarno/Greenpeace



TOP LEFT: 31 March 2018, Papua, Indonesia: Deforestation for oil palm plantation development by the GAMA group. ©Ifansasti/Greenpeace



REMAINING THREE: 1 April 2018, Papua, Indonesia: Deforestation for oil palm plantation development linked to the Hayel Saeed Anam group. ©Ifansasti/Greenpeace

‘In the national interest’ – how Indonesian government ministers shield the palm oil industry from scrutiny

Transparency has become a key battleground in the fight to clean up Indonesia’s palm oil industry. In May 2019, the Indonesian Coordinating Ministry for Economic Affairs ordered palm oil producer companies not to share information regarding the oil palm concessions they own,³⁷⁶ reportedly on grounds of national economic security.³⁷⁷

As long ago as 2010, the government of then president Susilo Bambang Yudhoyono proposed to make publicly available a wide range of land management information, including land use/cultivation permit (HGU) data, as part of its forest and climate commitments.³⁷⁸ This became known as the One Map Initiative. In 2017, Indonesia’s Supreme Court confirmed that the Ministry of Agrarian and Spatial Planning must make HGU information available to the public, following a legal challenge by NGO Forest Watch Indonesia.³⁷⁹ This would have put the names of concession holders, as well as the location, area and boundaries of each concession, in the public domain. However, the ministry continues to prevaricate.³⁸⁰

Even as this saga was unfolding, the need for transparency

was being acknowledged by some major industry players and their customers. In December 2018, the world’s largest palm oil trader, Wilmar International, committed to map and monitor hundreds of its suppliers to ensure they were not destroying rainforests.³⁸¹ Consumer goods manufacturers that use palm oil, including Unilever, Mondelez and Nestlé, have also committed to ‘no deforestation’ and are seeking to drive reform of the sector.

By ordering companies not to share concession data, and defying the Supreme Court’s order to make such data available itself, the government seems determined to thwart such initiatives.

Sofyan Djailil (Minister for the National Land Agency) defended the government’s action by saying it was necessary to protect the oil palm industry:³⁸² ‘[W]e don’t see a national interest in [making the data publicly available], we want to protect the national interest. Because the national interest is the palm oil industry. ... We attach importance to national interests. If there are violations of the law, report them. We protect the industry with the most farmers and the source of state income.’³⁸³

24 October 2015, Kalimantan, Indonesia: School children play in the heavily polluted haze from forest and peatland fires. By blocking the release of concession maps, the Indonesian government is helping companies obscure their links to deforestation and forest fires. ©Rante/Greenpeace



Similarly, Minister for Economic Affairs Darmin Nasution claimed that the government was acting in response to palm oil companies ‘flirting’ with the European Union by offering to disclose information in the hope of being able to continue exports.³⁸⁴ Since 2017 the EU has been debating the exclusion of biodiesel made from raw materials linked to ‘high indirect land-use change risk over concerns about forest conservation and climate change from its renewables targets. It finally concluded that only palm oil falls into this category and passed a regulation³⁸⁵ that foresees a complete phase-out of palm oil for biofuels by 2030, albeit with large exemptions that will render the implementation of this regulation very challenging.

It is unsurprising that the government appears anxious to protect the industry from scrutiny that would expose the full extent of its land grabbing and deforestation, as well as failure to comply with existing regulations such as holding the correct permits or payment of tax. There is significant entanglement between the palm oil industry and government officials in Indonesia.³⁸⁶

This is not the first time the Indonesian government has blocked private sector initiatives to increase transparency and sustainability in the palm oil sector. Throughout 2015 and 2016, ministers regularly condemned a nascent sustainability coalition, the Indonesian Palm Oil Pledge, for excluding palm oil producers that cleared forests. Major palm oil traders rapidly conceded to government pressure and disbanded the coalition, despite their sustainability commitments.³⁸⁷

By preventing brands from monitoring whether the companies that produce their palm oil are destroying forests, the Indonesian government is reinforcing the impression that the palm oil industry cannot be reformed. Ironically, by impeding efforts to clean up the palm oil sector the government threatens to cause untold damage to the Indonesian economy. Many consumer brands may find themselves with no choice but to stop buying palm oil altogether, as some European retailers, including Iceland in the UK, have already done.³⁸⁸

During the recent presidential campaign Co-ordinating Minister for Maritime Affairs Luhut Panjaitan, leader of the Indonesian government team lobbying the EU on palm oil³⁸⁹ and one of the most influential members of President Widodo’s administration, became embroiled in the controversy over HGU disclosure. Luhut denied owning a palm oil plantation,³⁹⁰ telling journalists that he supported transparency in the palm oil sector and misleadingly stating that ‘[The government] has a one map policy, the [HGU] data is public. Open it. You can see what land I have.’ He was later forced to admit ownership of a 10% stake in a palm oil company, PT Toba Bara Sejahtera (PT TBS).³⁹¹ In 2017, the Indonesian environmental NGO Walhi accused a subsidiary of PT TBS of seizing land from smallholder farmers to develop its plantation.³⁹² Luhut has been a strong advocate of restricting access to HGU data, even admitting that the government closed access because a number of companies had not complied with regulations.³⁹³

Hiding in plain sight

Not only is the Indonesian government refusing to release maps showing where palm oil companies' plantations are located, but palm oil conglomerates often hide their control of companies directly involved in deforestation by means of offshore holding companies or other opaque ownership structures.³⁹⁴

Since 2015, several thousand hectares of forest – including primary forest and protected peatland forest – have been cleared in the PT Megakarya Jaya Raya (PT MJR) concession in Papua, and the deforestation continues. Greenpeace investigations in April 2018 documented the destruction in the concession.³⁹⁵ The ultimate owner of PT MJR, and of three other plantation companies with contiguous landholdings and a timber processing facility, is a holding company in the United Arab Emirates (a secrecy jurisdiction).

Until PT MJR's board was restructured in June 2018 (apparently in response to Greenpeace's publicising of the

deforestation), Fouad Hayel Saeed Anam, Managing Director of the major Yemen-based palm oil trader Pacific Inter-Link (PIL), was Chief Commissioner of PT MJR (as well as the three associated plantation companies and the timber processing facility). A PIL associate remained as President Director even after the restructuring. The day after the board changes were published, PIL issued a statement denying that it owned or operated any oil palm plantations – a denial that cannot be independently verified given the opaque ownership structure. The holding companies of all four plantation companies remain unchanged,³⁹⁶ strengthening the suspicion that PIL or its senior management remains in control of the concessions despite the changes to the board.

In April 2018, Greenpeace identified Mars, Nestlé, PepsiCo and Unilever as customers of Pacific Inter-Link.³⁹⁷

31 March 2018, Papua, Indonesia: Deforestation for oil palm plantation development linked to the Hayel Saeed Anam group. ©Ifansasti/Greenpeace



Still trading in destruction



In December 2018, Wilmar International, the world's largest palm oil trader, committed to mapping and monitoring its palm oil suppliers for links to deforestation.³⁹⁸ In a statement issued jointly with Aidenvironment, Mondelez and Unilever, Wilmar published a timebound plan to:

- Identify all of the producers in its palm oil supply chain at the group level.
- Obtain a complete set of concession maps for those producers at the group level, including concessions from which it is not sourcing.
- Monitor all producer groups in its supply chain at the group level

- 'Suspend then engage' producer groups clearing forest or peatland after 1 January 2019.
- Publish a protocol governing its engagement with non-compliant producer groups.
- Disclose all non-compliant suppliers, including those identified through internal monitoring.
- Require suppliers that cleared forest or peatland after December 2015 to restore, conserve and protect an equivalent area.

This was not a new policy; rather, it was the first time a commodities trader had agreed to implement its existing policy in a meaningful way.

25 September 2018,
Sulawesi, Indonesia.
©Putera/Greenpeace



PALM OIL TRADERS REFUSING TO REFORM

- ✘ NONE
- PARTIAL
- ✓ FULL

	Map and monitor at group level	Suspend then engage	Disclose all non-compliant suppliers	Conversion cut-off date w/ recovery	Publish all supplier concession maps	100% verified NDPE
AAK	✘	✘	✘	✘	✘	✘
Asian Agri	✘	✘	✘	✘	✘	✘
Astra Agro Lestari	✘	✘	✘	✘	✘	✘
Bunge	✘	✘	✘	✘	✘	✘
Cargill	✘	✘	✘	✘	✘	✘
GAR	✘	✘	✘	✘	✘	✘
IOI	✘	✘	✘	✘	✘	✘
KLK	✘	✘	✘	✘	✘	✘
Louis Dreyfus	✘	✘	✘	✘	✘	✘
Musim Mas	✘	✘	✘	✘	✘	✘
Olam	✘	✘	✘	✘	✘	✘
Sime Darby	✘	✘	✘	✘	✘	✘
Wilmar	—	✓	—	✓	✘	✘

Following this announcement, Greenpeace Southeast Asia asked 11 other major palm oil traders to take equivalent actions to eliminate deforestation from their supply chains.³⁹⁹ A follow-up letter was sent in April 2019.

Six months have passed since Wilmar committed to reform its operations, yet the other traders have yet to take any meaningful action. Instead, they continue to misrepresent their approaches to supply chain implementation as robust, despite overwhelming evidence to the contrary. Further, the palm oil traders continue to hide behind sustainability consultants,⁴⁰⁰ notably Aidenvironment, TFT/Earthworm, Global Forest Watch and Proforest, as if the act of hiring one of these organisations automatically guaranteed a deforestation-free supply chain.

Most traders told Greenpeace Southeast Asia that they have a monitoring platform and report all non-compliant suppliers on their websites. However, most traders' 'grievance lists' only feature deforestation cases raised by NGOs or news reports, and none flagged by their consultants – an issue Greenpeace first exposed in November 2017.⁴⁰¹ It remains unclear whether the consultants have failed to identify instances of deforestation or whether the traders have chosen not to disclose them. Either way, the traders lack the company group and concession data needed to monitor for deforestation; only Wilmar has made a public commitment to obtain this data. Wilmar is also the only company that has clearly committed to

a 'suspend then engage' approach where producer groups have violated its policy.

Wilmar still has considerable work to do, especially when it comes to exploitation in its supply chain. It is not yet able to demonstrate that its supply chain is free from deforestation and human rights abuses,⁴⁰² despite having adopted an NDPE policy in 2013.⁴⁰³ Nor has it committed to make its supply chain transparent by publishing its suppliers' concession maps. Nonetheless, it is the only trader with a clearly set out programme that has the potential to reform the palm oil industry.

By contrast, the efforts of certain Indonesian government representatives to block transparency in the palm oil sector (see above) are strongly supported by the Indonesian Palm Oil Association (GAPKI). GAPKI's most senior staff are all drawn from the palm oil industry: its Chairman has been seconded from Astra Agro Lestari and its Deputy Chairperson from Musim Mas, both palm oil traders that are ostensibly committed to 'no deforestation'.

The impression this gives is that the vast majority of the palm oil sector is unwilling to reform. This leaves brands that use palm oil in a very difficult position. With just over 200 days to go before 2020, time is running out to eliminate forest destroyers from the palm oil supply chain. Brands have a stark choice: force GAR, Musim Mas and other palm oil traders to stop prevaricating and reform, or stop doing business with them altogether.



CONGO BASIN: SELLING OUT THE CONGO



The Congo Basin contains the second-largest area of tropical rainforest in the world, after the Amazon rainforest. Its trees and other plants hold vast reservoirs of carbon, equivalent to some 115 GtCO₂, or 21 years' worth of US fossil fuel emissions.⁴⁰⁴ Moreover, scientists have recently mapped a huge area of peatland in the central Congo Basin, straddling the Democratic Republic of the Congo (DRC) and the neighbouring Republic of the Congo. This peatland complex covers an area of 14.5 million ha and is thought to store carbon equating to a further 110 GtCO₂.⁴⁰⁵

In addition to the Congo Basin's global

importance as a carbon reservoir, approximately 60 million people living in the region rely on the forest for their subsistence.⁴⁰⁶ The Congo Basin rainforest is also home to endangered megafauna such as gorillas, chimpanzees and forest elephants.⁴⁰⁷

With some notable exceptions (eg Sudcam, see below), massive deforestation over large contiguous areas in order to establish large-scale plantations has been rare in the region in the past decades.⁴⁰⁸ Industrial logging is the most extensive use of land in the Congo Basin, with almost 50 million ha under concession – nearly one-fourth of the total forest area.⁴⁰⁹ The logging sector

13 September
2017, DRC:
Peatland rainforest.
©Beltrá/Greenpeace

29 December 2016,
Zhangjiagang, China:
Mukula logs in a timber
yard. *Pterocarpus*
tinctorius, or Mukula
tree, is a rare and slow-
growing hardwood
unique to southern and
Central Africa. Mukula
has been illegally logged
and traded from Zambia
and DRC to China for
the last decade, feeding
the increasing demand
'rosewood' in the
Chinese market.
©Lu Guang/Greenpeace



Alfred Brownell is an environmental and human rights lawyer whose Liberian NGO Green Advocates (GA) represents communities seeking to protect their environmental and human rights. In 2019, he was awarded the Goldman Environmental Prize for his long-term work, at great personal cost, to stop Golden Veroleum Liberia (GVL) from destroying 220,000ha of forest, important for people, the climate and wildlife including elephants, chimpanzees, pygmy hippopotamuses and tree pangolins. GVL is related to the major palm oil producer and trader Golden Agri-Resources. GVL cleared community forests and sacred sites without notice, consent of communities or fair compensation. When people spoke out against the destruction, GVL received support from Liberian authorities, who harassed, threatened, and arbitrarily detained residents without charge. Alfred Brownell brought in international NGOs, the RSPO and media to challenge this. Alfred Brownell and his family have been forced to flee, but the forest – at least for the moment – has been saved.

is the principal cause of the destruction of intact forest landscapes (IFLs) in the region,⁴¹⁰ with Forest Stewardship Council (FSC) certified concessions taken together showing twice the proportion of IFL loss as non-certified concessions. In Cameroon, 84% of IFLs in FSC concessions were destroyed during the period 2000–2013.⁴¹¹ Marked by poor governance, corruption and gross human and civil rights violations, the Congo Basin lacks the basic preconditions for credible FSC certification. By certifying logging companies in the region, the FSC is compounding corrupt de facto land-use planning and resource allocation via discretionary procedures – a form of land grabbing which preceded the widespread use of the term itself – instead of supporting proper conservation and land-use planning with the involvement of local communities.⁴¹²

However, the global hunger for natural resources – including oil and timber – and agricultural commodities, combined with governments' attempts to attract foreign investors, represents a significant threat. While the Congo Basin peatlands are currently relatively undisturbed, parts of them are earmarked for oil exploration, industrial logging and plantation development. These activities would significantly damage the peatlands.⁴¹³

The DRC, the largest country in the Congo Basin,

has within its borders about 60% of the region's rainforest.⁴¹⁴ In 2018 the DRC lost nearly 500,000ha of primary rainforest, representing over 13% of primary rainforest loss worldwide.⁴¹⁵ While small-scale, shifting agriculture is the dominant direct driver of forest loss in the country,⁴¹⁶ industrial logging is the second most important, being responsible for over 20% of primary and mature secondary forest loss from 2000 to 2014.⁴¹⁷

Plans to expand industrial activities into forest areas are often justified by the need to generate government revenue to finance 'development'. However, the mining-driven growth of GDP since the early 2000s has been described as 'growth without development',⁴¹⁸ as benefits are channelled to the shareholders of foreign multinationals and a few government officials and ministers, due to poor governance, corruption and patronage. Transparency International ranked the DRC joint 161st out of 180 countries in its 2018 Corruption Perceptions Index (which ranks countries based on their perceived public-sector corruption), with a score of 20/100.⁴¹⁹ According to Global Witness, between 2013 and 2015 more than \$750 million of mining revenues paid by companies to state bodies in the DRC were lost to the treasury with no clarity about how it was spent or where it ended up.⁴²⁰

Republic of Congo: what a carve-up

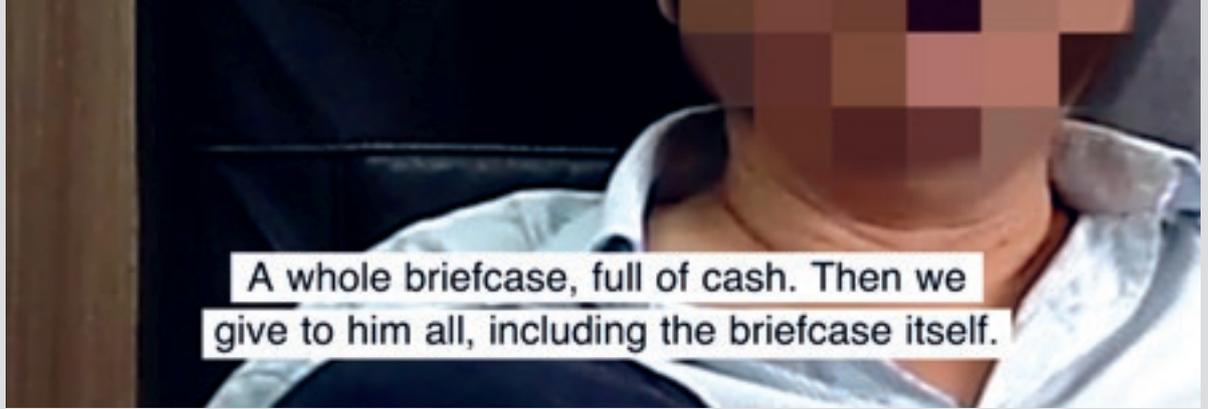


Top: 2016, Republic of Congo: 'The last forest area' handled by to SICOFOR general manager by the then Minister of Forest Economy. Source : Screenshot of the Dépêches de Brazzaville's website via Environmental Investigation Agency

Undercover video evidence collected by Environmental Investigation Agency between March 2015 and March 2018 reveals how one of the most influential groups of affiliated timber companies in Africa has built its business model on bribery and other crimes.

Republic of Congo: Okoume logs about to be peeled in the facility of the Deji Group's affiliate in Gabon. Source: Environmental Investigation Agency





A four-year investigation by NGO the Environmental Investigation Agency (EIA) in the Republic of the Congo and Gabon – countries that account for nearly two-thirds of the area controlled by logging companies in the Congo Basin⁴²¹ – recently exposed how the Chinese Deji Group of companies has built its business model on corruption.⁴²²

The Deji Group is EIA's name for an informal group of companies controlled by the Chinese businessman Xu Gong De.⁴²³ It controls an estimated 1.5 million ha of forest in Gabon and the Republic of the Congo.⁴²⁴

The investigation revealed how in the Republic of the Congo the group obtained a forest concession corruptly,⁴²⁵ and that in both the Republic of the Congo and Gabon it routinely over-harvests timber (according to EIA analysis, one group company effectively stole nearly 85,000m³ of timber in the Republic of the Congo between 2013 and 2016 alone) and cuts unauthorised species and trees below the minimum size.⁴²⁶ The report also shows that between 2013 and 2016 it exported from the Republic of the Congo an estimated 100,000 logs in excess of the maximum percentage that it was legally permitted to export as roundwood rather than as sawn or otherwise processed timber, thus flouting a law intended to boost the timber industry's contribution to

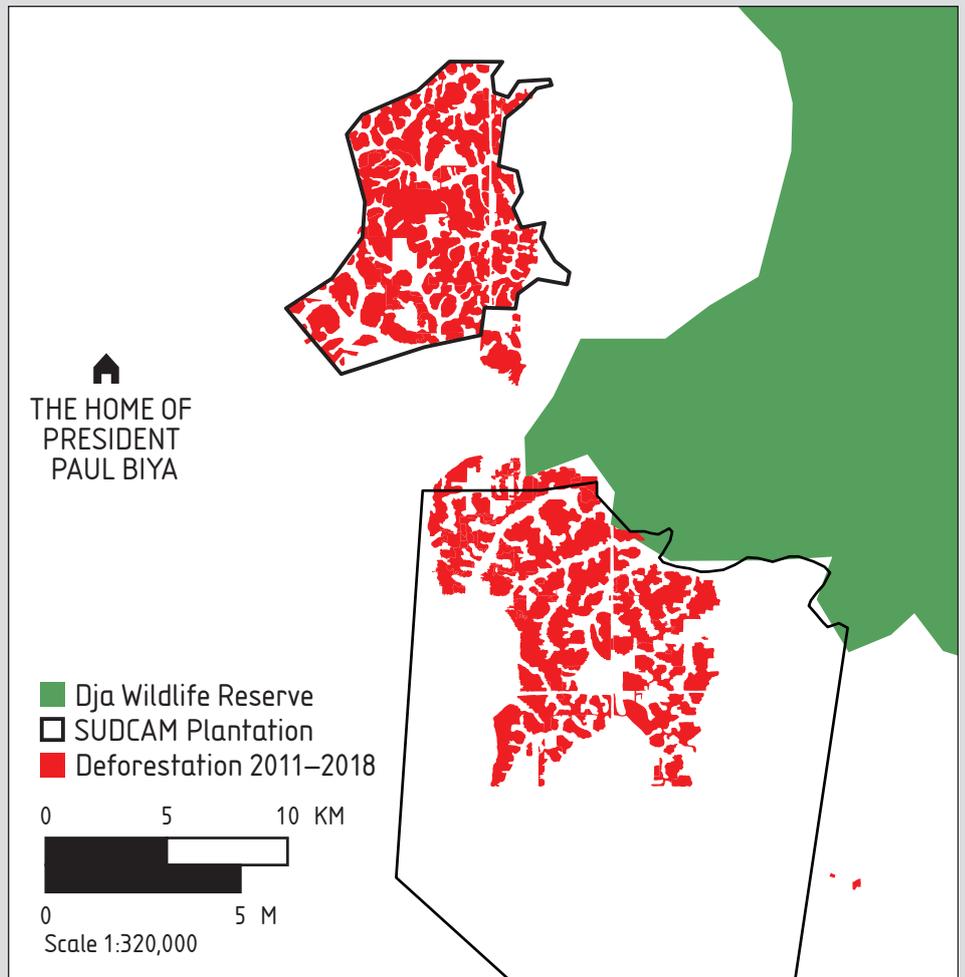
the national economy and generate local employment in timber processing,⁴²⁷ and that during each year of the same period it avoided payment of (at a minimum) between \$2.7 million and \$6.7 million in tax to the two countries, by means of transfer pricing manipulation.⁴²⁸

Representatives of Deji Group companies explained in detail to EIA's undercover investigators how their companies in both the Republic of the Congo and Gabon routinely bribe officials, including government ministers (one of whom, Congo's Minister for Water and Forests from 1980 to 1985 and Minister of Forest Economy from 1997 to 2016, is alleged to have repeatedly been paid sums in excess of \$150,000), in order to ensure that they can continue to operate in this way.⁴²⁹

EIA's investigation suggests that the Deji Group's modus operandi is by no means an exception – in fact, the corruption and criminality characteristic of Deji are widespread in the industrial logging sector across the Congo Basin region.⁴³⁰

Despite the group's appalling record of past and ongoing illegality, timber from Deji Group companies is traded to China, Europe and the US.⁴³¹ In the US, plywood using veneer from Deji timber has even been promoted as environmentally friendly and suitable for certified sustainable construction projects.⁴³²

Cameroon: the reckless expansion of the rubber sector



Singapore-based and -listed Halcyon Agri Corporation Limited describes itself as ‘the world’s leading rubber franchise’, with an integrated global network that gives it ‘control over the entire value chain of how rubber is grown, sourced, produced, and distributed’.⁴³⁸ In 2016, Halcyon took control of two Cameroonian rubber plantations, Hévéa Cameroun SÁ (Hevecam) and Sud-Cameroun Hévéa SÁ. (Sudcam). It boasts that these two (noncontiguous) operations, if ‘taken as one’, would represent the world’s largest single rubber plantation.⁴³⁹

Between 2011 and May 2018, Sudcam cleared over 10,000ha of dense tropical rainforest in order to plant rubber trees.⁴⁴⁰ In 2013, the EU-financed Independent Observer of Forestry Control recommended the clearance of at least 11,300ha of forest,⁴⁴¹ without having checked the legality of Sudcam’s land tenure or plantation operations.⁴⁴² In early December 2018 Halcyon’s CEO announced a temporary suspension of clearing, but during the preceding seven months the company ramped up the pace of destruction, cutting on average 6.5ha per day.⁴⁴³

Sudcam is 20% owned by Société de Production de Palmeraies et d’Hévéa (SPPH), a company reportedly controlled by an ‘influential member’ of the

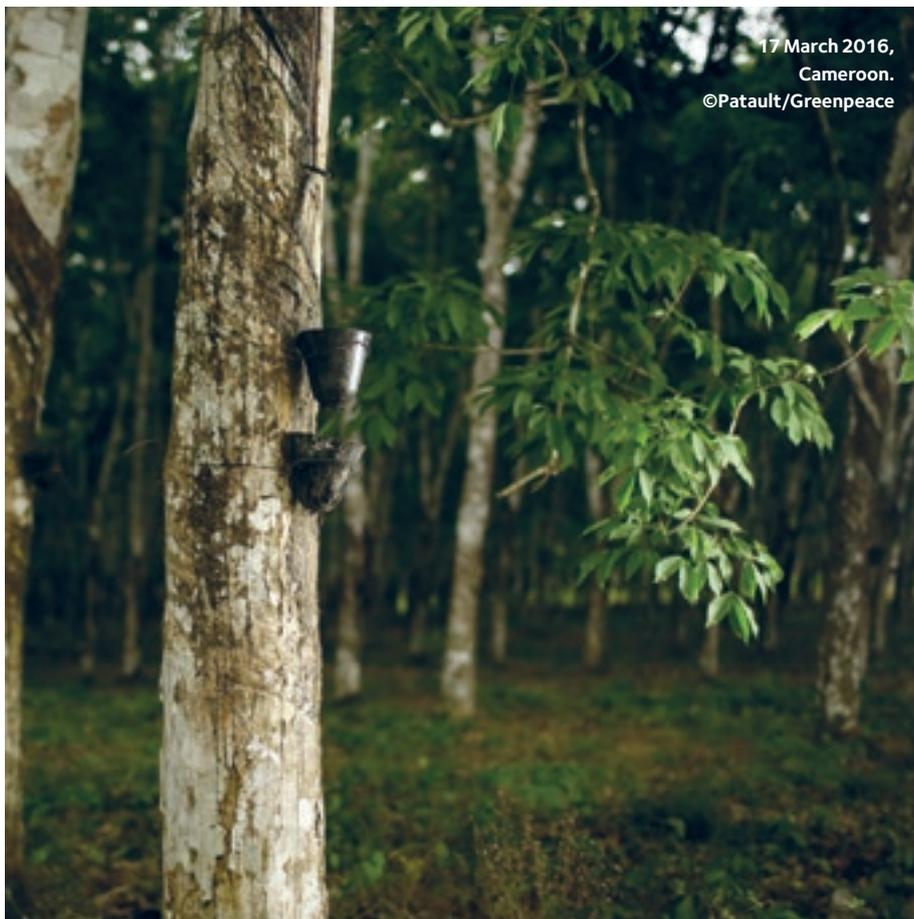
Cameroonian political elite.⁴⁴⁴ This individual’s identity is unknown, but the plantation lies only seven kilometres from the town of Mvomeka’a, where Cameroon’s head of state Paul Biya, in power for more than 36 years, has a mansion, compound and airstrip. Moreover, a 2016 company document seen by Greenpeace Africa indicates that Serge Baroux Mounier, the French brother-in-law of Biya’s son Franck, was at that time a Sudcam director.⁴⁴⁵ In a September 2018 email, Halcyon’s CEO Robert Meyer claimed not to know whether Sudcam had what he called ‘ties to the government’.⁴⁴⁶ In a follow-up email he also claimed not to know SPPH’s registration number in the country’s trade register.⁴⁴⁷

Sudcam’s concessions appear to violate Cameroonian laws and regulations in numerous respects, including illegally low land rents and allocation of freehold to a foreign-owned company. The company has also been granted effective immunity from land rights challenges and a blanket exemption from future legislation.⁴⁴⁸

Sudcam’s concessions overlap with the customary land of nearly 30 local communities, including the indigenous Baka people. Neither the land allocation nor the project approval procedure met international standards for consulting with local populations and

A rubber explosion

The global area of productive natural rubber plantations increased by 58% between 2000 and 2017 to 11.7 million ha.⁴³³ This expansion came at the cost of forests, notably in the Mekong region of Southeast Asia, which includes Thailand, Vietnam, Cambodia, Laos and Myanmar. A recent study estimated that some 3 million ha of forest have been destroyed in Southeast Asia to make way for rubber since 2000.⁴³⁴ Rubber plantations are also expanding in Sub-Saharan Africa.⁴³⁵



World of rubber

While about 30% of global rubber exports go to China, 25% go to the EU and 20% to the US.⁴³⁶ About three-quarters of the world's natural rubber production is used to manufacture tyres for cars, trucks and aircraft.⁴³⁷ The EU and the US are home to many of the world's major tyre and car manufacturers, who have a significant influence on demand. Other natural rubber applications include medical supplies, gloves, condoms and mattresses.





9 December 2006,
Eastern Province,
Cameroon: Baka women
head into the forest on
a fishing expedition.
©Davison/Greenpeace

obtaining their free, prior and informed consent (FPIC). In an apparent violation of the UN Declaration on the Rights of Indigenous Peoples, houses in two Baka villages were reportedly demolished in the course of the land clearance and their inhabitants forced to relocate. As of November 2018, the affected communities had still not received redress.⁴⁴⁹

According to Sudcam's own severely inadequate 2011 environmental impact assessment (EIA)⁴⁵⁰ the concession area is also home to gorillas, chimpanzees and forest elephants,⁴⁵¹ although their presence is mentioned only in passing. The EIA fails to mention that chimpanzees and the Central African population of African elephant are endangered, nor does it mention that two species it says are found in the area – the western gorilla and the zingana tree (*Microberlinia bisulcata*) – are critically endangered.⁴⁵²

Sudcam's three concessions are close, and in one instance directly adjacent, to the Dja Faunal Reserve, a UNESCO World Heritage Site designated in 1987 for its Outstanding Universal Value in animal and plant biodiversity.⁴⁵³ In 2012, soon after Sudcam commenced operations, UNESCO's World Heritage Centre and the IUCN concluded that the reserve met the criteria for inclusion on the List of World Heritage in Danger,⁴⁵⁴ on account of the threats posed both by nearby large-scale deforestation and by the anticipated hunting and foraging activities of the influx of plantation workers and their families.⁴⁵⁵ However, UNESCO states that parties have consistently rejected World Heritage Centre proposals to include the reserve on this list.⁴⁵⁶

Sudcam's devastating impact on the environment and local communities and apparent illegality did not stop the French public sector research institute the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) from signing a 'long-term collaboration' agreement with Sudcam's then-

parent company in 2014, to help the company 'maximise productivity and yield'.⁴⁵⁷ The partnership, the terms of which remain undisclosed, ended early in 2017.⁴⁵⁸

In the face of the massive deforestation caused by Halcyon's Cameroon plantations, Norway's Government Pension Fund Global divested from Halcyon Agri in 2018⁴⁵⁹ on the recommendation of its Council on Ethics, which concluded that there was an unacceptable risk of the company being responsible for serious environmental damage.⁴⁶⁰

In November 2018, Halcyon Agri published a 'Sustainable Natural Rubber Supply Chain Policy'⁴⁶¹ and in April 2019 its UK-registered subsidiary Corrie MacColl, which manages its Cameroon plantations,⁴⁶² announced the formation of a 'Sustainability Council' tasked with monitoring the implementation of the new policy.⁴⁶³ Astonishingly, the inaugural membership includes only one representative of a local community and none from NGOs (despite the company's claim in the press release that NGO delegates are included).⁴⁶⁴ Moreover, most of the council members have potential conflicts of interest. Besides a representative of the business consultancy Proforest (reportedly tasked with carrying out a gap analysis of Sudcam's EIA⁴⁶⁵), one-third of the council members are government officials, two of them from the very ministry that approved Sudcam's dubious EIA. The other members are representatives of Corrie MacColl customers (Michelin, Pioneer Balloon and Becton, Dickinson and Company).⁴⁶⁶ Michelin's inclusion represents an additional potential conflict of interest given that it's one of the principal corporate partners of CIRAD, the French public research institute that collaborated with Sudcam (see above).⁴⁶⁷

In addition to Michelin, Halcyon Agri reports that its customers include major tyre companies such as Bridgestone, Continental and Goodyear.⁴⁶⁸

7 April 2003, Cameroon.
©Mauthe/Greenpeace



Côte d'Ivoire and Ghana: the cocoa frontier

3 October 2008, Côte d'Ivoire: A nine-year old carries sacks of cocoa pods weighing about 30kg. The family has no other income beyond the cocoa plantation. The child does not attend school and his work involves cutting cocoa fruit off the trees with a machete.

©Daniel Rosenthal/laif

Over 60% of the world's cocoa supply is produced by the West African nations of Côte d'Ivoire and Ghana.⁴⁶⁹ In large part as a result of its importance as the world's leading cocoa producer,⁴⁷⁰ Côte d'Ivoire has lost most of its forest cover since gaining independence from France in 1960 – less than 11% of the country is still forested, with under 4% being dense forest.⁴⁷¹ Cocoa was far and away the largest single driver of deforestation in the country between 1990 and 2015, being responsible for almost a quarter of tree cover loss.⁴⁷² At the current rate of destruction, the country will have lost all its primary forests within a few decades.⁴⁷³ Ghana, the world's second most important producer,⁴⁷⁴ lost an estimated 700,000ha of forest – 10% of its total tree cover – between 2001 and 2014, again with roughly a quarter of the loss being attributed to the cocoa industry.⁴⁷⁵

Cocoa-driven deforestation in Côte d'Ivoire includes extensive illegal clearance in national parks and other protected areas – indeed, the country's Forest Development Corporation (SODEFOR) estimates that 40% of Ivorian cocoa comes from protected areas.⁴⁷⁶ One study examined 23 protected areas and found that seven of them had been almost completely converted to cocoa, while 13 had lost their entire primate populations.⁴⁷⁷ Elephants are close to disappearance; other threatened species include pygmy



hippos, flying squirrels, pangolins, leopards and crocodiles.⁴⁷⁸

Modern slavery and child labour are rife in the cocoa industry. According to the Global Slavery Index, almost 1.6 million children worked in the industry across Côte d'Ivoire and Ghana between 2016 and 2017, of whom nearly 1.5 million were defined as being in child labour⁴⁷⁹ and 1.4 million engaged in hazardous work.⁴⁸⁰ Under the International Labour Organization (ILO) definition, some 16,000 of these children (mainly in Ghana) were victims of forced labour.⁴⁸¹ The 2018 Cocoa Barometer states that '[n]ot a single company or government is anywhere near reaching the sector-wide objective of the elimination of child labour, and not even near their commitments of a 70% reduction of child labour by 2020.⁴⁸² In addition, there were an estimated 13,700 adult victims of forced labour in cocoa agriculture in the two countries between 2013 and 2017, mainly in Côte d'Ivoire.⁴⁸³ The drivers of modern slavery in cocoa agriculture include the chronic poverty of farmers along with price instability, low levels of education and poor access to policing and justice.⁴⁸⁴

Human Rights Watch and the Ivorian Coalition of Human Rights Actors have denounced SODEFOR's reported forced evictions of farmers without prior notice, which often involve the farmers being beaten and humiliated and their homes and possessions burned.⁴⁸⁵ In addition to its direct impact on rural communities, the cocoa trade provided a significant source of funds for both government and rebel forces during Côte

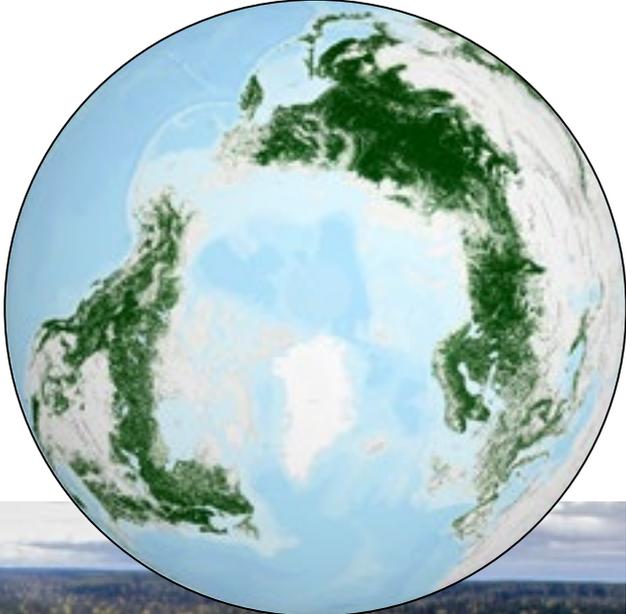
d'Ivoire's civil wars (2002–2007 and 2010–2011).⁴⁸⁶ A 2017 field investigation by Mighty Earth found that authorities in Côte d'Ivoire, and in particular staff of SODEFOR, regularly receive bribes to turn a blind eye to illegal cocoa plantations. According to reports, SODEFOR staff effectively ask farmers for protection money.⁴⁸⁷

The Mighty Earth investigation also found evidence of traders including Olam, Cargill and Barry Callebaut buying cocoa illegally grown in protected areas. These traders reportedly supply consumer brands, including Ferrero, Hershey, Mars and Mondelez.⁴⁸⁸ When Mighty Earth confronted 70 cocoa and chocolate companies with its findings, none of them denied sourcing cocoa from protected areas.⁴⁸⁹

In March 2017, 12 major cocoa and chocolate companies joined with the Ivorian and Ghanaian governments to form the Cocoa & Forests Initiative (CFI), pledging to end deforestation by the industry in the two countries. Today, 32 leading chocolate and cocoa companies are signed up⁴⁹⁰ – essentially the whole of the chocolate sector. However, cocoa-driven deforestation has continued: investigations by Mighty Earth identified nearly 14,000ha of deforestation in Côte d'Ivoire's cocoa-growing heartland in 2018 – a figure comparable to that for the two previous years – as well as much smaller areas in Ghana.⁴⁹¹

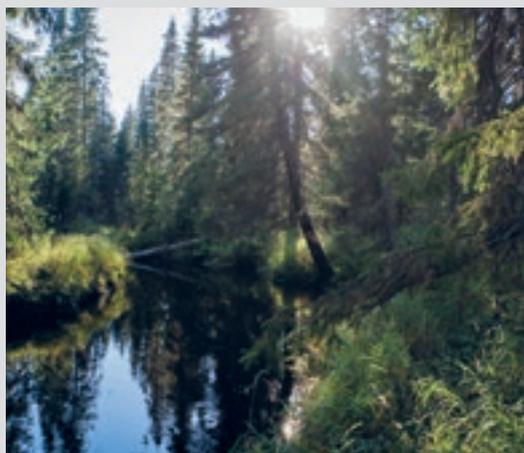


BOREAL: THE PULP INDUSTRY'S THREAT TO THE GREAT NORTHERN FOREST



Dirty business

The boreal forest ecosystem's trees, plants and soils (including vast areas of peatlands and permafrost) together store more carbon than the world's tropical forests.⁴⁹² Most of the forest's carbon is in its soils, with only 5% in the trees themselves.⁴⁹³ This makes the Great Northern Forest the single largest terrestrial carbon store on the planet.



11 September 2016, Russia. ©Podgorny/Greenpeace

8 September 2016, Russia. ©Greenpeace

14 December 2016, Sweden. ©Stoppel/Greenpeace

19 June 2006, Finland: Illegally logged Russian timber entering Finland. ©Rastenberger/Greenpeace



12 September 2016, Russia. ©Podgorny/Greenpeace

Wood is booming

Wood-based pulp production has nearly tripled worldwide since 1961,⁴⁹⁴ at the cost of forests from the tropics to the boreal. The market for single-use paper-based packaging and tissue products continues to grow,⁴⁹⁵ along with that for garments made from pulp-derived yarns such as viscose. As a result, the virgin pulp industry is booming⁴⁹⁶ and expansion of pulp mills continues.⁴⁹⁷

The Great Northern Forest, also known as the boreal forest, rings the planet's land surface south of the Arctic zone, covering parts of Russia, Canada, Alaska (the US), Sweden, Norway and Finland. It represents nearly one-third of the forest left on earth,⁴⁹⁸ with about 30% of it classed as primary (or old-growth) forest.⁴⁹⁹

The vast boreal landscapes include the territories of several hundred indigenous communities,⁵⁰⁰ who have stewarded the land since time immemorial. Indeed, some features of the boreal forest reflect this human interaction, which has 'inextricably tied Indigenous Peoples to the landscapes that sustain and define the diverse Indigenous cultures'.⁵⁰¹ In other words, these forests are Indigenous Cultural Landscapes⁵⁰² of deep social and cultural significance, as well as being of great economic importance to indigenous peoples. Respecting the knowledge and rights of these communities is essential for lasting forest protection.

The Great Northern Forest is also home to a rich diversity of native mammals ranging from elk (known as moose in North America and the world's largest living deer species) through beavers, wolverines and porcupines to martens and flying squirrels. Reindeer (known as caribou in North America) live in the Great Northern Forest and the tundra beyond.⁵⁰³ Large predators include brown and grizzly bears, wolves and Siberian tigers.⁵⁰⁴ The understorey in old-growth forests harbours a remarkable range and abundance of mosses, lichens and fungi,⁵⁰⁵ which in turn host an array of insects.

Reindeer in wreckage

Over 19 million of Sweden's original 25 million ha of forest have been clearcut,⁵⁰⁶ while at present rates of harvesting the remaining old-growth boreal forest could be destroyed within 20 years.⁵⁰⁷ The remaining forest is already fragmented.⁵⁰⁸ Logging continues to have significant impacts on over 1,300 red-listed species of animals, plants, fungi and lichens,⁵⁰⁹ and threatens the livelihoods and culture of the Sámi indigenous people, whose traditional way of life depends on reindeer herding.



Pulping the Sámi way of life

Timber, pulp and paper giant Svenska Cellulosa AB (SCA) controls 2.6 million ha of forestland in northern Sweden,⁵¹⁰ the ancestral homeland of the Sámi. SCA has been clearcutting old-growth forests and replacing them with plantations of fast-growing and invasive non-native lodgepole pine. As of 2017, SCA had nearly 300,000 ha of lodgepole pine plantations.⁵¹¹

The company's operations threaten the traditional Sámi way of life by destroying old-growth forest to expand its plantations. The lodgepole pine plantation stands are impassably dense, so force Sámi herders to move their reindeer herds around them, increasing their workload and costs.⁵¹² Lodgepole pine also impacts reindeer health by impeding the growth of lichens that the animals depend on for winter grazing.

SCA's forestry operations in Sweden are FSC-certified.⁵¹³ Certification is supposed to be conditional on obtaining the free, prior and informed consent⁵¹⁴ of the Sámi, who are recognised in the Swedish constitution as an indigenous people and national minority.⁵¹⁵ However, in August 2017 all 44 Sámi communities in Sweden reconfirmed their zero tolerance for lodgepole pine plantations in reindeer herding areas, which they have opposed since 2008.⁵¹⁶

SCA is expanding its operations further. In February 2019 the company opened what it claims is the world's

largest pulp mill,⁵¹⁷ intended to meet growing demand from tissue and packaging manufacturers.⁵¹⁸ Linked to the pulp expansion, SCA is also proposing to expand its production of tall oil – a co-product of the process of pulping coniferous trees with applications in the chemicals and bioenergy sectors⁵¹⁹ – by more than 100%.⁵²⁰ SCA admits that the mill will increase 'demand for pulpwood and sawmill chips in northern Sweden for a considerable time'.⁵²¹ SCA also has plans to nearly double kraftliner production (for making corrugated cardboard) at its Obbola packaging mill,⁵²² creating pressure for further clearcutting and lodgepole pine plantation establishment.

Many of Europe's biggest brands source raw materials from SCA, apparently considering FSC certification to be a sufficient guarantee of sustainability. SCA's customers include its Swedish former subsidiary Essity, Kimberly Clark (Europe) and Sofidel (Italy),⁵²³ with brands such as Velvet, Tempo, Tork and Lotus (Essity),⁵²⁴ Kleenex and Andrex (Kimberly Clark),⁵²⁵ and Nalys and Regina (Sofidel).⁵²⁶ One of SCA's biggest buyers of virgin fibre kraftliner, the UK-based DS Smith,⁵²⁷ manufactures corrugated cardboard packaging for L'Oréal,⁵²⁸ Mars, Mondelez, Nestlé, Procter & Gamble, Unilever⁵²⁹ and Amazon.⁵³⁰ IKEA also sources corrugated cardboard made with SCA's kraftliner.⁵³¹

THE UNITED STATES: PLOUGHED PRAIRIES, DEAD WATERS



‘The widespread extent of grassland conversion in the US – the rate of which rivals that of some tropical deforestation – makes it a larger emission source than conversion of the Brazilian Cerrado [...] Moreover, the disproportionate contribution of [soil organic carbon stocks] to these emissions may challenge future mitigation efforts. [...] soil organic carbon] sourced emissions may represent a climate forcing that is effectively irreversible over human relevant timescales.’⁵³²

Spawn SA, Lark TJ & Gibbs HK (2019) ‘Carbon emissions from cropland expansion in the United States’

The US is a leading producer and exporter of soya and maize⁵³³ – crops for which global demand is being fuelled by rising meat consumption⁵³⁴ and increased take-up of biodiesel and bioethanol, the latter driven by government-imposed overall use targets and percentage blending mandates.⁵³⁵ In 2017/18 the US had the largest area under soya production in the world – some 36.2 million ha⁵³⁶ – and came just behind China for area under maize at 33.5 million ha.⁵³⁷ Approximately 58% of soya and 15% of maize produced in the US is exported.⁵³⁸ China and the EU are leading importers of US soya,⁵³⁹ although imports by China are significantly decreasing due to trade disputes and with African Swine Fever having reduced China’s pig herd by some 20%.⁵⁴⁰

A significant proportion of US production of both soya and maize is used domestically for either animal feed (41% of maize⁵⁴¹ and 26% of soya⁵⁴² production) or biofuels (34.5% of maize⁵⁴³ and around 2% of soya⁵⁴⁴ production). Less than 10% of US maize production is used domestically for food and drink, the majority of it for corn syrup and sweeteners.⁵⁴⁵ US soya production rose 63% in the 20 years to 2017, while maize output rose 59% over the same period.⁵⁴⁶

Huge areas of biodiverse and carbon-rich grasslands and other habitats have been sacrificed to this expansion, especially across the Great Plains⁵⁴⁷ and the midwestern Corn Belt⁵⁴⁸ (where maize and soya are typically grown in rotation⁵⁴⁹). Across the whole of the US, it is estimated

that over 4 million ha of ‘grassland, shrubland, wetland and forestland’ were converted to crop production between 2008 and 2016, with over 80% of this being grassland.⁵⁵⁰ Maize, wheat and soya predominated as initial crops on newly converted cropland.⁵⁵¹

In recent years satellite imagery has allowed more accurate observation of land-use change and estimates of emissions from deforestation. Emissions from the conversion of non-forest habitats such as grassland – where there may also be significant organic carbon stocks in the soil itself – are often overlooked in carbon accounting. This is unfortunate insofar as the impacts can be significant, especially in a country such as the US, where most new croplands replace grassland.⁵⁵²

While estimates of the climate impact of grassland conversion vary, a 2019 study of cropland expansion in the US between 2008 and 2012 found that on average it caused the release of 38.8 million tonnes of carbon into the atmosphere per year⁵⁵³ (equivalent to the annual CO₂ emissions of 36 coal-fired power plants⁵⁵⁴). The study identified grassland conversion as the primary source of emissions, with more than 90% of these emissions originating from soil organic carbon stocks.⁵⁵⁵ Over 73% of the emissions were attributable to new cropland initially planted with maize, soya and wheat.⁵⁵⁶

In addition to the climate impact, the destruction of

Monarch butterfly (*Danaus plexippus*). These short lived insects migrate to Mexico each year, but no single butterfly completes the return journey. Instead four different generations are born throughout the year and each completes a segment of the round trip. They can fly at between 20km and 40km an hour, and make use of updrafts of warm air called thermals to rise high into the air and slowly glide down. This endangered species has been negatively impacted by herbicides, human disturbances, and predation. ©Taylor/Greenpeace



Top: 12 June 2004, Nebraska, USA.
©Beltrá/Greenpeace

©Shutterstock

grassland and native vegetation by industrial agriculture carries a heavy cost in terms of biodiversity loss. For example, in the Great Plains it threatens the future of bird species that are found nowhere else, as well as insects such as bumblebees and the iconic monarch butterfly.⁵⁵⁷ Moreover, some 17% (around 25 million ha) of the land there that has already been ploughed, and 87% of the remaining grassland is on poor-quality soils that are prone to erosion and require large inputs of fertiliser to be viable for agriculture. In turn, these intensive practices have serious implications for the quality of surface and potable water and for aquatic biodiversity.⁵⁵⁸

Nitrogen fertiliser use on US croplands has risen dramatically since the 1940s. One of the most dramatic impacts of the ploughing of such soils and the subsequent overapplication of fertilisers⁵⁵⁹ is the 'dead zone' that develops each year in the Gulf of Mexico, where nutrients carried seaward by the Mississippi River system from farmland, together with sewage inputs and urban runoff, produce massive algal blooms that deplete oxygen and kill off much marine life.⁵⁶⁰ This is perhaps the best-known example of what appears to be a growing global issue.⁵⁶¹ In some years, over 2 million ha of coastal waters in the Gulf of Mexico can be affected.⁵⁶²



April 1936, Cimarron County, Oklahoma, USA:
The dust bowl. Source: US Farm Security Administration.
Photographer: Arthur Rothstein.



21 February 2005, Minnesota, USA: Maize (*Zea mays*) plants suffering from dust storms, erosion, and drought, Minnesota ©Brandenburg

VISION:

LAND, FORESTS AND FOOD SYSTEMS FOR A HEALTHY PLANET



21 November 2017,
Thailand: A child tastes an
organic flower and fresh
vegetable spring roll. The
Thai Education Foundation
and Greenpeace Southeast
Asia hosted an activity
aimed at promoting safe,
nutritious lunches for
school children made from
ecological ingredients.
©Roengchai Kongmuang/
Greenpeace



‘Forests and agriculture can get us at least a quarter of the way to meeting the Paris Agreement’s goal of limiting warming to 1.5°C. While a rapid decarbonization of the global economy remains essential, aggressive action to reduce emissions from the land sector can buy additional time for this transition. Maximizing mitigation from forests and agriculture requires protecting and restoring forests, improving agricultural practices, and shifting to more sustainable diets.’⁵⁶³

Woods Hole Research Center policy brief

‘[M]uch of humanity’s progress has come at a considerable cost to the environment. To produce more food and other non-food agricultural goods, a combination of intensified agricultural production processes and the clearing of forests has led to the degradation of natural resources and is contributing to climate change. Should [the development community] continue to address these challenges with a “business as usual” approach, the future will not look promising. Sustainable food and agriculture systems cannot be achieved without significant additional efforts.’⁵⁶⁴

FAO (2018) ‘The future of food and agriculture – Alternative pathways to 2050’

Scientists, doctors and world leaders have all agreed: the current model of industrial food production and consumption is not good for us or the planet. With almost a quarter of current greenhouse gas emissions coming from agriculture, forestry and other land use,⁵⁶⁵ reform of the agribusiness and food sectors – from farm to factory to fork – is crucial to keep global warming below 1.5°C and support healthy, biodiverse ecosystems. Achieving these goals also requires massive programmes to restore and conserve forests and other natural ecosystems, and reversing demand for the high-risk commodities that are driving deforestation and land conversion.

NO DEFORESTATION



Cattle, cocoa, palm oil, pulp and paper, rubber and soya products are high-risk commodities, whose production is strongly and consistently associated with forest destruction and conversion of natural ecosystems. Despite the proliferation of ‘no deforestation’ commitments, traders dealing in these commodities routinely fail to exclude forest destroyers from their supply chains. Government regulation and certification bodies – including the Roundtable on Responsible Soya (RTRS), the Roundtable on Sustainable Palm Oil (RSPO) and the Programme for the Endorsement of Forest Certification (PEFC) – are not a proxy for the due diligence required to ensure producer groups are not engaging in deforestation or forest degradation, clearing peatland or violating human rights.

Even the Forest Stewardship Council (FSC), which is significantly more rigorous than other certification schemes, has neither implemented its standards consistently across regions nor enforced its policies regarding members’ association with deforestation at group level. The scheme allows conversion of natural forest covering up to 5% of the area of a group’s certified forest management units, and the conversion of up to 10% or 10,000ha of forest across the totality of its operations (including forestry, oil palm or rubber) within the previous five years. Further, the FSC relies heavily on NGOs to police its policies. Since 2016, the US-based NGO Mighty Earth has filed

complaints against Olam’s oil palm and rubber operations in Gabon, Korindo’s oil palm operations in Indonesia and KTS’s oil palm operations in Sarawak, Malaysia.⁵⁶⁶

Accordingly, companies must adopt and implement ‘no deforestation’ policies if they have not already done so, and take responsibility for ensuring that the producer groups and other companies in their supply chains are compliant with those policies as soon as possible – and no later than 2020. These policies should be enforced across all commodities, regardless of volumes, and must cover indirect supply (such as soya or palm oil used as animal feed in meat and dairy supply chains). Companies must also adopt and implement global standards on human rights, including the United Nations Guiding Principles on Business and Human Rights,⁵⁶⁷ the United Nations Declaration on the Rights of Indigenous Peoples⁵⁶⁸ and sector-specific labour protocols where available.⁵⁶⁹

For a company’s commodity supply to be considered deforestation-free, it must be able to demonstrate that none of the entities in its supply chain – including producer groups, refiners and traders – is involved in or linked to forest destruction. To be meaningful, ‘no deforestation’ must apply across commodities and at the corporate group level – ie even in operations from which a company is not currently sourcing. This will minimise the risk of leakage and the creation of ‘no



deforestation’ and ‘deforestation’ commodity streams.

Taking the soya industry as an example, a company should be able to demonstrate that the soya it is buying comes from producer groups that are not responsible for forest or habitat destruction. Further, it must be able to prove that its soya suppliers are not linked to such destruction, either directly or through trade with destructive producers whose soya is sold elsewhere.

In other words, if a trader sells soya from producer groups that are destroying the Cerrado or other South American ecosystems, then it is not compliant with ‘no deforestation’ standards and must be excluded from the market.

Brands and traders must be able to demonstrate that their supply chains are free from deforestation. This means publishing complete lists of the producer groups in their supply chains, as well as the mills, crushers, farms, plantations and other relevant infrastructure. Brands must work with traders to get land tenure boundaries, such as concession maps, and other data necessary to enable successful supply chain monitoring into the public domain. Ultimately, brands and traders must suspend trade with any company that refuses to comply with ‘no deforestation’ standards or exploits its workers, local communities or indigenous peoples.

The most efficient way for companies to meet their ‘no

deforestation’ commitments would be for all sectors involved with these commodities – including producers, traders, retailers and consumer brands – and governments to act together. However, traders and producer country governments have shown limited inclination to collaborate and many remain actively hostile to reform. Accordingly, brands must lead the way and drive change throughout the agribusiness sector by taking control of and responsibility for their own supply chains. Importing country governments must play their part by regulating or legislating to prevent the sale of commodities from producers that cannot be demonstrated to be deforestation-free.

If a company wants to maintain its current consumption of high-risk commodities, it must demonstrate that all of the groups in its supply base are compliant with ‘no deforestation’ standards such as the High Carbon Stock Approach (HCSA). If it cannot prove this, then it must reduce consumption to whatever is available from groups whose compliance can be verified.

Given the perilous state of the earth’s climate and biodiversity, companies that are unwilling or unable to do what is needed to fix the global commodity trade and keep forest destroyers out of their supply chains must avoid high-risk commodities entirely.

REGREENING THE PLANET: NATURE-BASED SOLUTIONS



Without a massive programme of forest restoration⁵⁷⁰ and other ‘natural climate solutions’, keeping global warming below 1.5°C will be impossible.⁵⁷¹

Natural climate solutions have an estimated potential to reduce land-use sector emissions and increase carbon uptake from the atmosphere to a combined 23.7 GtCO₂e per year by 2030⁵⁷² – nearly half of current annual emissions from all sectors.⁵⁷³ These solutions include not just ending deforestation and restoring degraded forests, but also improving all aspects of forest management, reforestation, improved management of grazing land, a variety of methods for improving carbon uptake on agricultural land, adoption of ecological farming practices and protecting and restoring wetlands.⁵⁷⁴

One of the key measures for sequestering carbon is reforestation (restoration of forest on land that has been deforested relatively recently). The IPCC suggests that boosting the total area of the world’s forests, woodlands and woody savannahs, adding up to 24 million ha of forest, every year from now until 2030 could absorb around one-quarter of the atmospheric carbon necessary to limit global warming to 1.5°C.⁵⁷⁵ Natural

climate solutions are a core component of pathways to 1.5°C, and contrary to proposals from the fossil fuel industry must not be used to offset emissions elsewhere.

Policymakers have already committed to restore and protect the world’s forests. In 2014, governments and companies signing the New York Declaration on Forests committed to restoring 150 million ha of degraded forest lands by 2020 and an additional 200 million ha by 2030.⁵⁷⁶ Just over half (24) of the countries that have signed up to the Bonn Challenge and other schemes have published detailed restoration plans, covering two-thirds of the total pledged area.⁵⁷⁷

Achieving the levels of restoration and reforestation they have committed to will require concerted effort from companies and governments. The emphasis must be on restoring degraded lands in the regions with the highest biodiversity and carbon sequestration potential. Such areas may be currently zoned for agricultural development or logging, and governments must review their land-use plans to put degraded lands and other potential restoration areas off limits. This includes reclaiming undeveloped areas within existing land title areas through, for example, a



21 June 2010, Sumatra, Indonesia: Local community together with Greenpeace and other NGOs work to protect and restore an area of peatland forest. ©Van Lembang/ Greenpeace

28 October 2017, DRC: With support from Greenpeace Africa, Congo Basin peatland experts from the UK and DRC take soil samples in an area of newly discovered peatland. ©McElvaney/ Greenpeace

review of existing concessions and land permits. National parks, Indigenous lands and protected areas must be expanded, to ensure the most important areas from a wildlife, cultural or climate perspective enjoy the highest possible protections. Interestingly, new forests are growing naturally on abandoned agricultural land in post Soviet Eastern Europe.⁵⁷⁸

Companies must support these initiatives through direct funding, commensurate with the scale of their consumption of high-risk commodities. This means financing projects that can demonstrate additional long-term environmental and social gains, and reporting transparently on levels of investment and measurable outcomes. Companies implementing ‘no deforestation’ via the HCSA need to provide financing for the conservation and restoration of HCS/HCV areas. Ultimately, companies are liable for ensuring the protection and conservation of an area equivalent to their commodity/resource footprint. Private and public sectors should work together to provide a just transition that gives local communities and small-scale farmers alternative development models that are based on forest

protection, not deforestation.

Ongoing carbon uptake and long-term storage require permanent natural forest, not industrial plantations for harvest.⁵⁷⁹ Plantations intended for harvest have rapid initial carbon uptake (as does natural forest) but most of this carbon is lost following harvest, through burning, decomposition of wood products and waste, which severely limits plantations’ long-term carbon storage potential. Conservation of natural forests and restoration of natural ecosystems are also important for biodiversity.⁵⁸⁰

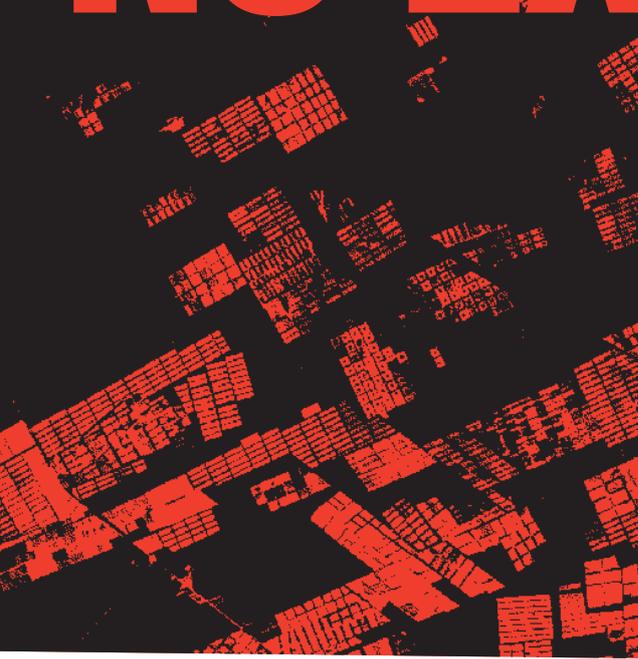
However, a recent study showed that, of the 24 detailed forest restoration plans by tropical and subtropical countries, 45% of the land area was designated for monoculture plantations. Brazil, for example, has pledged to establish 19 million ha of wood, fibre and other plantations, more than doubling its pulpwood plantation footprint. Taking into account agroforestry and other plantation-based projects, ‘two-thirds of the area committed to global reforestation for carbon storage is slated to grow crops’⁵⁸¹ – so when it comes to restoration, governments are not only cooking the books, but cooking the global climate.





29 August 2008, Sumatra, Indonesia" Acacia plantation and logs outside Tesso Nilo National Park. Many so-called restoration schemes are plantations, which deliver virtually no climate or biodiversity gains in stark contrast to the benefits of natural forest restoration. ©Beltrá/Greenpeace

NO EXPANSION



'Transitions in global and regional land use are found in all pathways limiting global warming to 1.5°C ... Model pathways that limit global warming to 1.5°C ... project a [400 million ha] reduction to a [250 million ha] increase of non-pasture agricultural land for food and feed crops and a [50 million – 1.1 billion ha] reduction of pasture land, to be converted into a [0 – 600 million ha] increase of agricultural land for energy crops and a [200 million ha] reduction to [950 million ha] increase in forests by 2050 relative to 2010 ... Mitigation options limiting the demand for land include ... ecosystem restoration and changes towards less resource-intensive diets.'⁵⁸²

IPCC 1.5°C report, Summary for Policymakers

'Man's attitude toward nature is today critically important. Simply because we have now acquired a fateful power to alter and destroy nature. But man is part of nature, and his war against nature is inevitably a war against himself.'

Rachel Carson, Silent Spring

Limiting global temperature rises to below 1.5°C means not only ending deforestation but wholesale restoration of degraded lands back into healthy and permanent forest. This requires radical change to current models of development and commodity production, including halting the land expansion of agribusiness.

At present, 5 billion ha – over one-third of the earth's total land area – is given over to agriculture. About two-thirds of this (over a quarter of total land area) is pasture and the remaining third is cropland, much of which is given over to the production of animal feed. Some 4 billion ha – just over 30% of the earth's land area – is forest. The remaining third is taken up with other natural environments, including desert, savannahs and shrubland, as well as urban, suburban and other built-up areas.⁵⁸³ In other words, most land capable of growing plants is already occupied by people, or nature, or both – and claiming it for forest restoration (or agricultural expansion) would have profound equity and ecological impacts.

Companies and governments have committed to restore 350 million ha of cleared or degraded lands back into forest by 2030.⁵⁸⁴ 350 million ha is almost



11 December 2016, Kalimantan, Indonesia. ©fansasti/Greenpeace

11 January 2019, Chaco Province, Argentina. ©Katz/Greenpeace

3% of the earth's total ice-free land area – larger than the area given over to agriculture in Brazil and Indonesia combined.⁵⁸⁵

Yet agribusiness expansion plans – significantly increasing production of commodities with the highest risk of deforestation – also involve commandeering vast areas of land. Put simply, there is not enough land to protect forests, restore degraded lands and permit agriculture to expand. Something has to give. The necessity of tackling climate change and protecting biodiversity – and the agribusiness sector's role in driving the climate and extinction crisis – means governments and companies must prioritise forest protection and restoration.

This means placing a cap on the amount of land available for agriculture and reducing the amount of grazing land. In all scenarios considered by the IPCC, limiting global temperature rises to below 1.5°C means reducing pasture by between 50 million and 1.1 billion ha by 2050 (compared with 2010 levels). The total footprint of non-pasture land would also change significantly: according to the IPCC, 'cropland for food and feed production decreases in most 1.5°C pathways, both compared to a no-climate baseline

and relative to 2010'.⁵⁸⁶

Halting land expansion does not require further intensification of the agricultural system – ie increasing the use of chemical inputs or factory farming. Indeed, returning ecosystems back to health requires a transition towards ecological farming systems, which both governments and companies must actively support. Such reforms must be introduced in conjunction with a shift to a more plant-based diet, which requires significantly less land to produce the same amount of calories. Replacing meat and dairy with plant-based foods is therefore the quickest and easiest way to free up the land needed for restoration, climate mitigation and ecological agriculture.

Companies sourcing forest and agricultural commodities have a responsibility to support this transition by requiring all producer groups in their supply chains to demonstrate that not only are they protecting forests – 'no deforestation' – but they are not increasing their land footprint – 'no expansion'. Producer groups that continue to threaten the climate and biodiversity by expanding their planted area should be excluded from the global market.

HEALTHY DIET FOR PEOPLE AND PLANET



Pressure to expand and intensify agricultural production is deeply rooted in the overconsumption of meat and dairy, and the consistent forecasts that meat and dairy consumption will continue to rise. Globally, meat production is forecast to rise 76% by 2050;⁵⁸⁷ dairy production is forecast to increase by 1.1% per year to 2050.⁵⁸⁸ The most rapid growth is predicted to come from regions with the smallest current *per capita* consumption, such as Asia and Africa, although some growth is also anticipated in North America and Europe, where consumption is already extremely high.⁵⁸⁹ Increased consumption of meat and dairy will increase demand for animal feed. Hence, production of soya and other animal feed crops is also forecast to increase dramatically over the same period.⁵⁹⁰

Agribusiness and food companies play a key role in promoting the spread of Western-style diets, dominated by a meat and dairy component.⁵⁹¹ By contrast, health professionals are warning that current levels of meat and dairy consumption in North America, Europe and some South American countries (notably Brazil and Argentina) are already too high, and that replacing meat and dairy with

nutritious plant-based foods is essential both for our health and for the stability of our climate.

In January 2019, a report in *The Lancet* concluded that a diet that was healthy for people and the planet requires 'substantial dietary shifts, including a greater than 50% reduction in global consumption of unhealthy foods, such as red meat,' and 'a greater than 100% increase in consumption of healthy foods, such as nuts, fruits, vegetables, and legumes'.⁵⁹²

Accordingly, Greenpeace is calling for global *per capita* consumption of livestock products to halve by 2050, with an interim 2030 milestone of no more than 24 kg of meat and 57 kg of dairy *per capita* per year. These figures align with the findings of the EAT-Lancet Commission, which also sets 2030 as the target date for transforming our diet.⁵⁹³

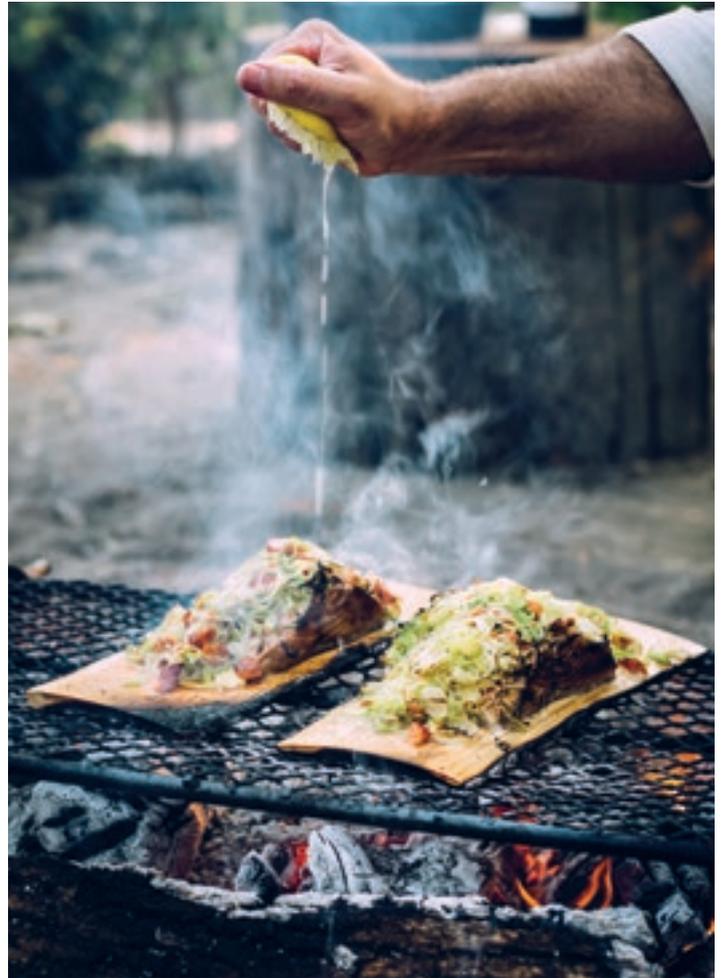
Greenpeace's target figures are higher than current consumption in several countries and regions (notably, average dairy consumption in China and Southeast Asia, average meat consumption in India and average consumption of both meat and dairy in Africa) and would allow some room for consumption in those regions to rise. However, for Europe, North America

15 July, 2001, Brazil.
©Evans/Greenpeace

2 June 2019, Jakarta, Indonesia. ©Sukarno/Greenpeace

Stock image

15 July, 2001, Brazil.
©Evans/Greenpeace



and other regions where *per capita* meat or dairy consumption is substantially higher than the global average,⁵⁹⁴ greater and faster reductions are needed: more than 70% by 2030.

The public debate on how to address the climate impact of the food system places responsibility solely on individuals to change their diets. However, it is the global food giants that shape public attitudes and choice through advertising, pricing and availability, and governments who support this system through policies and subsidies. Given their role in creating the planetary crisis, food brands now have a responsibility to deliver the solution – both for the planet and our health. This means replacing the meat and dairy in their products with healthy, affordable and delicious plant-based foods. For governments, this means shifting policies and subsidies to support ecological food systems and healthy diets.

Many food brands are already exploiting the growing appetite for plant-based diets, offering vegetarian or vegan options alongside their standard, meat-rich fare. Such products are often heavily

processed, sold at a premium and no healthier than meat-based equivalents. Further, they are offered in addition to meat and dairy products – as an effort by brands to increase sales, not influence what their current customer bases are eating. Global food companies still plan to grow sales of meat and dairy products, increasing their meat and dairy footprint.

Ultimately, *per capita* meat and dairy consumption in Europe and North America must fall by more than 70% by 2030 – for the sake of forests, the climate and our health. Food companies based in or supplying Europe and North America need to deliver these reductions by dramatically reducing their meat and dairy footprint. This means replacing industrially produced milk, pork, beef and poultry products with plant-based foods that are healthier for consumers and for the planet.

The greater a company's current meat and dairy footprint, the greater the cuts it will need to make. Fast food brands, and other companies whose current business model is entirely dependent on meat and dairy, will need to evolve beyond all recognition.

2001, Bangladesh.
©Robinson/
Greenpeace



System change – healthy farming for healthy food

An organic farm on the edge of the Austrian capital Vienna. All the animals are free range all year round, far exceeding the minimum requirements for organic farmlands in Austria. These pigs are fed on alfalfa, one of the most nutritious forage crops available. The farm avoids supermarkets and sells all its products direct to customers.

Changes in diet must go hand-in-hand with a shift to ecological farming, where our food system ensures food security and protects our climate and biodiversity. For the livestock sector, that means rearing healthy animals with respect and without suffering, using land that is not required for human food production or biodiversity. It also means replacing the current system of relying on high-protein, intensively farmed feed with an ecological approach where ruminant animals are fed on grassland and pork and poultry on waste food and crop residues.

As the end users for agricultural commodities, food companies are responsible for transforming the food system and delivering the shift to ecological farming practices. This also means ensuring that the necessary changes to the way we produce, trade and consume food do not further disadvantage communities, workers and other groups at the bottom of the food chain.



TIME FOR ACTION

In order to help limit global warming to below 1.5°C, companies and governments must:

PROTECT NATURE

No deforestation:
end all trade with forest and ecosystem destroyers

Conserve peatlands:
end peatland development and rewet degraded peatlands

Halt expansion:
no additional land for industrial agriculture

Fund restoration:
restore forest equivalent to commodity footprints

CHANGE THE SYSTEM

Full disclosure:
publish maps of producer group landholdings and make supply chains fully transparent

Reduce demand:
replace meat and dairy with healthy plant-based foods

Just transition:
reform trade, shift to ecological farming and support affected communities

Protect people:
uphold human rights,⁵⁹⁵ indigenous rights to self-determination and land, and the principle of free, prior and informed consent

30 November 2018, Sweden: Greta Thunberg has inspired untold numbers of school children and adults to make their voices heard and demand action from politicians and companies to take action on climate. ©Eriksson/Greenpeace





23 July 2009, Kalimantan
Indonesia. ©Beltrá/Greenpeace



APPENDIX:

DEFORESTATION AND TREE COVER LOSS DATA

Global tree cover loss 2001–2018

In this report we have based most global and regional data on the annual ‘tree cover loss’ maps produced by scientists from University of Maryland (UMD) using a Landsat-based global monitoring system.⁵⁹⁷ This detects loss of tree cover in 30m-by-30m grid cells. This is currently the best available standardised information for tropical forests, but it does not represent deforestation itself.

Tree cover loss is not always deforestation because:

1. Not all tree cover is forest – some is plantations. Harvest or other loss (eg fire) in a plantation is not usually counted as deforestation, whether or not the plantation is replanted.
2. Some tree cover loss is temporary and the forest is expected to grow back, for example after rotational logging, wildfire or shifting agriculture.

Deforestation is a change of land use from natural forest, usually to crops, pasture or other human land use (eg mining) or to tree plantation. The change is expected to be permanent.

Other tree cover loss in natural forest remains a matter for concern: disturbances such as logging or fire lead to immediate CO₂ emissions and loss of biodiversity and other ecosystem services (eg flood control). Long-term loss of carbon stock may result if regrowth is restricted, and tree cover loss can lead to further damage; for example, logged forest may be more vulnerable to future fire.

Where the UMD tree cover loss data is used in this report, it is based on a threshold of loss of 30% tree canopy cover.

Global drivers of tree cover loss 2001–2015

Global and regional data on drivers of tree cover loss 2001–2015 are taken from Curtis PG et al (2018).

This data, based on remote sensing, covers tree cover loss from 2001 to 2015 divided among five drivers:

- Commodity-driven deforestation, defined by the long-term, permanent conversion of forest and shrubland to a non-forest land use such as agriculture (including oil palm), mining or energy infrastructure.
- Shifting agriculture, defined as small- to medium-scale forest and shrubland conversion for agriculture that is later abandoned and followed by subsequent forest regrowth
- Forestry, defined as large-scale forestry operations occurring within managed forests and tree plantations with evidence of forest regrowth in subsequent years
- Wildfire, defined as large-scale forest loss resulting from the burning of forest vegetation with no visible human conversion or agricultural activity afterward
- Urbanisation, defined as forest and shrubland conversion for the expansion and intensification of existing urban centers.

The dataset does not distinguish among drivers within these sets – for example, it does not distinguish soya cultivation from grazing. The data is low spatial resolution, identifying one main driver per 10km-by-10km grid cell. This makes it most suitable for global or regional estimates. The satellite data analysis used is more accurate for some types of agriculture than others; row crops, cattle grazing or oil palm plantations are relatively easily identified, but in Sub-Saharan Africa



the dataset may not distinguish shifting agriculture from small-scale permanent agriculture (such as forest conversion for smallholder cacao growing), meaning much of the commodity-driven deforestation in Sub-Saharan Africa is likely to have been misclassified as shifting agriculture.

Tropical primary rainforest loss 2001–2018

In addition to tree cover loss, the same University of Maryland team have produced a mapping layer showing the presence of primary humid forests in tropical areas (primary tropical rainforest). This dataset shows natural, mature forest areas that have not been cleared and regrown in recent history (less than 30–50 years) prior to 2001.⁵⁹⁸

This covers humid tropical forests only so does not include dryland tropical forest areas such as Brazil's Cerrado or the Gran Chaco, nor any forest outside the tropics, such as the boreal forest.

Loss of tropical primary rainforest is calculated by overlaying the tree cover loss data (see above) with this layer to determine where tree cover was lost in primary tropical rainforest.

Other sources

National and subnational deforestation data used in this report are from other sources where these are likely to be more accurate than the UMD data, such as MapBiomas (<http://mapbiomas.org/map>) for the Brazilian Amazon.

The boreal forest map (2015) is extracted from the ESA Climate Change Initiative Land Cover project maps (<https://www.esa-landcover-cci.org/?q=node/164>).

Other sources are referenced in the text.

These sources may use different methodology from the UMD dataset (eg different canopy cover thresholds for forest loss) so should not be directly compared to it.

ENDNOTES

1. Watson R (2019)
2. IPBES (2019)
3. IPCC (2018c)
4. IPBES (2019)
5. Kssinger G, Herold M & De Sy V (2012) p11
6. 'For terrestrial and freshwater ecosystems, land-use change has had the largest relative negative impact on nature since 1970, followed by the direct exploitation, in particular overexploitation, of animals, plants and other organisms mainly via harvesting, logging, hunting and fishing ... Agricultural expansion is the most widespread form of land-use change, with over one third of the terrestrial land surface being used for cropping or animal husbandry. This expansion, alongside a doubling of urban area since 1992 and an unprecedented expansion of infrastructure linked to growing population and consumption, has come mostly at the expense of forests (largely old-growth tropical forests), wetlands and grasslands.' Source: Díaz Set al (2019) p4
7. Fearnside P (2017)
8. IPCC (2014a) pp822–824. Total direct agricultural emissions amount to ~5.8 GtCO₂e/yr. Of this, animal products (all livestock emissions) account for:
 - 2.1 GtCO₂e/yr from enteric fermentation of animals
 - 0.99 GtCO₂e/yr from manure
 - 0.34 GtCO₂e/yr from fertiliser emissions (of total 0.68; at least 50% are directly for feed)Total direct emissions from livestock (industrial or otherwise) therefore amount to 3.43 GtCO₂e/yr, which is 59% of total direct agricultural emissions.
9. Consumer Goods Forum website 'Deforestation'
10. In this report, mentions of 'Greenpeace' should be read as references to Greenpeace International unless otherwise indicated.
11. CIA website 'The World Factbook'
12. Analysis by Greenpeace, based on data from Curtis PG et al (2018), shows that 30 million ha of permanent deforestation during the six years 2010–2015 were attributable to agriculture and other commodity production. This figure (25% of global tree cover loss) includes deforestation for energy infrastructure and mining as well as crops and pasture. The annual rate during this period shows no clear trend; if the mean of 5 million ha/year has continued for the four years 2016–2019, 50 million ha will have been lost by 2020.
13. From 23.3 million ha in 2010 to 33.9 million ha in 2017. Source: FAOSTAT website 'Crops'
14. From 23,600 metric tonnes in 2010 to 41,500 metric tonnes in 2017. Source: IndexMundi website 'Indonesia palm oil production by year', based on data from <https://www.fas.usda.gov/commodities/oilseeds>
15. FAOSTAT website 'Crops'
16. Alexandratos N & Bruinsma J (2012) p74 Table 3.4
17. FAO (2018). Data were accessed via the online database linked to this report (<http://www.fao.org/global-perspectives-studies/food-agriculture-projections-to-2050/en>). All figures used refer to the business-as-usual scenario, comparing the base year 2012 with 2050 projections.
18. Henders S, Persson M & Kastner T (2015) p6 and European Commission (2013) pp21–22
19. Sharma S, IATP & Schlesinger S (2017) p25
20. See eg Khaitan R (2017), Bell D & Shelman M (2011) and Scott-Villiers P et al (2016)
21. Bahadoran Z, Mirmiran P & Azizi F (2015)
22. IPCC (2018c)
23. Greenpeace does not support dedicating land to the production of bioenergy crops including the harvest of standing trees. See Greenpeace (2018b)
24. In line with the dietary targets from the EAT-Lancet commission and Greenpeace (2018c).
25. Seymour F & Busch J (2016)
26. Kissinger G, Herold M & De Sy V (2012) p11
27. Pan Y et al (2011)
28. IPBES (2019)
29. Greenpeace does not support dedicating land to the production of bioenergy crops including the harvest of standing trees. See Greenpeace (2018b)
30. Attenborough D (2018)
31. Guterres A (2018)
32. Chernilo D (2017)
33. IPCC (2014b)
34. IPCC (2014b)
35. USGCRP (2017)
36. See eg Carleton TA & Hsiang SM (2016)
37. IPCC (2018c)
38. UN (2018). See also Herring SC et al, eds (2019), and Blunden J, Arndt DS & Hartfield G, eds (2018)
39. Díaz Set al (2019)
40. IPBES (2019)
41. IPBES (2019)
42. UN (2019)
43. Willet W (2019) and Lucas T & Horton R (2019)
44. Global Forest Watch website 'Global annual tree cover loss'
45. 24.3 million ha. Source: CIA website 'The World Factbook'
46. In 2016, 29.7 million ha of tree cover were lost worldwide. The average for 2001–2018 was 20.1 million ha/year. Source: Global Forest Watch website 'Global annual tree cover loss'
47. Approximately 12 million ha of tree cover were lost in tropical forests. See Weisse M & Dow Goldman E (2019)
48. Source: Pendrill F et al (2019). Net emissions indicates emissions minus absorption.
49. In 2014, net emissions for these uses totalled 1,322 MtCO₂e in Japan, 817 MtCO₂e in Germany and 494 MtCO₂e in the UK. Source: CAIT Climate Data Explorer
50. Analysis by Greenpeace, based on data from Curtis PG et al (2018), shows that 98% of permanent deforestation during the period 2010–2015 was attributable to these causes. This figure (representing 25% of all tree cover loss) includes deforestation for energy infrastructure and mining as well as crops and pasture. Shifting agriculture (where the cleared area is used for agriculture for some years, then forest is allowed to regrow) accounts for a further 21% of tree cover loss. Forestry, which includes all types of logging followed by regrowth of trees, accounts for a further 31%; in some cases this may be part of long cycles causing significant short- to medium-term forest damage and carbon emissions.
51. 'For terrestrial and freshwater ecosystems, land-use change has had the largest relative negative impact on nature since 1970, followed by the direct exploitation, in particular overexploitation, of animals, plants and other organisms mainly via harvesting, logging, hunting and fishing ... Agricultural expansion is the most widespread form of land-use change, with over one third of the terrestrial land surface being used for cropping or animal husbandry. This expansion, alongside a doubling of urban area

- since 1992 and an unprecedented expansion of infrastructure linked to growing population and consumption, has come mostly at the expense of forests (largely old-growth tropical forests), wetlands and grasslands.' Source: Díaz S et al (2019) p4
52. Analysis by Greenpeace, based on data from Curtis PG et al (2018).
 53. CIA website 'The World Factbook'
 54. Analysis by Greenpeace, based on data from Curtis PG et al (2018).
 55. Analysis by Greenpeace, based on data from Curtis PG et al (2018), shows that 30 million ha of permanent deforestation during the six years 2010–2015 was attributable to agriculture and other commodity production. The annual rate during this period shows no clear trend; if the mean of 5 million ha/year has continued for the four years 2016–2019, 50 million ha will have been lost by 2020.
 56. CIA website 'The World Factbook'
 57. Global Forest Watch (2019b). Analysis by Greenpeace.
 58. IPCC (2014a) p820 Figure 11.2
 59. Increasing from 11.4 GtCO₂e in 2009 to 20.2 GtCO₂e. Source: Bajzelj B et al (2014) p927 Table 2
 60. IPCC (2018c)
 61. Guterres A (2018)
 62. Díaz S et al (2019)
 63. IPBES (2019)
 64. Graph based on analysis by Greenpeace of data from Curtis PG et al (2018).
 65. Tree cover loss 2010–2018 graphs based on analysis by Greenpeace of data from Curtis PG et al (2018) and Global Forest Watch (2019b).
 66. In 2018, 32.76 million pigs were produced in Denmark. Source: Eurostat online database 'Production forecasts pig - head - quarterly data'.
 67. Agriculture & Food (2013)
 68. Wilkins B (2018)
 69. IPCC (2014a) p824. Total direct agricultural emissions amount to ~5.8 GtCO₂e/yr. Of this, animal products (all livestock emissions) account for:
 - 2.1 GtCO₂e/yr from enteric fermentation of animals
 - 0.99 GtCO₂e/yr from manure
 - 0.34 GtCO₂e/yr from fertiliser emissions (of total 0.68; at least 50% are directly for feed)
 Total direct emissions from livestock (industrial or otherwise) therefore amount to 3.43 GtCO₂e/yr, which is 59% of total direct agricultural emissions.
 70. See Henders S, Persson UM & Kastner T (2015) and De Sy V et al (2015).
 71. Fearnside P (2017)
 72. Henders S, Persson UM & Kastner T (2015) p4
 73. Silva JF (2018) pp5–6
 74. Joseph K (2018) p4
 75. European Commission (2013) pp23–24
 76. As of 2017. Source: FAOSTAT website 'Crops'
 77. FAOSTAT website 'Crops'
 78. Spring J (2018b), Gibbs HK et al (2015) and Critical Ecosystem Partnership Fund (2017) pp51–52
 79. NASA Earth Observatory website 'Deforestation in Paraguay' and Oliveira G & Hecht S (2016)
 80. 14.4 million tonnes of soybeans were produced globally in 1997 and 353 million tonnes in 2017. Source: FAOSTAT website 'Crops'
 81. IDH & IUCN NL (2019) p26
 82. 'Globally, livestock production has responded to increasing demand primarily through a shift from extensive, small-scale, subsistence, mixed crop and livestock production systems towards more intensive, large-scale, geographically-concentrated, commercially oriented, specialized production units. Monogastric species (pigs and poultry) in particular, by virtue of their high feed conversion ratios and short generation intervals, are well suited to rapid intensification of production.' Source: Robinson TP et al (2011) p43
 83. Sharma S, IATP & Schlesinger S (2017) p25
 84. Mottet A et al (2017) p5 Table 2. Analysis based on area used for growing oilseed crop/cake in million ha: poultry (60.3), pigs (39), cattle (30.9), small ruminants (1.1), for a total of 131.4 million ha.
 85. Gerber PJ et al (2013) pp14–17
 86. Alexandratos N & Bruinsma J (2012) p74 Table 3.4
 87. Godfray HCJ et al (2018)
 88. International Agency for Research on Cancer/World Health Organisation (2018)
 89. World Cancer Research Fund/American Institute for Cancer Research (2018)
 90. Talaie M et al (2017)
 91. Tharrey M et al (2018)
 92. European Public Health Association (2017) p5
 93. New York Declaration on Forests (2014)
 94. World Economic Forum (2018)
 95. World Economic Forum (2018)
 96. Consumer Goods Forum (2010)
 97. Bonn Challenge (2011)
 98. New York Declaration on Forests website 'Home'
 99. New York Declaration on Forests (2014)
 100. Mitchell AL, Rosenqvist A & Mora B (2017) and Curtis PG et al (2018)
 101. Treiblmaier H (2018)
 102. Pendrill F et al (2019)
 103. In this report, mentions of 'Greenpeace' should be read as references to Greenpeace International unless otherwise indicated.
 104. The concept of a group goes beyond formal parent–subsidiary company relationships. In producer countries, a large segment of agribusiness is controlled by complex groupings of companies owned by individuals and families. In many cases there is no single ultimate parent company and the group consists largely of privately held companies, not listed on any stock exchange. Different family members may be the ultimate shareholders in different companies, or parts of the group may be held offshore, rendering the ultimate owner unknowable. It is necessary to take a broad view of what constitutes a group, including control – financial, managerial, operational or other – and ownership links, to get around unscrupulous companies' deliberate obscuring of their ownership in order to avoid losing market access for their products.
 105. Greenpeace (2018d)
 106. Greenpeace (2018a)
 107. Correspondence between Greenpeace International and companies, January to May 2019. Copies held by Greenpeace.
 108. See Henders S, Persson M & Kastner T (2015) p6 and European Commission (2013) pp21–22
 109. Sharma S, IATP & Schlesinger S (2017) p25
 110. Byerlee D et al (2017) p5
 111. See Greenpeace (2018a)
 112. See eg Chain Reaction Research (2018a,b), Chain Reaction Research (2019) and Trase (2018a)
 113. See Greenpeace (2018a)
 114. Higonnet E, Bellantonio M & Hurowitz G (2017)
 115. See Environmental Investigation Agency (2019a,c) and Kusumaningtyas R (2018)
 116. Eg the World Cocoa Foundation's Cocoa & Forests Initiative (<https://www.worldcocoafoundation.org/initiative/cocoa-forests-initiative/>).
 117. Eg the Global Platform for Sustainable Natural Rubber (<https://gpsnr.org/>).
 118. Nestlé (2019b)
 119. Correspondence between Nestlé and Greenpeace UK, April 2019. Copies held by Greenpeace UK.
 120. Tandon S (2016)
 121. Rogers C (2018)
 122. Lee T (2015)
 123. Bruckner M et al (2019)
 124. Mielke (2018)
 125. Mielke (2018)
 126. Including so-called 'distillers dried grains' (a byproduct of ethanol production), which represented nearly 8% of annual maize production in 2018. Source: National Corn Growers Association website, 'World of corn: Corn usage by segment 2018'
 127. Domestic soya oil consumption was at 10.4 million tonnes in 2018 (source: USDA Foreign Agricultural Service website 'PSD Online'). Domestic biodiesel demand was estimated to account for 3.3 million tonnes of soya oil in 2018 (source: Mielke (2018)), which is less than 3% of the 2018 domestic soya production of 124 million tonnes (source: USDA Foreign Agricultural Service website 'PSD Online').
 128. Nestlé (2019a)
 129. Starbucks (2018) and Logan B (2018)
 130. Dunkin' Donuts (2018)
 131. Escobar N et al (2018)
 132. European Bioplastics (2018)
 133. Coca-Cola website 'Sustainability: PlantBottle™ packaging'
 134. Barrett A (2018)
 135. Nestlé (2017)
 136. See eg Weinberger H (2014), Gendell A (2016), Cho R (2017), Braskem website 'I'm green™ Polyethylene' and Gotro J (2013)

137. See Suaria G et al (2016)
138. And conversely, some fossil-based plastic can be designed to be biodegradable.
139. Climate Advisers (2013) p15
140. Gibbs HK et al (2015)
141. 23.3 million ha in 2010 to 33.9 million ha in 2017. Source: FAOSTAT website 'Crops'
142. Indonesian production in the 2010/11 growing season totalled 23.6 million tonnes, and in 2017/18 it reached 41.5 million tonnes. Source: USDA Foreign Agricultural Service website 'PSD Online'.
143. FAOSTAT website 'Crops'
144. Global Forest Watch (2019b). Analysis by Greenpeace.
145. FAO (2018). Data were accessed via the online database linked to this report (<http://www.fao.org/global-perspectives-studies/food-agriculture-projections-to-2050/en>). All figures used refer to the business-as-usual scenario, comparing the base year 2012 with 2050 projections.
146. Alexandratos N & Bruinsma J (2012) p74 Table 3.4
147. Mielke (2018)
148. EU imports in 2010/11 totalled 4,944 thousand metric tonnes, and in 2017/18 reached 7,057 thousand metric tonnes. Source: USDA Foreign Agricultural Service website 'PSD Online'.
149. Transport & Environment (2018)
150. Suroyo G & Diela T (2018)
151. Cargill (2017)
152. Total (nd)
153. Rosendahl J (2018)
154. Greenpeace International (2018a)
155. Ship & Bunker (2019)
156. Natural Resources Defense Council, Dogwood Alliance and Southern Environmental Law Centre (2017)
157. Drax website 'Environment'
158. Eurostat online database 'International trade'
159. Drax website 'Environment'
160. Viewed on a 100-year timescale. Source: Stephenson A & MacKay D (2014) p13
161. Laganière J et al (2017)
162. Drax (2019). Based on Renewable Obligation Certificates (ROCs) sales of £665m (p36) and Contract for Difference income of £321.5m (p126); explanations in source.
163. Hancock T (2017)
164. Feng E (2017)
165. Dalugdug AJ (2018)
166. Tandon S (2016)
167. See eg Agarwal S (2016) and The Economic Times (2018)
168. BBC (2018)
169. Mondelez International (2018)
170. Ren D (2017)
171. Nestlé (2019a)
172. Ben & Jerry's (2019)
173. Mijnheer D (2019) and Serious Fraud Office (2019b)
174. Greenenergy website 'Home'
175. Serious Fraud Office (2019b)
176. Serious Fraud Office (2019a)
177. European Network of Scientists for Social and Environmental Responsibility (2019)
178. Magnusson WE et al (2018) p2
179. Pignati WA et al (2017)
180. Soares de Almeida V (2017)
181. Cerdeira AL et al (2010)
182. Meyer DE & Cederberg C (2010) p6
183. Brito R, Mano A & Spring J (2018)
184. Carneiro Filho A (2018)
185. As of 30 May 2019. See Diário Oficial da União (2019a–h)
186. Câmara dos Deputados website 'PL 6299/2002'
187. Forbes website '#1605 Blairo Maggi'
188. Firpo de Souza Porto M (2018)
189. Firpo de Souza Porto M (2018)
190. Greenpeace Brazil analysis based on official records of approvals since 2010.
191. Sánchez-Bayo F & Wyckhuys KAG (2019)
192. Casado J et al (2019) p1204
193. Silva V et al (2019)
194. FAO (2017), pvii
195. Steffen W et al (2015)
196. Campbell BL et al (2017)
197. WWF (2017b) and WWF (2018a)
198. WWF (2018a) p6
199. I UCN (2018)
200. The global use of pesticides in agriculture has nearly doubled between 1990 and 2016, from 3.1 to 5.9 million tonnes. Source: FAOSTAT website 'Pesticides'
201. Roy DB et al (2003)
202. Sánchez-Bayo F & Wyckhuys KAG (2019)
203. Clothianidin, imidacloprid and thiamethoxam. See European Commission website 'Neonicotinoids'.
204. FAOSTAT website 'Pesticides'
205. Díaz S et al (2019)
206. A number of GM crops have been developed to have resistance to a variety of herbicides, including canola, maize, rice, sugar beet, and wheat. See Green JM & Owen MDK (2011)
207. International Service for the Acquisition of Agri-biotech Applications (2017) p100
208. Cordonnier M (2018) and International Service for the Acquisition of Agri-biotech Applications (2017) pp16–17, 21
209. See Marinho CD et al (2014) p5222, Cattelan AJ & Dall'Agnol A (2018) and International Service for the Acquisition of Agri-biotech Applications (2018).
210. International Service for the Acquisition of Agri-biotech Applications (2017) p17
211. International Service for the Acquisition of Agri-biotech Applications (2017) p17
212. In Argentina, pesticide application rates increased from 1.93 kg/ha in 1996 to 5.17 kg/ha in 2016, whilst in Brazil, rates increased from 1.55 kg/ha to 4.31 kg/ha. Source: FAOSTAT website 'Pesticides'
213. IPCC (2014a), see eg p384
214. EPA website 'Understanding global warming potentials'
215. 0.68 GtCO₂e/yr. The 12% includes direct agriculture emissions, not emissions from land-use change. Source: IPCC (2014a) p823
216. Breitburg D et al (2018)
217. National Oceanic and Atmospheric Administration (2017)
218. UN Convention to Combat Desertification (2017)
219. Smit LAM & Heederik D (2017)
220. Smit LAM & Heederik D (2017)
221. UN Environment (2017)
222. GRAIN (2016)
223. Global Witness (2018)
224. Minow Smith D (2015)
225. Department for International Development (2015) p12
226. Díaz S et al (2019) p7
227. Bayu DJ (2019)
228. MapBiomass Project v3.1 'Annual land use land cover maps of Brazil'
229. MapBiomass Project v3.1 'Annual land use land cover maps of Brazil'
230. The Amazon biome is defined by its plant and animal communities, which share similar environmental and geoclimatic conditions and history, resulting in its own particular biological diversity. Source: Instituto Brasileiro de Geografia e Estatística (IBGE) website 'Mapa de biomas e de Vegetação'
231. MapBiomass Project v3.1 'Annual land use land cover maps of Brazil'
232. MapBiomass Project v3.1 'Annual land use land cover maps of Brazil'
233. FAO (2005)
234. Tyukavina A et al (2017) p3 Table S2A
235. Gibbs HK et al (2015)
236. Greenpeace (2006)
237. Adario P (2016)
238. Greenpeace (2014)
239. Greenpeace (2014)
240. Watts J (2017)
241. Estrada Patiño R (2017)
242. Average annual deforestation in the 95 soya-producing municipalities monitored by the Soy Moratorium between 2008/09 to 2017/18 was 5.2 times lower than between 2001/02 to 2007/08. Source: ABIOVE & Agrosatélite (2018) p20
243. ABIOVE & Agrosatélite (2018) p15 and Kastens JH et al (2017)
244. ABIOVE & Agrosatélite (2018) p18
245. Fearnside P (2017) and Gollnowa F et al (2018)
246. Jornal Económico com Lusa (2018)
247. Bolsonaro F & Bittar M (2019) and Agência Senado (2019)
248. Azevedo AA et al (2017)
249. Freitas G Jr & Freitas T (2018)
250. Mano A (2019)
251. Ricupero R et al (2019)
252. Dias BFS (1982)
253. Strassburg B, Brooks T & Feltran-Barbieri R (2017)
254. Ministry of the Environment (2017) p65

255. WWF (2017a) p2
256. MapBiomias Project v3.1 'Annual land use land cover maps of Brazil'
257. Critical Ecosystem Partnership Fund (2017) pp146–151
258. MapBiomias Project v3.1 'Annual land use land cover maps of Brazil'
259. 88.2 million ha. Source: CIA website 'The World Factbook'
260. Critical Ecosystem Partnership Fund (2017) pp51–52
261. 24.3 million ha. Source: CIA website 'The World Factbook'
262. MapBiomias Project v3.1 'Annual land use land cover maps of Brazil'
263. MapBiomias Project v3.1 'Annual land use land cover maps of Brazil'
264. Input Brasil website 'Regions: MATOPIBA'
265. USDA (2012)
266. Carneiro Filho A & Costa K (2016) p9
267. ABIOVE (2007) p10
268. Trase (2018b)
269. Trase (2018a); see also Chain Reaction Research (2018a,b) and Chain Reaction Research (2019)
270. Spring J (2018a)
271. Repórter Brasil (2017)
272. Milhorance F (2018)
273. Milhorance F (2018)
274. Agronegócio Estrondo website 'Geografia'
275. Rio de Janeiro 126,000ha, São Paulo 152,300ha. Source: AboutBrasil website, 'Top 10 largest cities in Brazil'
276. According to the Department of Federal Revenue of Brazil (Receita Federal), Delfin Rio S/A Crédito Imobiliário (CNPJ 33.923.848/0001-41) was created on 20 November 1972 in Rio de Janeiro and Ronald Guimarães Levinsohn is the only owner. See Receita Federal website 'Consulta Quadro de Sócios e Administradores – QSA' and 'Emissão de comprovante de inscrição e de situação cadastral'
277. Property number 736, acquired 30 December 1978. Originally registered in Santa Rita de Cássia and then changed to Formosa do Rio Preto. See Neto MRC (2018) pp7, 18, copy held by Greenpeace Brazil
278. See Ministry of Land Policy and Agrarian Reform (1999) p27
279. When Levinson's Delfin group collapsed in the early 1980s, the federal bank Caixa took on the debt of 6 billion cruzeiros. In 1991, Levinsohn agreed to pay 300 million reais over 13 years to maintain control of what was left of the debt-ridden company; this sum was never paid. Source: de Oliveira S (2018)
280. In 2016, the Federal Public Ministry in Rio de Janeiro (MPF/RJ) accused Levinsohn and 15 others of criminal association and crimes against the financial system for the sale of securities to Brazil's Postales and Petros (Petrobrás) funds. The 'Operation Fresh Star' investigation uncovered that some 90 million Brazilian reais had been diverted from these funds. See Federal Public Ministry (2016) and Veja (2016). See also eg Vieira L & Araújo V (2014) Schmidt S (2017)
281. Neto MRC (2018) p6. Copy held by Greenpeace Brazil.
282. Delfin Rio S/A Crédito Imobiliário and Cia de Melhoramentos do Oeste da Bahia. See Agronegócio Estrondo website 'Administração'
283. Public registry profiles show that Delfin Crédito Imobiliário S/A and Companhia de Melhoramentos do Oeste da Bahia (CMOB) are owned by the family. The ultimate owner of Colina Paulista S/A (CNPJ 68.756.444/0001-95) is Tamzim Trading Ltd, which is registered in the British Virgin Islands. União de Construtoras S/A (CNPJ 43.938.885/0001-87) is now called Druida de Desenvolvimento Ltda. Its ultimate owner, Giacometti Investments S/A, is based in Panama. Source: Receita Federal website 'Consulta Quadro de Sócios e Administradores – QSA'
284. The registry profile (copy held by Greenpeace) shows that União de Construtoras S/A changed its name to Druida de Desenvolvimento in March 2011.
285. The three companies being sued by the community are Cia Melhoramentos do Oeste da Bahia, Colina Paulista and Delfin [sic] Crédito Imobiliário. Source: Alvarenga MF (2017) p1. Copy held by Greenpeace Brazil.
286. Neto MRC (2018) p18. Copy held by Greenpeace Brazil.
287. Greenpeace mapping analysis May 2019
288. Comissão Pastoral da Terra (2019)
289. Reimberg M (2009)
290. Ibama website 'Consulta de autuações ambientais e embargos'
291. See Reimberg M (2009) and Comissão Pastoral da Terra (2005).
292. Associação de Advogados/as de Trabalhadores/as Rurais (2019)
293. Associação de Advogados/as de Trabalhadores/as Rurais (2019)
294. Auto de infração no. 2018-004964/TEC/AIMU – 0388, issued 28 May 2018 by INEMA (Instituto de Meio Ambiente e Recursos Hídricos). Copy held by Greenpeace Brazil.
295. On 3 May 2017, a maintenance order – 'liminar de manutenção de posse' – in favour of the geraizeiro communities was issued (see Alvarenga MF (2017), copy held by Greenpeace Brazil). This decision was reconfirmed on 13 November 2018 and 5 February 2019; see Neto JCL (2018) and Batista JPS (2019), copies held by Greenpeace Brazil. For a history of the legal cases see Associação de Advogados/as de Trabalhadores/as Rurais (2019).
296. Batista JPS (2019) pp20–21. Copy held by Greenpeace Brazil.
297. Associação de Advogados/as de Trabalhadores/as Rurais (2019)
298. Milhorance F (2019) and Silva U (2019); see <https://youtu.be/VTSPWuJlqL0>
299. Neto J (2019a). The same article contains a report by the Association of Lawyers for Rural Workers stating that this community leader had been intimidated before, on the evening of 6 June 2018, when Estrela Guia, with illegal support from local police, invaded his home and detained him on the same grounds. The community leader is one of the 11 geraizeiros who represent the community in the legal action against the three companies that claim ownership of land within the Estrondo estate.
300. Neto J (2019b)
301. Associação de Advogados/as de Trabalhadores/as Rurais (2019)
302. Release order and terms of conduct number 0000254-45.2019.805.0081
303. Personal communication between community members and Greenpeace staff, 28 May 2019
304. Release order and terms of conduct number 0000254-45.2019.805.0081
305. Secretary of Environment and Sustainable Development (2018) pp452–454
306. MapBiomias Chaco Project (2019)
307. Company Action on Deforestation (2018) p1
308. Encyclopaedia Britannica website 'Gran Chaco'
309. WWF website 'Gran Chaco'
310. NASA Earth Observatory website 'Deforestation in Paraguay'
311. Global Forest Watch website 'Gran Chaco deforestation' and Baumann M et al (2016)
312. 26.9 million ha. Source: MapBiomias Chaco Project (2019)
313. Gross forest loss. Source: MapBiomias Chaco Project (2019)
314. Tree cover loss data: Global Forest Watch (2019b). Based on Hansen MC et al (2013), analysis by Greenpeace.
315. Barros CJ, Campos A & Griffin J (2018) and Repórter Brasil (2018)
316. Volante J & Seghezzo L (2017) and Illegal Deforestation Monitor (2019)
317. Joseph K (2019) p2
318. FAO STAT website 'Livestock primary'
319. UN Comtrade Database
320. Carcass weight equivalent. Source: Joseph K (2019) p2
321. Joseph K (2019) p2
322. UN Comtrade Database
323. Raguzzi MS (2017) p1
324. Analysis by Greenpeace based on University of Maryland (2019). States including part of the Chaco used in this analysis: Chaco, Córdoba, Formosa, Salta, Santa Fe, Santiago del Estero and Tucumán.
325. MapBiomias Chaco Project (2019)
326. See eg Greenpeace Argentina (2016), Greenpeace Argentina (2018) and Greenpeace Argentina (2019)
327. Greenpeace Argentina (2016)
328. Mapping analysis by Greenpeace Argentina. See Greenpeace Argentina (2016) p13.
329. In 2013, Verra admitted to clearing the land. Source: Colonisation Institute (2013a). Fragment viewable in Greenpeace Argentina (2016), p14
330. See eg Bloomberg website 'Alberto Esteban Verra' and Infobae (2018)
331. See Pagina/12 (2019) and Penacca PA (2019)
332. National Forestry Department (2009). Fragment viewable in Greenpeace Argentina (2016), p14

333. On 21 October 2011, the National Forestry Department informed the Colonisation Institute that 'the commission of the violation of the forest zoning is confirmed, but the value of the fine is corrected ... to be dated from the date the infringement is detected on satellite image rather than from the time when the violation is actually committed'. Source: National Forestry Department (2011). Fragment viewable in Greenpeace Argentina (2016), p14
334. Colonisation Institute (2013a). Fragment viewable in Greenpeace Argentina (2016), p14. Currency conversion at rates as of January 2013.
335. Colonisation Institute (2013a). Fragment viewable in Greenpeace Argentina (2016), p14
336. Colonisation Institute (2013b). Fragment viewable in Greenpeace Argentina (2016), p14
337. Decree 2121/2013, 24 December 2013. See Mandela Centre (2017)
338. See Ministry of Environment and Sustainable Development (2017)
339. Eg in Chaco Province (see REDAF (2018)) and Salta Province (see Greenpeace Argentina (2016) p7 and Greenpeace Argentina (2018) p18)
340. Eg in Santiago del Estero Province (see Greenpeace Argentina (2016) p17)
341. Eg in Santiago del Estero Province (see Greenpeace Argentina (2016) p15)
342. Eg in Formosa Province (see Greenpeace Argentina (2016) p9)
343. Forest zoning (Ordenamientos Territoriales de Bosques Nativos (OTBN)) by Province. See Ministry of Environment and Sustainable Development (2017) p6
344. Based on data from the Ministry of Environment and Sustainable Development; see Greenpeace Argentina (2016) pp9–10
345. Secretary of Environment and Sustainable Development (2018) pp435, 473
346. Secretary of Agro-Industry & Ministry of Production and Labour (2018) p55
347. Gobierno de Formosa website 'Producción sustentable: Programa ganadero provincial'
348. Subsecretary of Natural Resources of Chaco Province (2017a). Fragment viewable in Greenpeace Argentina (2018), p11
349. Greenpeace Argentina (2019)
350. Subsecretary of Natural Resources of Chaco Province (2017b). Fragment viewable in Greenpeace Argentina (2019), p2
351. NOVA Chaco (2019)
352. Secretary of Agro-Industry & Ministry of Production and Labour (2018) p20
353. Gobierno del Pueblo de la Provincia del Chaco (2016) pp21–23 and Secretary of Environment and Sustainable Development (2018) p473
354. Diario Norte (2017)
355. Greenpeace Argentina analysis for the 2015–2017 period. See Greenpeace Argentina (2018) p18
356. Crump J, ed (2016) p6
357. IUCN (2017)
358. Crump J, ed (2016) p6
359. IUCN (2017)
360. Joosten H (2015) p6 and Crump J, ed (2016) p34
361. Including emissions from decomposition and fires. Source: Joosten H (2015) p6; see also IPCC (2014a) p828
362. Greenpeace mapping analysis based on peat area (Ritung S et al (2011)) and 2017 forest cover (Indonesian Ministry of Environment and Forestry, National Forest Monitoring System (NFMS) (2018)).
363. Harris N et al (2015) and Global Fire Emissions Database (GFED) website '2015 fire season: Emissions estimates'
364. Koplitz SN et al (2016)
365. Curtis PG et al (2018) p2
366. Austin KG et al (2017) pp42–43, 46
367. Chain Reaction Research (2017)
368. Global Forest Watch website 'Dashboards – Indonesia'
369. See Ancrenaz M et al (2016), Singleton I et al (2017) and Nowak MG et al (2017).
370. Hooijer A et al (2006) p6
371. Austin KG et al (2017) p43
372. Indonesian Ministry of Environment and Forestry (2015) pp37, 40
373. World Bank Group (2016)
374. Koplitz SN et al (2016). The study focused on adult mortality 'due to lack of knowledge on the effects of air pollution on child mortality' but acknowledged that 'impacts on children are likely significant'.
375. Harris N et al (2015) and Global Fire Emissions Database (GFED) website '2015 fire season: Emissions estimates'
376. In early May 2019, the Deputy of Food and Agriculture Coordination of the Coordinating Ministry for Economic Affairs Musdalifah Machmud reportedly sent a letter to the Chair of the Indonesian Palm Oil Board (DMSI), Chair of the Indonesian Palm Oil Entrepreneurs Association (GAPKI) and heads of companies in the palm oil sector. Sources: CNN Indonesia (2019b) and Jong HN (2018)
377. CNN Indonesia (2019c)
378. In 2010, during the government of President Yudhoyono, plans were laid to make land management information public through the so-called 'One Map' policy. This was to include not just plantation and farming permit (HGU) data, but also other forms of land rights including indigenous and community lands, and commercial concessions for mining and agriculture. Source: Down to Earth (2012)
379. Jong HN (2018)
380. Jacobson P (2017) and Jong HN (2018)
381. Wilmar International (2018)
382. See Bayu DJ (2019)
383. Candra SA (2019b)
384. CNN Indonesia (2019a)
385. European Commission (2019)
386. Regarding entanglement, see eg The Gecko Project & Mongabay (2019)
387. Shah V (2016)
388. In April 2018 Iceland pledged to remove palm oil from all its own-brand foods by the end of the year. See Smithers R (2018)
389. See Kemaritaman Majalah Triwulan (2018) p17 and AntaraNews.com (2018)
390. Candra SA (2019a)
391. Saputro W (2019)
392. Firman M (2017)
393. CNN Indonesia (2019b)
394. See Greenpeace International (2018a)
395. Greenpeace (2018a) pp80–85
396. Greenpeace (2018a) pp80, 82
397. Greenpeace (2018e)
398. Kuok KH et al (2018)
399. Correspondence between Greenpeace International and companies, January to May 2019. Copies held by Greenpeace.
400. Greenpeace (2018a) pp20–21
401. Greenpeace Southeast Asia (2017)
402. Verification of NDPE compliance should be conducted by an independent third party using the Palm Oil Innovation Group (POIG) Verification Indicators or equivalent; see POIG (2016)
403. Wilmar International (2013)
404. FAO (2015). For CO₂ equivalence, see https://cdiac.ess-dive.lbl.gov/trends/emis/top2014_tot (C value * 3.67 for conversion to CO₂); source: Boden TA, Marland G & Andres RJ (2017)
405. Dargie GC et al (2017)
406. Nasi R, Taber A & van Vliet N (2011)
407. WorldAtlas website 'Animals of the Congo Basin in Africa'
408. Mayaux P et al (2013)
409. Greenpeace Africa (2017)
410. Potapov PV et al (2017)
411. Analysis of FSC concessions with valid forest management certificates in September 2017 from Greenpeace Africa (2017).
412. Greenpeace (2011)
413. Dargie GC et al (2018)
414. Mayaux P et al (2013)
415. Weisse M & Dow Goldman E (2019)
416. Curtis PG et al (2018)
417. 70% of tree cover loss within primary and mature secondary forest between 2000 and 2014. Source: Tyukavina A et al (2018)
418. Trefon T (2016)
419. Transparency International (2018)
420. Global Witness (2017)
421. Environmental Investigation Agency (2019b) p14. Analysis based on data from OFAC Monitoring System website 'Forest concessions'.
422. Environmental Investigation Agency (2019b) pp18–48
423. Environmental Investigation Agency (2019b) p21
424. Environmental Investigation Agency (2019b) p22
425. Environmental Investigation Agency (2019b) pp30–34
426. Environmental Investigation Agency (2019b) pp36–40
427. Environmental Investigation

- Agency (2019b) pp5, 41–43
428. Environmental Investigation Agency (2019b) pp45–47
429. Environmental Investigation Agency (2019b) pp28–29
430. Environmental Investigation Agency (2019b) pp13, 48
431. Environmental Investigation Agency (2019b) pp49–57, 67
432. Environmental Investigation Agency (2019b) pp49, 54–55
433. FAOSTAT website 'Crops'
434. European Commission (2018) p69
435. European Commission (2018) p92
436. European Commission (2018) p70
437. WWF website 'Transforming the global rubber market'
438. Halcyon Agri (2018a) p19
439. Halcyon Agri (2018a) p7
440. Greenpeace Africa (2018) pp2–3
441. AGRECO-CEW (2013) pp17–19
442. Mbolo M (2013)
443. Based on analysis of satellite imagery by Greenpeace Africa.
444. See Assembe-Mvondo S, Putzel L & Eba'a Atyi R (2015) pp9–10 and GMG Global Ltd (2010)
445. According to a 2016 company document seen by Greenpeace Africa. See Greenpeace Africa (2018) pp8–9
446. Meyer R (2018b)
447. Meyer R (2018a)
448. See Greenpeace Africa (2018) pp8–10.
449. Osuna Orozco A & Salber M (2019) pp24, 27
450. Among its shortcomings are a complete lack of reference to habitat and species surveys performed in the field, the IUCN Red List of Threatened Species, HCV and HCS areas or potential impacts on the Outstanding Universal Value of the adjacent World Heritage Site, as well as a failure to include maps of customary land rights/uses or to address the FPIC of indigenous peoples in the project area or the economic value of the forest to their communities. See Greenpeace Africa (2018)
451. Enviro Consulting (2011) p31
452. Maisels F, Bergl RA & Williamson EA (2018) and Cheek M & Cable S (2000)
453. UNESCO World Heritage Centre website 'Dja Faunal Reserve'
454. UNESCO World Heritage Centre website 'State of conservation: Dja Faunal Reserve (Cameroon)'
455. Maziz L, Diedhiou Y & Lethier H (2012) p19
456. UNESCO World Heritage Centre website 'State of conservation: Dja Faunal Reserve (Cameroon)'
457. GMG Global Ltd (2016) p10
458. Greenpeace Africa (2018) p10
459. Norges Bank (2019)
460. Council on Ethics of the Government Pension Fund Global (2018)
461. Halcyon Agri (2018b)
462. Corrie MacColl website 'What we do: Plantations'
463. Corrie MacColl & Halcyon Agri (2019)
464. Corrie MacColl & Halcyon Agri (2019)
465. Fritts R (2019).
466. Corrie MacColl & Halcyon Agri (2019)
467. CIRAD website 'Unité de recherche Performance des Systèmes de Culture des Plantes Pérennes: Principaux partenaires'
468. Halcyon Agri (2018a) p30
469. Based on production for 2016–2017 (63%) and estimated production for 2017–2018 (61%). Source: International Cocoa Organization (2019)
470. FAOSTAT website 'Crops'
471. Higonnet E, Bellantonio M & Hurowitz G (2017) pp6–7. See <http://www.mightyearth.org/chocolatesdarksecretcitations/> note 17 for basis of calculation.
472. 23.5% of total forest loss between 1990 and 2015 has been attributed to cocoa production. Source: BNETD, EtcTerra, RONGEAD & ONU-REDD (FAO/PNUD/PNUJ) (2016) p14
473. Calculated by Mighty Earth on the basis of government mapping. Source: Higonnet E, Bellantonio M & Hurowitz G (2017) p12
474. FAOSTAT website 'Crops'
475. Higonnet E, Bellantonio M & Hurowitz G (2017) p4 citing Kroeger A et al (2017)
476. Higonnet E, Bellantonio M & Hurowitz G (2017) p10
477. Higonnet E, Bellantonio M & Hurowitz G (2017) p7 citing Bitty AE et al (2015)
478. Higonnet E, Bellantonio M & Hurowitz G (2017) p7
479. Defined as being engaged in hazardous work and/or exceeding the maximum allowable working hours for children of their age.
480. Global Slavery Index website 'Cocoa'
481. The Global Slavery Index acknowledges that its estimates do not include children forced to work by parents who are themselves in forced labour, and may therefore underestimate the overall total as defined in ILO terms. However, as the Global Slavery Index also explains, while the ILO definition of child forced labour includes situations where children are forced to work by relatives other than their parents, in the cultural context of Côte d'Ivoire and Ghana 'relatives other than parents (for instance, aunts, uncles, siblings, grandparents) are often primary caregivers who take on the role of parent and make decisions for the child'. Accordingly the Global Slavery Index also provides an estimate of the number of children forced to work by someone who was not a family member: roughly 1,000 children fell into this category, all of them in Ghana. Source: Global Slavery Index website 'Cocoa'.
482. Fountain AC & Hütz-Adams F (2018) p2
483. Global Slavery Index website 'Cocoa'
484. Global Slavery Index (2018)
485. Human Rights Watch (2013)
486. Global Witness (2007)
487. Higonnet E, Bellantonio M & Hurowitz G (2017) p16
488. Higonnet E, Bellantonio M & Hurowitz G (2017) pp8–11. For links between the traders and the chocolate companies named (among others), see <http://www.mightyearth.org/chocolatesdarksecretcitations/>
- 'Annex: supply chain references'
489. Higonnet E, Bellantonio M & Hurowitz G (2017) p12
490. World Cocoa Foundation website 'Cocoa & Forests Initiative'
491. Higonnet E et al (2018) pp3, 5
492. Gauthier S et al (2015) and Bradshaw CJA & Warkentin IG (2015)
493. Bradshaw CJA & Warkentin IG (2015)
494. FAOSTAT website 'Forestry production and trade'
495. FAOSTAT website 'Forestry production and trade'
496. Baffoni S (2019)
497. Environmental Paper Network 'EPN pulp mills map'
498. 30% as of 2010, according to Keenan RJ et al (2015) Table 1; 27% as of 2000 according to Hansen MC, Stehman SV & Potapov PV (2010) Table 1
499. Morales-Hidalgo O, Oswalt SN & Somanathan E (2015) Figure 6
500. Greenpeace USA (2017)
501. Forest Stewardship Council Canada (2016) p2
502. The term 'Indigenous Cultural Landscapes' (ICLs) refers to 'living landscapes to which Indigenous peoples attribute social, cultural, and economic value because of their enduring relationship with the land, water, fauna, flora and spirits, and their present and future importance to their cultural identity. An ICL is characterized by features that have been maintained through long-term interactions with the landscape based on land-care knowledge, and adaptive livelihood practices. They are landscapes over which Indigenous peoples exercise responsibility for stewardship.' Definition adopted by Forest Stewardship Council Canada (2016).
503. Gunn A (2016)
504. Lakehead University Faculty of Natural Resources Management (2014)
505. See Bergeron Y & Fenton NJ (2012), Boudreault C et al (2002) and Esseen PA et al (1997)
506. Ahlkrona E, Giljam C & Wennberg S (2017)
507. Ahlkrona E, Giljam C & Wennberg S (2017) and Larsson A, ed (2011)
508. Ahlkrona E, Giljam C & Wennberg S (2017) p11
509. ArtDatabanken (2015) p15
510. SCA website 'Our business'
511. SGS Qualifor (2016) p41
512. Sámiid Riikkasearvi/SSR (2018) p4
513. SCA (2019a)
514. FAO (2016)
515. The Sámi's status as an indigenous people received legislative recognition in 1977. On 1 April 2000 Sweden officially recognised the Sámi as a national minority. See Minority Rights Group International website 'Sami'
516. See Sámiid Riikkasearvi/SSR website and Sámiid Riikkasearvi/SSR (2018)
517. SCA (2019b)
518. Larsson U (2017)
519. See eg Fact.MR (nd) or Pelfonel J (2016)
520. SCA (2018)
521. SCA (2017) p65

522. EUWID (2019)
523. Source: Greenpeace research, as well as engagement with Essity and Sofidel
524. Essity website 'Brands'
525. Kimberly-Clark website 'Our brands'
526. Sofidel website 'Brands & products'
527. SCA (2015) p21
528. DS Smith (2017)
529. Holmes L (2018) and DS Smith (2018) p8
530. See eg DS Smith website 'Your source for Frustration Free Packaging' and Oliver M (2017)
531. Source: Greenpeace research and engagement with IKEA
532. Spawn SA, Lark TJ & Gibbs HK (2019)
533. FAO STAT website 'Crops' and 'Crops and livestock products'
534. USDA website 'Soybeans & Oil Crops' and Smith LH (2015)
535. Lane J (2019)
536. USDA National Agricultural Statistics Service (2018b) p17 Table 3-35
537. USDA National Agricultural Statistics Service (2018a) p29 Table 1-41
538. On the basis of 2016 figures. Source: FAO STAT website 'Crops' and 'Crops and livestock products'
539. USDA Foreign Agricultural Service (2018)
540. USDA Foreign Agricultural Service (2019)
541. Including 'distillers' dried grains' (a byproduct of both fuel ethanol and beverage alcohol production – see for example Powers et al (1995) pp388–389), which equated to nearly 8% of annual maize production in 2018. Source: National Corn Growers Association website 'World of corn: Corn usage by segment 2018'
542. US soya production in 2016 was 116.9 million tonnes (source: FAO STAT website 'Crops'). During the 2016/17 marketing year, it is estimated that 28.3 million tonnes (31.2 million short tons) of soya meal and 2.4 million tonnes (2.7 million short tons) of soya hulls were fed to US animals (source: Decision Innovation Solutions (2018) p6), equating to 30.7 million tonnes or 26.3% of domestic production.
543. National Corn Growers Association website 'World of corn: Corn usage by segment 2018'
544. Domestic soya oil production in 2014 (the most recent year for which figures are available) was 9.71 million tonnes, which net of imports (69,600 tonnes) and exports (892,000 tonnes), and assuming for simplicity that oil was used within the year of production or importation, gives an estimated domestic consumption of 8.88 million tonnes (source: FAO STAT website 'Crops processed' and 'Crops and livestock products'). Domestic biodiesel demand is said to account for over 25% of US soya oil use (source: United Soybean Board (2018)), giving a figure of at least 2.22 million tonnes, which is roughly 2% of the total 2014 domestic soya production of 106.9 million tonnes (source: FAO STAT website 'Crops').
545. National Corn Growers Association website 'World of corn: Corn usage by segment 2018'
546. FAO STAT website 'Crops'
547. WWF (2018b) pp1–2
548. Wright CK & Wimberly MC (2013)
549. Green TR et al (2018)
550. Lark T et al (2018) pp1–2
551. Spawn SA, Lark TJ & Gibbs HK (2019) p6
552. Spawn SA, Lark TJ & Gibbs HK (2019) p1
553. Spawn SA, Lark TJ & Gibbs HK (2019) p4
554. EPA website 'Greenhouse gas equivalencies calculator'
555. Spawn SA, Lark TJ & Gibbs HK (2019) p5
556. Spawn SA, Lark TJ & Gibbs HK (2019) p6
557. WWF (2016) pp4–5
558. WWF (2018b) pp1, 5
559. Donner S (2009) and Peiyu C, Lu C & Yu Z (2018)
560. National Oceanic and Atmospheric Administration (2017)
561. See eg Breitburg D et al (2018) and McLellan E (2015)
562. National Oceanic and Atmospheric Administration (2017)
563. Houghton RA et al (2015)
564. FAO (2018) pix
565. IPCC (2014a) p820 Figure 11.2
566. Mighty Earth subsequently suspended the Olam complaint following negotiations with Olam, which led to a decision by the group to implement a moratorium on further deforestation for oil palm and rubber plantations and a group-wide NDPE policy. The complaint is still suspended, pending the outcome of further remediation steps to be taken by Olam (source: personal communications with Mighty Earth, 2 June 2019). The outcome of the Korindo complaint is pending a final decision by the FSC Board of Directors (source: personal communications with Mighty Earth, 2 June 2019). For FSC rules, see FSC (2015) p44 and FSC (2011) pp4–5. For details on the complaints, see Mighty Earth (2016), FSC website 'Korindo Group' and Mighty Earth (2019)
567. UN (2011)
568. UN (2007)
569. Such as Federasi Serikat Pekerja Minamas et al (2015)
570. See CLARA (2018) for guiding principles for forest landscape restoration. This excludes monoculture plantations.
571. IPCC (2018a) p114
572. See Griscom BW et al (2017b) pp7–11 Table S1
573. 49 GtCO₂e in 2010. Source: IPCC (2014a) p6. The mitigation potential of the land sector should not be used as an argument for offsetting fossil-fuel emissions against carbon uptake by living systems (the biosphere). The fossil and biosphere carbon cycles are not comparable. Carbon released or absorbed by vegetation and soils is part of a 'fast' cycle of carbon movement between atmosphere, land surface and oceans, on timescales measured in years or decades, whereas burning fossil fuel introduces carbon to the biosphere which was previously buried for millions of years. This fossil carbon can only be removed on geological ('slow') timescales. Enhancing carbon uptake by the biosphere is thus best seen as restoration of the loss of carbon from the biosphere within recent decades through deforestation and other processes. Biosphere carbon is not permanently 'locked up' and remains far more vulnerable to future events such as forest fire than fossil carbon left in the ground. Source: IPCC (2013) p470
574. See Griscom BW et al (2017a) and Project Drawdown website 'Land Use Sector summary'
575. IPCC (2018b)
576. New York Declaration on Forests (2014)
577. Lewis SL et al (2019)
578. Potapov PV et al (2012) and Potapov PV et al (2014)
579. Lewis SL et al (2019)
580. See eg IPBES (2018) p36.
581. Lewis SL et al (2019) p26
582. IPCC (2018c) p16
583. Based on FAO STAT website 'Selected indicators: World'
584. New York Declaration on Forests (2014)
585. The world's ice-free land area totals approximately 13.2 billion ha. There were 284 million ha of agricultural land in Brazil in 2016 (source: FAO STAT website 'Selected indicators: Brazil') and 57 million ha in Indonesia (source: FAO STAT website 'Selected indicators: Indonesia').
586. IPCC (2018a) pp97, 144
587. Alexandratos N & Bruinsma J (2012) p74 Table 3.4
588. Alexandratos N & Bruinsma J (2012) p75 Table 3.5
589. Alexandratos N & Bruinsma J (2012) pp75–78
590. FAO (2018). Data were accessed via the online database linked to this report (<http://www.fao.org/global-perspectives-studies/food-agriculture-projections-to-2050/en>).
591. See eg Tandon S (2016), Rogers C (2018) and Lee T (2015)
592. Willett W et al (2019) p2
593. See Greenpeace (2018c) p14 and EAT-Lancet Commission (2019) p10. For meat, the global planetary health diet in the EAT-Lancet report includes no more than 98 grams of red meat (pork, beef or lamb), 203 grams of poultry and 196 grams of fish per week: a combined total of just over 25 kg per year. For dairy, it includes between 0 and 500 grams per week with a median figure of 250 grams/week, which translates into an annual range of between 0 and 183 kg with a median figure of 91 kg/year. While this is higher than in Greenpeace's vision, it represents a cut of nearly two-thirds from the current average for Europe.
594. Greenpeace (2018c) p14
595. UN (2011) 'Guiding principles on business and human rights: Implementing the United Nations "Protect, Respect and Remedy" framework' United Nations Human Rights Office of the High Commissioner https://www.ohchr.org/documents/publications/GuidingprinciplesBusinesshr_eN.pdf
596. Hansen MC et al (2013). Data also available from <http://earthenginepartners.appspot.com/science-2013-global-forest> and <https://>





23 July 2009,
Kalimantan Indonesia.
©Beltrá/Greenpeace

REFERENCES

- ABIOVE (2007) 'Understanding the soy moratorium: Responsible production' http://www.abiove.com.br/english/sustent/ms_cprodutor_24jul07_us.pdf
- ABIOVE & Agrosatellite (2018) 'Soy moratorium: Monitoring soy crops in the Amazon biome using satellite images' <http://www.abiove.org.br/site/FILES/English/30012019-170116-ingles.pdf>
- About Brasil website 'Top 10 largest cities in Brazil' https://www.aboutbrasil.com/modules/brazil-brasil/top_10_brazil.php?hoofd=11&sub=53&art=1445 accessed 28 May 2019
- Adario P (2016) '10 years ago, the Amazon was being bulldozed for soy. Then everything changed' 16 May 2016 Greenpeace UK <https://www.greenpeace.org.uk/10-years-ago-amazon-was-being-bulldozed-soy-then-everything-changed-20160516/>
- Agarwal S (2016) 'Mondelez looks at double digit growth in chocolates category' 4 August 2016 <https://www.livemint.com/Companies/zcGJe4MeW2sRSiffZBk9mM/Mondelez-looks-at-double-digit-growth-in-chocolates-category.html>
- Agência Senado (2019) 'Chico Rodrigues defende fim de reserva legal em propriedade rural' 15 May 2019 <https://www12.senado.leg.br/noticias/materias/2019/05/15/chico-rodrigues-defende-fim-de-reserva-legal-em-propriedade-rural>
- AGRECO-CEW (2013) 'Rapport de mission n°068/OI/AGRECO-CEW: Dénonciation Meyomessala' http://apvcameroun.cm/images/Rapport-OI-FLEGT-AGRECO-CEW-068_dnon_Hva-Sud_Meyomessala.pdf
- Agriculture & Food (2013) 'Fact file – Danish pig production' https://lf.dk/~media/lf/aktuelt/publikationer/svinekod/engelsk-fact-file-final-opdateret-september-2013.pdf?_a=da
- Agronegócio Estrondo website 'Administração' <http://www.agronegociostrondo.com.br/administracao.html> accessed 4 June 2019
- Agronegócio Estrondo website 'Geografia' <http://www.agronegociostrondo.com.br/geografia.html> accessed 20 May 2019
- Ahlkrona E, Giljam C & Wennberg S (2017) 'Kartering av kontinuitetsskogen i boreal region' <https://www.naturvardsverket.se/upload/miljoarbete-i-samhallet/miljoarbete-i-sverige/regeringsuppdrag/2017/bilaga-3-kartering-av-kontinuitetsskog-boreal-region-20170117.pdf>
- Alexandratos N & Bruinsma J (2012) 'World agriculture towards 2030/2050: The 2012 revision' ESA Working Paper No 12-03, Food and Agriculture Organization of the United Nations, <http://www.fao.org/3/a-ap106e.pdf>
- Alvarenga MF (2017) 'Ação de manutenção de posse' 3 May 2017, process no. 0501082-35.2017.8.05.0022
- Ancrenaz M et al (2016) 'Pongopygmaeus (Bornean orangutan)' <https://www.iucnredlist.org/species/17975/123809220>, the IUCN Red List of Threatened Species, accessed 21 May 2019
- AntaraNews.com (2018) 'Luhut bahas isu sawit dalam kunjungan kerja di Eropa' 24 April 2018 <https://www.antaranews.com/berita/704194/luhut-bahas-isu-sawit-dalam-kunjungan-kerja-di-eropa>
- ArtDatabanken (2015) 'Rödlistade arter i Sverige 2015' Swedish University of Agricultural Sciences (SLU) www.artdatabanken.se/globalassets/ew/subw/artd/2.-var-verksamhet/publikationer/22.-rodlistan-2015/rodlistan_2015.pdf
- Assembe-Mvondo S, Putzel L & Eba'a Atyi R (2015) 'Socioecological responsibility and Chinese overseas investments: The case of rubber plantation expansion in Cameroon' http://www.cifor.org/publications/pdf_files/WPapers/WP176CIFOR.pdf
- Associação de Advogados/as de Trabalhadores/as Rurais (2019) 'Em novo ataque, seguranças da fazenda Estrondo "prendem" gerente de Formosa do Rio Preto (BA)' 26 May 2019 https://www.facebook.com/notes/associa%C3%A7%C3%A3o-de-advogados-as-de-trabalhadores-as-rurais-aatrbahia/em-novo-ataque-seguran%C3%A7as-da-fazenda-estrondo-prendem-gerente-de-formosa-do-r/1020263041509182/?_tn=H-R
- Attenborough D (2018) 'The people's seat address [transcript]' 3 December 2018 COP24 https://unfccc.int/sites/default/files/resource/The%20People%27s%20Address%202.11.18_FINAL.pdf
- Austin KG et al (2017) 'Shifting patterns of oil palm driven deforestation in Indonesia and implications for zero-deforestation commitments' Land Use Policy 69:41–48 https://www.researchgate.net/publication/321432512_Shifting_patterns_of_oil_palm_driven_deforestation_in_Indonesia_and_implications_for_zero-deforestation_commitments/download
- Azevedo AA et al (2017) 'Limits of Brazil's Forest Code as a means to end illegal deforestation' PNAS 114:7653–7658 <https://www.pnas.org/content/early/2017/06/27/1604768114>
- Baffoni S (2019) 'The paper and packaging boom: A growing wave of pulp production threatens the world's forests and climate' 1 March 2019 Environmental Paper Network <https://environmentalpaper.org/2019/03/the-paper-and-packaging-boom-a-growing-wave-of-pulp-production-threatens-the-worlds-forests-and-climate/>
- Bahadoran Z, Mirmiran P & Azizi F (2015) 'Fast food pattern and cardiometabolic disorders: A review of current studies' Health Promotion Perspectives 5(4): 231–240 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772793/>
- Bajzelj B et al (2014) 'Importance of food-demand management for climate mitigation' Nature Climate Change 4:924–928 <https://www.nature.com/articles/nclimate2353.pdf>
- Barrett A (2018) 'Danone uses bioplastics bottle for So Delicious brand' 27 June 2018 Bioplastics News <https://bioplasticsnews.com/2018/06/27/danone-wave-bioplastics-plantbased-bottle-packaging/>
- Barros CJ, Campos A & Griffin J (2018) 'Forced labour in Paraguay: The darkness at the bottom of the global supply chain' 18 September 2018 The Guardian <https://www.theguardian.com/environment/2018/sep/18/forced-labour-in-paraguay-the-darkness-at-the-bottom-of-the-global-supply-chain>
- Batista JPS (2019) 'Ação discriminatória' 5 February 2019, document no. 1902050916203200000018743133, process no. 8000499-51.2018.8.05.0081
- Baumann M et al (2016) 'Carbon emissions from agricultural expansion and intensification in the Chaco' Global Change Biology 23:1902–1916 <https://doi.org/10.1111/gcb.13521>
- Bayu DJ (2019) 'Tolak buka data HGU, Menteri Agraria berdalih lingkungan industri sawit' 6 March 2019 Katadata.co.id <https://katadata.co.id/berita/2019/03/06/tolak-buka-data-hgu-menteri-agraria-berdalih-lingkungan-industri-sawit>
- BBC (2018) 'First ads banned under new junk food rules' 4 July 2018 <https://www.bbc.com/news/uk-44706755>
- Bell D & Shelman M (2011) 'KFC's radical approach to China' Harvard Business Review 89(11): 137–142 <https://hbr.org/2011/11/kfcs-radical-approach-to-china>
- Ben & Jerry's (2019) 'The final straw: Ben & Jerry's announces plan to eliminate single-use plastic in Scoop

- Shops worldwide' 28 January 2019 PR Newswire <https://www.prnewswire.com/news-releases/the-final-straw-ben-jerrys-announces-plan-to-eliminate-single-use-plastic-in-scoop-shops-worldwide-300784504.html>
- Bergeron Y & Fenton NJ (2012) 'Boreal forests of eastern Canada revisited: Old growth, nonfire disturbances, forest succession, and biodiversity' *Botany* 90: 509–523 <https://www.nrcresearchpress.com/doi/10.1139/b2012-034>
- Bitty AE et al (2015) 'Cocoa farming and primate extirpation inside The Ivory Coast's protected areas' *Tropical Conservation Science* 8(1): 95–113 https://tropicalconservationscience.mongabay.com/content/v8/tcs_v8i1_95-113_Bitty.pdf
- Bloomberg website 'Alberto Esteban Verra' <https://www.bloomberg.com/profile/person/14004553> accessed 30 May 2019
- Blunden J, Arndt DS & Hartfield G, eds (2018) 'State of the climate in 2017' Special Supplement to the Bulletin of the American Meteorological Society 99(8) August 2018 <https://doi.org/10.1175/2018BAMSStateoftheClimate.1>
- BNETO, Etcterra, RONGEAD & ONU-REDD (FAO/PNUD/PNUe) (2016) 'Analyse qualitative des facteurs de déforestation et de dégradation des forêts en Côte d'Ivoire' final report 10 novembre 2016 <https://www.etcterra.org/download/161216081210-161214-analyse-facteurs-def-deg-ci-rapport-final.pdf>
- Boden TA, Marland G & Andres RJ (2017) 'Global, regional, and national fossil-fuel CO₂ emissions' Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy https://doi.org/10.3334/CDIAC/00001_V2017
- Bolsonaro F & Bittar M (2019) 'Projeto de Lei nº 2362, de 2019' <https://www25.senado.leg.br/web/atividade/materias/-/matéria/136371>
- Bonn Challenge (2011) 'The Challenge' <http://www.bonnchallenge.org/content/challenge>
- Boudreault C et al (2002) 'Bryophyte and lichen communities in mature to old growth stands in eastern boreal forests of Canada' *Canadian Journal of Forest Research* 32: 1080–1093 <https://doi.org/10.1139/x02-027>
- Bradshaw CJA & Warkentin IG (2015) 'Global estimates of boreal forest carbon stocks and flux' *Global and Planetary Change* 128: 24–30 <https://www.sciencedirect.com/science/article/pii/S0921818115000429>
- Braskem website 'I'm green™ Polyethylene' <http://plasticoverde.braskem.com.br/site.aspx/Im-greenTM-Polyethylene> accessed 30 May 2019
- Breitburg D et al (2018) 'Declining oxygen in the global ocean and coastal waters' *Science* 359(6371): eaam7240 <https://science.sciencemag.org/content/359/6371/eaam7240>
- Brito R, Mano A & Spring J (2018) 'Brazil court overturns ban on weed-killer glyphosate' 3 September 2018 Reuters <https://www.reuters.com/article/us-brazil-agriculture/brazil-court-overturns-ban-on-weed-killer-glyphosate-idUSKCN1L1D7>
- Bruckner M et al (2019) 'Quantifying the global cropland footprint of the European Union's non-food bioeconomy' *Environmental Research Letters* 14(4): 045011 <https://iopscience.iop.org/article/10.1088/1748-9326/ab07f5>
- Byerlee D et al (2017) *The tropical oil crop revolution: Food, feed, fuel, and forests* (New York: Oxford University Press)
- CAIT Climate Data Explorer <http://cait.wri.org/> accessed 26 May 2019
- Câmara dos Deputados website 'PL 6299/2002' <https://www.camara.leg.br/proposicoesWeb/fichadetramitacao?idProposicao=46249> accessed 29 May 2019
- Campbell BL et al (2017) 'Agriculture production as a major driver of the Earth system exceeding planetary boundaries' *Ecology and Society* 22(4): 8 <https://www.ecologyandsociety.org/vol22/iss4/art8/>
- Candra SA (2019a) 'Akui kuasai lahan tambang, Luhut: Bukan HGU' 26 February 2019 *Republika* <https://nasional.republika.co.id/berita/nasional/umum/pnjc3g382/akui-kuasai-lahan-tambang-luhut-bukan-hgu>
- Candra SA (2019b) 'Ini alasan pemerintah tolak buka data HGU atas lahan' 7 March 2019 *Republika* <https://nasional.republika.co.id/berita/nasional/umum/pnzxy409/ini-alasan-pemerintah-tolak-buka-data-hgu-atas-lahan>
- Cargill (2017) 'Cargill to build state-of-the-art biodiesel plant in Wichita, Kansas' 21 September 2017 <https://www.cargill.com/2017/cargill-to-build-state-of-the-art-biodiesel-plant-in-wichita-ks>
- Carleton TA & Hsiang SM (2016) 'Social and economic impacts of climate' *Science* 353: aad9837 <https://science.sciencemag.org/content/353/6304/aad9837>
- Carneiro Filho A (2018) 'The soy industry's poison package' 5 July 2018 *Global Canopy* <https://medium.com/global-canopy/the-soy-industrys-poison-package-7e4a90e8c72b>
- Carneiro Filho A & Costa K (2016) 'The expansion of soybean production in the Cerrado' https://www.inputbrasil.org/wp-content/uploads/2016/11/The-expansion-of-soybean-production-in-the-Cerrado_Agroicone_INPUT.pdf
- Casado J et al (2019) 'Screening of pesticides and veterinary drugs in small streams in the European Union by liquid chromatography high resolution mass spectrometry' *Science of the Total Environment* 670: 1204–1225 <https://www.sciencedirect.com/science/article/pii/S0048969719311969#f0020>
- Cattelan AJ & Dall'Agnol A (2018) 'The rapid soybean growth in Brazil' *Oilseeds & fats, Crops and Lipids* 25(1): D102 <https://www.oil-journal.org/articles/oil/full.html/2018/01/oil170039/oil170039.html>
- Cerdeira AL et al (2010) 'Agricultural impacts of glyphosate-resistant soybean cultivation in South America' *Journal of Agricultural and Food Chemistry* 59: 5799–5807 <https://pubs.acs.org/doi/10.1021/jf102652y>
- Chain Reaction Research (2017) 'Unsustainable palm oil faces increasing market access risks: NDPE sourcing policies cover 74 percent of Southeast Asia's refining capacity' 1 November 2017 <https://chainreactionresearch.files.wordpress.com/2017/10/unsustainable-palm-oil-faces-increasing-market-access-risks-final-1.pdf>
- Chain Reaction Research (2018a) 'ADM: Matopiba sourcing could link company to deforestation' 21 September 2018 <https://chainreactionresearch.com/report/adm-matopiba-sourcing-could-link-company-to-deforestation>
- Chain Reaction Research (2018b) 'The chain: Bunge, Cargill, others fined for Brazilian deforestation in Cerrado; Investors push Bunge to ban deforestation-linked suppliers' 24 May 2018 <https://chainreactionresearch.com/the-chain-bunge-cargill-others-fined-for-brazilian-deforestation-in-cerrado-investors-push-bunge-to-ban-deforestation-linked-suppliers/>
- Brazilian-deforestation-in-cerrado-investors-push-bunge-to-ban-deforestation-linked-suppliers/
- Chain Reaction Research (2019) 'Brazilian state of Tocantins: A hotspot for Cerrado deforestation' 1 April 2019 <https://chainreactionresearch.com/report/brazilian-state-of-tocantins-a-hotspot-for-cerrado-deforestation/>
- Cheek M & Cable S (2000) 'Microberlinia bisulcata' <https://www.iucnredlist.org/species/30441/9550479>, the IUCN Red List of Threatened Species, accessed 21 May 2019
- Chernilo D (2017) 'The question of the human in the Anthropocene debate' *European Journal of Social Theory* 20(1): 44–60 <https://doi.org/10.1177/1368431016651874>
- Cho R (2017) 'The truth about bioplastics' 14 December 2017 *Phys.org* <https://phys.org/news/2017-12-truth-bioplastics.html>
- CIA website 'The World Factbook' <https://www.cia.gov/library/publications/the-world-factbook/> accessed 26 May 2019
- CIRAD website 'Unité de recherche Performance des Systèmes de Culture des Plantes Pérennes: Principaux partenaires' <https://ur-systemes-de-perennes.cirad.fr/l-unite/partenaires/principaux-partenaires>
- CLARA (2018) 'Executive summary: Missing pathways to 1.5°C – The role of the land sector in ambitious climate action' Climate Land Ambition and Rights Alliance <https://www.climateandambitionrightsalliance.org/report>
- Climate Advisers (2013) 'Reducing supply chain deforestation' <https://www.climateadvisers.com/wp-content/uploads/2017/07/2013-04-Reducing-Supply-Chain-Deforestation.pdf>
- CNN Indonesia (2019a) 'Darmin curiga ada pengusaha "Main" dengan Eropa soal sawit' 8 May 2019 <https://www.cnnindonesia.com/ekonomi/20190508204026-92-393201/darmin-curiga-ada-pengusaha-main-dengan-eropa-soal-sawit?>
- CNN Indonesia (2019b) 'Luhut soal batasi akses HGU: Ada korporasi belum patuh aturan' 10 May 2019 https://www.cnnindonesia.com/ekonomi/20190509154845-92-393493/luhut-soal-batasi-akses-hgu-ada-korporasi-belum-patuh-aturan?utm_source=twitter&utm_medium=oa&utm_content=cnnindonesia&utm_campaign=cmssocmed
- CNN Indonesia (2019c) 'Pemerintah: Larangan buka data pemilik HGU demi kekayaan RI' 8 May 2019 <https://www.cnnindonesia.com/ekonomi/20190508130636-92-393021/pemerintah-larangan-buka-data-pemilik-hgu-demi-kekayaan-ri?>
- Coca-Cola website 'Sustainability: PlantBottle™ packaging' <https://www.coca-colaafrica.com/stories/sustainability-packaging-plantbottle#> accessed 30 May 2019
- Colonisation Institute (2013a), document held by Greenpeace Argentina
- Colonisation Institute (2013b), April 2013, document held by Greenpeace Argentina
- Comissão Pastoral da Terra (2005) 'Tabela 8 - trabalho escravo' <https://www.cptfnacional.org.br/component/jdownloads/send/12-trabalho-escravo/81-trabalho-escravo-2005?Itemid=0>
- Comissão Pastoral da Terra (2019) 'Pistoleiros da Fazenda Estrondo abrem fogo contra Geraizeiros em Formosa do Rio Preto (BA)' <https://www.cptfnacional.org.br/publicacoes/noticias/confitos-no-campo/4616->

[pistoleiros-da-fazenda-estrondo-abrem-fogo-contra-geraizeiros-em-formosa-do-rio-preto-ba](#)

Company Action on Deforestation (2018) 'Gran Chaco' <https://www.company-action.org/wp-content/uploads/2018/04/TheGranChaco.pdf>

Consumer Goods Forum (2010) 'Consumer goods industry announces initiatives on climate protection' 29 November 2010 https://www.theconsumergoodsforum.com/press_releases/consumer-goods-industry-announces-initiatives-on-climate-protection/

Consumer Goods Forum website 'Deforestation' <https://www.theconsumergoodsforum.com/initiatives/environmental-sustainability/key-projects/deforestation/> accessed 26 May 2019

Cordonnier M (2018) 'Conventional soya (non-GMO) maintains niche market in Brazil' 19 January 2018 Soybean & Corn Advisor http://www.soybeansandcorn.com/news/Jan19_18-Conventional-soya-non-GMO-Maintains-Niche-Market-in-Brazil

Corrie MacColl & Halcyon Agri (2019) 'Delivering on Sustainability: Corrie MacColl Forms Cameroon Sustainability Council' 23 April 2019 press release https://www.halcyonagri.com/wp-content/uploads/2019/04/CorrieMacColl_Release_Sustainability_Council_Launch_23_April_2019.pdf

Corrie MacColl website 'What we do: Plantations' <https://www.corrie-maccoll.com/what-we-do/plantations/> accessed 20 May 2019

Council on Ethics of the Government Pension Fund Global (2018) 'Recommendation to exclude Halcyon Agri Corp Ltd from the Government Pension Fund Global (GPF) 24 October 2018 unofficial translation <https://etikkradet.no/files/2019/03/Recommendation-Halcyon-24.10.18.pdf>

Critical Ecosystem Partnership Fund (2017) 'Ecosystem profile: Cerrado biodiversity hotspot' revised February 2017 <https://www.cepf.net/sites/default/files/cerrado-ecosystem-profile-en-revised-2017.pdf>

Crump J, ed (2016) 'Smoke on water: Countering global threats from peatland loss and degradation' UNEP rapid response assessment, United Nations Environment Programme and GRID-Arendal https://gridarendal-website-live.s3.amazonaws.com/production/documents/s_document/376/original/RRapeatland_revised_jan.pdf?1515398975

Curtis PG et al (2018) 'Classifying drivers of global forest loss' Science 361: 1108–1111 <http://science.sciencemag.org/content/361/6407/1108>

Dalugdug AJ (2018) 'KFC fine-tunes India strategy, hands over 13 more stores to RJ Corp Firm' 27 November 2018 Food Business Africa <https://www.foodbusinessafrica.com/2018/11/28/kfc-india-sells-13-restaurant-stores-to-franchise-partner-devyani/>

Dargie GC et al (2017) 'Age, extent and carbon storage of the central Congo Basin peatland complex' Nature 542(7639): 86–90 <https://doi.org/10.1038/nature21048>

Dargie GC et al (2018) 'Congo Basin peatlands: Threats and conservation priorities' Mitigation and Adaptation Strategies for Global Change 24(4): 669–686 <https://doi.org/10.1007/s11027-017-9774-8>

deOliveira S (2018) 'Em 83, BC interveio no Grupo Delfin após onda de saques e acusação de fraude' 19 January 2018 O Globo <https://acervo.oglobo.globo.com/em-destaque/em-83-bc-interveio-no-grupo-delfin-apos-onda-de-saques-acusacao-de-fraude-22301040>

DeSyV et al (2015) 'Land use patterns and related carbon losses following deforestation in South America' Environmental Research Letters 10(12):124004. <http://iopscience.iop.org/article/10.1088/1748-9326/10/12/124004/meta>

Decision Innovation Solutions (2018) '2018 soybean meal demand assessment: United States' United Soybean Board September 2018 <https://unitedsoybean.org/wp-content/uploads/LOW-RES-FY2018-Soybean-Meal-Demand-Analysis-1.pdf>

Department for International Development (2015) 'Why corruption matters: Understanding causes, effects and how to address them' Evidence paper on corruption January 2015 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/406346/corruption-evidence-paper-why-corruption-matters.pdf

Diário Norte (2017) 'La ganadería chaqueña entre la inercia, los intermediarios y el desafío por crecer' 28 February 2017 <http://www.diarionorte.com/article/148963/la-ganaderia-chaquena-entre-la-inercia-los-intermediarios-y-el-desafio-por-crecer>

Diário Oficial da União (2019a) 'Ato No. 1, de 9 de janeiro de 2019' http://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/58547404

Diário Oficial da União (2019b) 'Ato No. 4, de 17 de janeiro de 2019' http://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/59812507

Diário Oficial da União (2019c) 'Ato No. 7, de 4 de fevereiro de 2019' http://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/62786205

Diário Oficial da União (2019d) 'Ato No. 10, de 18 de fevereiro de 2019' http://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/64365728

Diário Oficial da União (2019e) 'Ato No. 17, de 19 de março de 2019' http://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/67956251

Diário Oficial da União (2019f) 'Ato No. 24, de 9 de abril de 2019' http://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/70888852

Diário Oficial da União (2019g) 'Ato No. 29, de 29 de abril de 2019' <http://www.in.gov.br/web/dou/-/ato-n-29-de-29-de-abril-de-2019-85957270>

Diário Oficial da União (2019h) 'Ato No. 34, de 16 de maio de 2019' <http://www.in.gov.br/web/dou/-/ato-n-34-de-16-de-maio-de-2019-113230352>

Dias BFS (1982) 'Alternativas para o desenvolvimento dos cerrados: Manejo e conservação dos recursos naturais renováveis' Brasília, FUNATURA/IBAMA

Díaz S et al (2019) 'Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, advance unedited version' 6 May 2019 https://www.ipbes.net/system/tdf/spm-global_unedited_advance.pdf?file=1&type=node&id=35245

Donner S (2009) 'Abuse of science and logic by the National Corn Growers Association' 5 July 2009 Maribo <http://simondonner.blogspot.com/2009/07/abuse-of-science-and-logic-by-national.html>

Down to Earth (2012) 'Indonesia's "One Map policy"' <http://www.downtoearth-indonesia.org/story/indonesia-s-one-map-policy>

Drax (2019) 'Annual report and accounts 2018' <https://www.drax.com/investors/results-reports-agm/>

Drax website 'Environment' <https://www.drax.com/sustainability/environment/> accessed 21 May 2019

DSSmith (2017) 'Growing circular with L'Oréal' 4 October 2017 <https://www.dssmith.com/uk/packaging/about/media/news-press-releases/2017/10/growing-circular-with-loreal>

DSSmith (2018) 'Redefining packaging: Annual report & accounts 2017' https://www.dssmith.com/content/assets/bc866dad9a9d4b95b06c92fb78e37d7c/ds_smith_annual_report_2017.pdf

DSSmith website 'Your source for Frustration Free Packaging' <https://www.dssmith.com/uk/packaging/markets/e-commerce--distribution/frustration-free-packaging> accessed 22 May 2019

Dunkin' Donuts (2018) 'Dunkin' Donuts to eliminate foam cups worldwide in 2020' 7 February 2018 press release <https://news.dunkindonuts.com/news/dunkin-donuts-to-eliminate-foam-cups-worldwide-in-2020>

EAT-Lancet Commission (2019) 'Healthy diets from sustainable food systems: Food planet health' Summary Report https://eatforum.org/content/uploads/2019/01/EAT-Lancet_Commission_Summary_Report.pdf

Encyclopaedia Britannica website 'Gran Chaco' <https://www.britannica.com/place/Gran-Chaco> accessed 13 March 2019

Enviro Consulting (2011) 'Environmental and social impact assessment' <https://storage.googleapis.com/planet4-africa-stateless/2018/10/fb4b3601-fb4b3601-2-sudcam%E2%80%99s-environmental-impact-assessment.pdf>

Environmental Investigation Agency (2019a) 'Promises in practice' <https://eia-international.org/wp-content/uploads/EIA-report-Promises-in-practice-spreads.pdf>

Environmental Investigation Agency (2019b) 'Toxic trade: Forest crime in Gabon and the Republic of Congo and contamination of the US market' https://content.eia-global.org/posts/documents/000/000/830/original/Toxic_Trade_EIA-web.pdf?1553480150

Environmental Investigation Agency (2019c) 'Who watches the watchmen?' <https://eia-international.org/report/who-watches-the-watchmen/>

Environmental Paper Network 'EPN pulp mills map' <https://environmentalpaper.org/mapping-the-expansion-of-the-paper-industry/> accessed 21 May 2019

EPA website 'Greenhouse gas equivalencies calculator' <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> accessed 21 May 2019

EPA website 'Understanding global warming potentials' <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials> accessed 20 May 2019

Escobar N et al (2018) 'Land use mediated GHG emissions and spillovers from increased consumption of bioplastics' Environmental Research Letters 13: 125005 <https://>

iopscience.iop.org/article/10.1088/1748-9326/aaefb/pdf

Esseen PA et al (1997) 'Boreal forests' Ecological Bulletin 46: 16–47 <https://www.jstor.org/stable/20113207>

Essity website 'Brands' <https://www.essity.com/brands/> accessed 21 May 2019

Estrada Patiño R (2017) 'Greenpeace Brazil suspends negotiations with cattle giant JBS' 23 March 2017 Greenpeace <https://www.greenpeace.org/usa/news/greenpeace-brazil-suspends-negotiations-cattle-giant-jbs/>

European Bioplastics (2018) 'The positive trend for the bioplastics industry remains stable' 5 December 2018 <https://www.european-bioplastics.org/new-market-data-the-positive-trend-for-the-bioplastics-industry-remains-stable/>

European Commission (2013) 'The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation' study funded by the European Commission, DG ENV, and undertaken by VITO, IIASA, HIVA and IUCN NL <http://ec.europa.eu/environment/forests/pdf/1.%20Report%20analysis%20of%20impact.pdf>

European Commission (2018) 'Feasibility study on options to step up EU action against deforestation' http://ec.europa.eu/environment/forests/studies_EUaction_deforestation_palm_oil.htm

European Commission (2019) 'Commission delegated regulation (EU) 2019/807 of 13 March 2019' Official Journal of the European Union 62 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0807&from=EN>

European Commission website 'Neonicotinoids' https://ec.europa.eu/food/plant/pesticides/approval_active_substances/approval_renewal/neonicotinoids_en accessed 19 May 2019

European Network of Scientists for Social and Environmental Responsibility (2019) 'Pesticides, poisoning and the politics of agrichemicals between Europe and Brazil' 27 March 2019 press release <https://ensser.org/events/2019/pesticides-poisoning-and-the-politics-of-agrichemicals-between-europe-and-brazil/>

European Public Health Association (2017) 'Healthy and sustainable diets for European countries' https://eupha.org/repository/advocacy/EUPHA_report_on_healthy_and_sustainable_diets_20-05-2017.pdf

Eurostat online database 'International trade' <https://ec.europa.eu/eurostat/web/euro-indicators/international-trade> accessed 17 May 2019

Eurostat online database 'Production forecasts pig-head - quarterly data' <https://ec.europa.eu/eurostat/web/agriculture/data/database> accessed 17 May 2019

EUWID (2019) 'SCA applies for permit to increase capacity at Obbola mill' 29 January 2019 <https://www.euwid-paper.com/news/singlenews/Artikel/sca-applies-for-permit-to-increase-capacity-at-obbola.html>

Fact.MR (nd) 'Crude tall oil market forecast, trend analysis & competition tracking – Global market insights 2018 to 2028' <https://www.factmr.com/report/1628/crude-tall-oil-market>

FAO [Food and Agriculture Organization of the United Nations] (2005) 'Computerized data gathering and networking as a control and monitoring system for the improvement of and reporting on forest management in the Amazon: The case of Brazil', section 3.1, 'Legal Amazon – Definition and forest cover', Forest Management Working Paper 27 <http://www.fao.org/3/j5416e/j5416e05.htm>

FAO (2015) 'Global forest resources assessment 2015: How are the world's forests changing?' <http://www.fao.org/3/a-i4793e.pdf>

FAO (2016) 'Free prior and informed consent: An indigenous peoples' right and a good practice for local communities' Food and Agriculture Organization of the United Nations <http://www.fao.org/3/a-i6190e.pdf>

FAO (2017) 'The future of food and agriculture – Trends and challenges' Rome, Food and Agriculture Organization of the United Nations <http://www.fao.org/3/a-i6583e.pdf>

FAO (2018) 'The future of food and agriculture – Alternative pathways to 2050' Rome, Food and Agriculture Organization of the United Nations <http://www.fao.org/3/i8429en/i8429en.pdf>

FAOSTAT [Food and Agriculture Organization of the United Nations, Statistics Division] website 'Crops' <http://www.fao.org/faostat/en/#data/QC> accessed 26 May 2019

FAOSTAT website 'Crops and livestock products' <http://www.fao.org/faostat/en/#data/TP> accessed 26 May 2019

FAOSTAT website 'Crops processed' <http://www.fao.org/faostat/en/#data/QD> accessed 26 May 2019

FAOSTAT website 'Forestry production and trade' <http://www.fao.org/faostat/en/#data/FO> accessed 26 May 2019

FAOSTAT website 'Livestock primary' <http://www.fao.org/faostat/en/#data/QL> accessed 7 June 2019

FAOSTAT website 'Pesticides' <http://www.fao.org/faostat/en/#data/EP> accessed 26 May 2019

FAOSTAT website 'Selected indicators: Brazil' <http://www.fao.org/faostat/en/#country/21> accessed 30 May 2019

FAOSTAT website 'Selected indicators: Indonesia' <http://www.fao.org/faostat/en/#country/101> accessed 30 May 2019

FAOSTAT website 'Selected indicators: World' http://faostat.fao.org/static/syb/syb_5000.pdf accessed 30 May 2019

Fearnside P (2017) 'Deforestation of the Brazilian Amazon' Oxford Research Encyclopedia of Environmental Science, Sep 2017 <https://doi.org/10.1093/acrefore/9780199389414.013.102>

Federal Public Ministry (2016) 'Operação Recomeço: MPF/RJ denuncia 16 pessoas por desvios nos fundos Postalise Petros' 4 July 2016 <http://www.mpf.mp.br/rj/sala-de-imprensa/noticias-rj/operacao-recomeco-mpf-rj-denuncia-16-pessoas-por-desvios-nos-fundos-postalis-e-petros>

Federasi Serikat Pekerja Minamas et al (2015) 'Free and fair labor in palm oil production: Principles and implementation guidance' <http://supply-chain.unglobalcompact.org/site/article/172>

Feng E (2017) 'McDonald's to double number of China restaurants' 8 August 2017 Financial Times <https://www.ft.com/content/ae5b2e96-7c1c-11e7-9108-000000000000>

Firman M (2017) 'Walhi tuduh perusahaan Luhut rebut lahan petani di Kalimantan Timur' 30 January 2017 Katadata.co.id <https://katadata.co.id/berita/2017/01/30/walhi-tuduh-perusahaan-luhut-rebut-lahan-petani-di-kalimantan-timur>

Firpo de Souza Porto M (2018) 'The tragic "Poison Package": Lessons for Brazilian society and public health' Cadernos de Saúde Pública 34(7) <https://doi.org/10.1590/0102-311X00110118>

Forbes website '#1605 Blairo Maggi' <https://www.forbes.com/profile/blairo-maggi/#387f54151c11> accessed 29 May 2019

Forest Stewardship Council Canada (2016) 'Intact forest landscapes and indigenous cultural landscapes: Working together to find a functional approach' <https://ca.fsc.org/preview.ifl-icl-discussion-paper-a-1105.pdf>

Fountain AC & Hütz-Adams F (2018) 'Cocoa Barometer 2018: Executive summary' http://www.cocoabarometer.org/Cocoa_Barometer/Download_files/2018%20Cocoa%20Barometer%20Executive%20Summary.pdf

Freitas G Jr & Freitas T (2018) 'Farm deregulation puts Bolsonaro on collision course with buyers' 26 October 2018 Bloomberg <https://www.bloomberg.com/news/articles/2018-10-26/farm-deregulation-puts-bolsonaro-on-collision-course-with-buyers>

Fritts R (2019) 'Huge rubber plantation in Cameroon halts deforestation following rebuke' 1 May 2019 Mongabay <https://news.mongabay.com/2019/05/huge-rubber-plantation-in-cameroon-halts-deforestation-following-rebuke/>

FSC (2011) 'Policy for the Association of Organizations with the FSC' September 2011 <https://ic.fsc.org/file-download/policy-for-the-association-of-organizations-with-fsc-a-375.pdf>

FSC (2015) 'Glossary of terms' in International Generic Indicators FSC-STD-60-004 V1-0 EN <http://igi.fsc.org/approved-documents.60.htm>

FSC website 'Korindo Group' <https://ic.fsc.org/en/web-page-/korindo-group> accessed 26 May 2019

Gauthier S et al (2015) 'Boreal forest health and global change' Science 349: 819–822 <https://science.sciencemag.org/content/349/6250/819>

Gendell A (2016) '101: Biobased, biodegradable, compostable' 18 October 2016 Sustainable Packaging Coalition <https://sustainablepackaging.org/101-biobased-biodegradable-compostable/>

Gerber PJ et al (2013) 'Tackling climate change through livestock: A global assessment of emissions and mitigation opportunities' Food and Agriculture Organization of the United Nations <http://www.fao.org/3/a-i3437e.pdf>

Gibbs HK et al (2015) 'Brazil's soy moratorium' Science 347: 377–378 https://www.researchgate.net/publication/271213939_Brazil's_Soy_Moratorium

Global Fire Emissions Database (GFED) website '2015 fire season: Emissions estimates' http://www.globalfiredata.org/updates.html#2015_indonesia accessed 26 May 2019

Global Forest Watch (2019a) 'Global Forest Watch's 2018 data update explained' <https://blog.globalforestwatch.org/data-and-research/technical-blog-global-forest-watch-s-2018-data-update-explained>

Global Forest Watch (2019b) 'Tree cover loss statistics' https://gfw2-data.s3.amazonaws.com/country-pages/country_stats/download/global.xlsx downloaded 8 May 2019

- Global Forest Watch website 'Dashboards – Indonesia' <https://www.globalforestwatch.org/dashboards/country/IDN> accessed 30 May 2019
- Global Forest Watch website 'Global annual tree cover loss' <https://www.globalforestwatch.org/dashboards/global?category=forest-change> accessed 19 May 2019
- Global Forest Watch website 'Gran Chaco deforestation' http://data.globalforestwatch.org/datasets/3d668cf0fbc415bba1ec00bc6263877_5 accessed 13 March 2019
- Global Slavery Index (2018) 'Findings – Importing risk – Cocoa' <https://www.globalslaveryindex.org/2018/findings/importing-risk/cocoa/> accessed 26 May 2019
- Global Slavery Index website 'Cocoa' <https://www.globalslaveryindex.org/2018/findings/importing-risk/cocoa/> accessed 29 May 2019
- Global Witness (2007) 'Hot chocolate: How cocoa fuelled the conflict in Côte d'Ivoire' <https://site-media.globalwitness.org/archive/files/pdfs/cotedivoire.pdf>
- Global Witness (2017) 'Regime cash machine: How the Democratic Republic of Congo's booming mining exports are failing to benefit its people' <https://www.globalwitness.org/en-gb/campaigns/democratic-republic-congo/regime-cash-machine/>
- Global Witness (2018) 'Deadliest year on record for land and environmental defenders, as agribusiness is shown to be the industry most linked to killings' 24 July 2018 <https://www.globalwitness.org/en/press-releases/deadliest-year-record-land-and-environmental-defenders-agribusiness-shown-be-industry-most-linked-killings/>
- GMG Global Ltd (2010) 'Establishment of a joint venture company', copy held by Greenpeace
- GMG Global Ltd (2016) 'Strategising growth, sustaining value: Annual report 2015' <http://infopub.sgx.com/FileOpen/GMG%20AR%202015.ashx?App=Prospectus&FileID=28641>
- Gobierno de Formosa website 'Producción sustentable: Programa ganadero provincial' <https://www.formosa.gob.ar/programa/ganadero> accessed 07 June 2019
- Gobierno del Pueblo de la Provincia del Chaco (2016) 'Lineamientos para el Plan de Gobierno 2015–2019' <http://comunicacion.chaco.gov.ar/identidad/descargas/Lineamientos-para-el%20Plan-de-Gobierno%202015-2019.pdf>
- Godfray HCJ et al (2018) 'Meat consumption, health and the environment' *Science* 361: eaam5324 <https://science.sciencemag.org/content/361/6399/eaam5324>
- Gollnowa F et al (2018) 'Property-level direct and indirect deforestation for soybean production in the Amazon region of Mato Grosso, Brazil' *Land Use Policy* 78: 377–385 <https://doi.org/10.1016/j.landusepol.2018.07.010>
- Goftro J (2013) 'Biopolyethylene: Drop-in replacement' 11 March 2013 *Polymer Innovation Blog* <https://polymerinnovationblog.com/bio-polyethylene-drop-in-replacement/>
- GRAIN (2016) 'The global farmland grab in 2016: How big, how bad?' 2 June 2016 <https://www.grain.org/article/entries/5492-the-global-farmland-grab-in-2016-how-big-how-bad>
- Green JM & Owen MDK (2011) 'Herbicide-resistant crops: Utilities and limitations for herbicide-resistant weed management' *Journal of Agricultural and Food Chemistry* 59(11): 5819–5829 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3105486/>
- Green TR et al (2018) 'Where is the USA Corn Belt, and how is it changing?' *Science of the Total Environment* 618: 1613–1618 <https://doi.org/10.1016/j.scitotenv.2017.09.325>
- Greenenergy website 'Home' <https://www.greenenergy.com/> accessed 28 May 2019
- Greenpeace (2006) 'Eating up the Amazon' <https://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/report/2010/2/eating-up-the-amazon.pdf?53ea6e>
- Greenpeace (2011) 'The case for a moratorium on FSC certification in the Congo Basin' <http://anyflip.com/puvv/xdlb/basic>
- Greenpeace (2013) 'Ecological livestock: Options for reducing livestock production and consumption to fit within ecological limits, with a focus on Europe' Greenpeace Research Laboratories Technical Report 03-2012 <https://www.greenpeace.org/international/publication/7332/ecological-livestock/>
- Greenpeace (2014) 'The Amazon soya moratorium: From the brink of disaster to a solution in the making' <http://www.greenpeace.org/archive-international/Global/international/code/2014/amazon/index.html>
- Greenpeace (2018a) 'Final countdown: Now or never to reform the palm oil industry' <https://www.greenpeace.org/international/publication/18455/the-final-countdown-forests-indonesia-palm-oil/>
- Greenpeace (2018b) 'Greenpeace position on bioenergy' <https://storage.googleapis.com/planet4-eu-unit-stateless/2019/03/cd081168-201811-greenpeace-bioenergy-position.pdf>
- Greenpeace (2018c) 'Less is more: Reducing meat and dairy for a healthier life and planet' <https://www.greenpeace.org/international/publication/15093/less-is-more/>
- Greenpeace (2018d) 'Moment of truth: Time for brands to come clean about their links to forest destruction for palm oil' <https://www.greenpeace.org/international/publication/15395/moment-of-truth/>
- Greenpeace (2018e) 'New deforestation revealed as Indonesian minister arrives in EU to defend palm oil industry' press release 27 April 2018 <https://www.greenpeace.org/international/press-release/16194/new-deforestation-revealed-as-indonesian-minister-arrives-in-eu-to-defend-palm-oil-industry/>
- Greenpeace Africa (2017) 'Cut from Congo: Industrial logging and the loss of intact forest landscapes in the Congo Basin' <http://www.greenpeace.nl/Global/nederland/report/2017/bossen/Cutfromcongo.pdf>
- Greenpeace Africa (2018) 'Halcyon Agri's ruinous rubber' <https://www.greenpeace.org/africa/en/press/477/greenpeace-africa-urges-halcyon-agri-to-stop-destroying-livelihood-biodiversity-in-cameroon/>
- Greenpeace Argentina (2016) 'Desmontes S.A. – Parte 3' http://greenpeace.co/pdf/INFORME_DESMONTES_SA_3_FINAL.pdf
- Greenpeace Argentina (2018) 'Desmontes S.A. – Parte 4' <http://greenpeace.org.ar/pdf/2018/12/Desmontes%20SA%20Parte%204%20FINAL%20%281%29.pdf>
- Greenpeace Argentina (2019) 'Recategorizaciones en Chaco: Establecimiento Monterrey (casos 26 y 27)' https://greenpeace.org.ar/pdf/chaco/Recategorizaciones_Chaco_Monterrey.pdf
- Greenpeace Southeast Asia (2017) 'Still cooking the climate: How the palm oil industry continues to drive deforestation' <https://www.greenpeace.org/southeastasia/publication/641/still-cooking-the-climate/>
- Greenpeace USA (2017) 'Clearcutting free speech' <https://www.greenpeace.org/usa/forests/boreal/clearcutting-free-speech/>
- Griscom BW et al (2017a) 'Natural climate solutions' *PNAS* 114(44): 11645–11650 <https://www.pnas.org/content/114/44/11645>
- Griscom BW et al (2017b) 'Natural climate solutions: Supporting information appendix' *PNAS* 114(44) <https://www.pnas.org/content/pnas/suppl/2017/10/11/1710465114.DCSupplemental/pnas.1710465114.sapp.pdf>
- Gunn A (2016) 'Rangifer tarandus (Reindeer)' <https://www.iucnredlist.org/species/29742/22167140>, the IUCN Red List of Threatened Species, accessed 21 May 2019
- Guterres A (2018) 'Statement by the Secretary-General on the IPCC special report global warming of 1.5°C' 8 October 2018 <https://www.un.org/sg/en/content/sg/statement/2018-10-08/statement-secretary-general-ippc-special-report-global-warming-15-c2%BAc>
- Halcyon Agri (2018a) 'Annual report 2017' https://www.halcyonagri.com/wp-content/uploads/2018/04/HALCA1001_Halcyon_Annual-Report-2017_6Apr_SGXsecure.pdf
- Halcyon Agri (2018b) 'Sustainable natural rubber supply chain policy ("SNRSCP")' https://www.halcyonagri.com/wp-content/uploads/2018/11/HAC_Sustainability-Policy.pdf
- Hancock T (2017) 'US fast-food chains chase growth in small-town China' 18 October 2017 *Financial Times* <https://www.ft.com/content/ca7b25be-9ed0-11e7-9a86-4d5a475ba4c5>
- Hansen MC et al (2013) 'High-resolution global maps of 21st-century forest cover change' *Science* 342: 850–853 <https://science.sciencemag.org/content/342/6160/850.full>
- Hansen MC, Stehman SV & Potapov PV (2010) 'Quantification of global gross forest cover loss' *Proceedings of the National Academy of Sciences* 107: 8650–8655 <https://www.pnas.org/content/107/19/8650>
- Harris N et al (2015) 'Indonesia's fire outbreaks producing more daily emissions than entire US economy' 16 October 2015 *World Resources Institute* <https://www.wri.org/blog/2015/10/indonesia-s-fire-outbreaks-producing-more-daily-emissions-entire-us-economy>
- Henders S, Persson M & Kastner T (2015) 'Trading forests: Land-use change and carbon emissions embodied in production and exports of forest-risk commodities' *Environmental Research Letters*, 10(12): 125012 <https://iopscience.iop.org/article/10.1088/1748-9326/10/12/125012/pdf>
- Herring SC et al, eds (2019) 'Explaining extreme events of 2017 from a climate perspective' *Special Supplement to the Bulletin of the American Meteorological Society* 100(1) January 2019 <https://doi.org/10.1175/BAMS-ExplainingExtremeEvents2017.1>
- Higonnet E, Bellantonio M & Hurowitz G (2017) 'Chocolate's

dark secret: How the cocoa industry destroys national parks' Mighty Earth http://www.mightyearth.org/wp-content/uploads/2017/09/chocolates_dark_secret_english_web.pdf

Higonnet E et al (2018) 'Behind the wrapper: Greenwashing in the chocolate industry' Mighty Earth http://www.mightyearth.org/wp-content/uploads/Chocolate-Report_english_FOR-WEB.pdf

Holmes L (2018) 'DSSmith CFO on driving an innovative business model' 15 December 2018 www.financialdirector.co.uk/2018/12/15/ds-smith-cfo-on-driving-an-innovative-business-model/

Hooijer A et al (2006) 'PEAT CO₂: Assessment of CO₂ emissions from drained peatlands in SE Asia' Delft Hydraulics report Q3943 7 December 2006 <https://www.wetlands.org/publications/peat-co2/>

Houghton RA et al (2015) 'Forests and land use: Undervalued assets for global climate stabilization' Woods Hole Research Center policy brief http://whrc.org/wp-content/uploads/2015/06/PB_Forests_and_Land_Use.pdf

Human Rights Watch (2013) 'Côte d'Ivoire: Arbitrary evictions in protected forests' 13 June 2016 <https://www.hrw.org/news/2016/06/13/cote-divoire-arbitrary-evictions-protected-forests>

Ibama website 'Consulta de autuações ambientais e embargos' <https://servicos.ibama.gov.br/ctf/publico/areasebargadas/ConsultaPublicaAreasEmbargadas.php> accessed 4 June 2019

IDH & IUCN NL (2019) 'European Soy Monitor: Insights on the European supply chain and the use of responsible and deforestation-free soy in 2017' researched by B Kuepper and M Riemersma of Profundo https://www.iucn.nl/files/publicaties/european_soy_monitor.pdf

Illegal Deforestation Monitor (2019) 'Nearly a quarter of Chaco deforestation potentially illegal, says Paraguay enforcement agency' 15 February 2019 <http://www.bad-ag.info/nearly-a-quarter-of-chaco-deforestation-potentially-illegal-says-paraguay-enforcement-agency/>

Index Mundi website 'Indonesia palm oil production by year' <https://www.indexmundi.com/agriculture/?country=id&commodity=palm-oil&graph=production>

Indonesian Ministry of Environment and Forestry (2015) 'Analisis data titik panas (Hotspot) kebakaran lahan dan hutan tahun 2015' <http://appgis.dephut.go.id/appgis/download.aspx>

Indonesian Ministry of Environment and Forestry, National Forest Monitoring System (NFMS) (2018) 'Landcover 2017' http://geoportal.menlhk.go.id/arcgis/rest/services/KLHK/Penutupan_Lahan_Tahun_2017/MapServer

Infobae (2018) 'Aldo Roggio renunció a la presidencia de dos de sus empresas' 16 August 2018 <https://www.infobae.com/economia/finanzas-y-negocios/2018/08/16/aldo-roggio-renuncio-a-la-presidencia-de-dos-de-sus-empresas/>

Input Brasil website 'Regions: MATOPIBA' <https://www.inputbrasil.org/regioes/matopiba/?lang=en> accessed 13 March 2019

Instituto Brasileiro de Geografia e Estatística (IBGE) website 'Mapa de biomas e de Vegetação' <https://ww2.ibge.gov.br/home/presidencia/noticias/21052004/biomashtml.shtm> accessed 21 May 2019

International Agency for Research on Cancer/World Health Organisation (2018) 'Q&A on the carcinogenicity of the consumption of red meat and processed meat' https://www.iarc.fr/wp-content/uploads/2018/07/Monographs-QA_Vol114.pdf

International Cocoa Organization (2019) 'Statistics – Production' <https://www.icco.org/statistics/production-and-grindings/production.html>

International Service for the Acquisition of Agri-biotech Applications (2017) 'Global status of commercialized biotech/GM crops in 2017' ISAAA Brief No. 53 <http://www.isaaa.org/resources/publications/briefs/53/download/isaaa-brief-53-2017.pdf>

International Service for the Acquisition of Agri-biotech Applications (2018) 'Biotech country facts & trends: Brazil' http://www.isaaa.org/resources/publications/biotech_country_facts_and_trends/download/Facts%20and%20Trends%20-%20Brazil-2017.pdf

IPBES (2018) 'The assessment report on land degradation and restoration: Summary for policymakers' <https://www.ipbes.net/assessment-reports/ldr>

IPBES (2019) 'Media release: Nature's dangerous decline "unprecedented"; species extinction rates "accelerating"' <https://www.ipbes.net/news/Media-Release-Global-Assessment>

IPCC (2013) 'Climate change 2013: The physical science basis' Contribution of Working Group I to the IPCC 5th Assessment Report <http://www.climatechange2013.org/report/>

IPCC (2014a) 'Climate change 2014: Mitigation of climate change' Cambridge University Press https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

IPCC (2014b) 'Summary for policymakers' in Climate change 2014: Impacts, adaptation, and vulnerability [Field CB et al, eds], Cambridge University Press https://www.ipcc.ch/site/assets/uploads/2018/02/ar5_wgll_spm_en.pdf

IPCC (2018a) 'Mitigation pathways compatible with 1.5°C in the context of sustainable development' in Special report: Global warming of 1.5°C [Masson-Delmotte V et al, eds] https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf

IPCC (2018b) 'Special report: Global warming of 1.5°C' [Masson-Delmotte V et al, eds] <https://www.ipcc.ch/sr15/>

IPCC (2018c) 'Summary for policymakers' in Special report: Global warming of 1.5°C, [Masson-Delmotte V et al, eds], World Meteorological Organization https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

IUCN (2017) 'Issues brief: Peatlands and climate change' <https://www.iucn.org/resources/issues-briefs/peatlands-and-climate-change>

IUCN (2018) 'Issues brief: Palm oil and biodiversity' <https://www.iucn.org/resources/issues-briefs/palm-oil-and-biodiversity>

Jacobson P (2017) 'Indonesian Supreme Court orders Jokowi administration to hand over palm oil permit data' 10 March 2017 Mongabay <https://news.mongabay.com/2017/03/indonesian-supreme-court-orders-jokowi-administration-to-hand-over-palm-oil-permit-data/>

Jong HN (2018) 'Public access to Indonesian plantation data still mired in bureaucracy' 8 March 2018 Mongabay <https://news.mongabay.com/2018/03/public-access-to-indonesian-plantation-data-still-mired-in-bureaucracy/>

Joosten H (2015) 'Peatlands, climate change mitigation and biodiversity conservation' Nordic Council of Ministers policy brief http://www.ramsar.org/sites/default/files/documents/library/ny_2_korrektur_anp_peatland.pdf

Jornal Económico com Lusa (2018) 'Discurso de Bolsonaro é o "mais ameaçador" para Amazônia e Acordo de Paris' 4 November 2018 <https://jornaleconomico.sapo.pt/noticias/discurso-de-bolsonaro-e-o-mais-ameaçador-para-amazonia-e-acordo-de-paris-373733>

Joseph K (2018) 'Argentina: Livestock and products annual' USDA Foreign Agricultural Service GAIN Report 3 September 2018 https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Annual_Buenos%20Aires_Argentina_9-3-2018.pdf

Joseph K (2019) 'Argentina: Livestock and products semi-annual' USDA Foreign Agricultural Service GAIN Report 27 March 2019 https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Semi-annual_Buenos%20Aires_Argentina_3-27-2019.pdf

Kastens JH et al (2017) 'Soy moratorium impacts on soybean and deforestation dynamics in Mato Grosso, Brazil' PLoS ONE 12(4):e0176168 <https://doi.org/10.1371/journal.pone.0176168>

Keenan RJ et al (2015) 'Dynamics of global forest area: Results from the FAO Global Forest Resources Assessment 2015' Forest Ecology and Management 352: 9–20 <https://www.sciencedirect.com/science/article/pii/S0378112715003400>

Kemaritaman Majalah Triwulan (2018) 'Melawan boikot Uni Eropa atas sawit' https://maritim.go.id/konten/unggahan/2018/09/hdsfbs_copy-ilovepdf-compressed.pdf

Khaitan R (2017) 'These 5 US fast food chains are showing big appetites for emerging markets' 6 August 2017 Frontera <https://frontera.net/news/global-macro/these-5-us-fast-food-chains-are-showing-big-appetites-for-emerging-markets/>

Kimberly-Clark website 'Our brands' <https://www.kimberly-clark.com/en/brands/our-brands> accessed 21 May 2019

Kissinger G, Herold M & De Sy V (2012) 'Drivers of deforestation and forest degradation: A synthesis report for REDD+ policymakers' Lexeme Consulting, Vancouver, Canada https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/65505/6316-drivers-deforestation-report.pdf

Koplitz SN et al (2016) 'Public health impacts of the severe haze in Equatorial Asia in September–October 2015: Demonstration of a new framework for informing fire management strategies to reduce downwind smoke exposure' Environmental Research Letters 11(9):094023 <http://iopscience.iop.org/article/10.1088/1748-9326/11/9/094023>

Kroeger A et al (2017) 'Eliminating deforestation from the cocoa supply chain' The World Bank Group March 2017 <https://openknowledge.worldbank.org/bitstream/handle/10986/26549/114812-5-5-2017-12-49-5-CocoaFinal.pdf?sequence=8&isAllowed=y%20>

Kuok KH et al (2018) 'Joint statement: Creating a deforestation-free palm oil supply chain' 7 December 2018 <https://www.wilmar-international.com/sustainability/wp-content/uploads/2018/12/JOINT->

[STATEMENT-FINAL-07122018-with-Signatures-v3.pdf](#)

Kusumaningtyas R (2018) 'External concern on the ISPO and RSPO certification schemes' Amsterdam, The Netherlands: Profundo https://www.foeeurope.org/sites/default/files/eu-us_trade_deal/2018/report_profundo_rspo_ispo_external_concerns_feb2018.pdf

Laganière J et al (2017) 'Range and uncertainties in estimating delays in greenhouse gas mitigation potential of forest bioenergy sourced from Canadian forests' *Global Change Biology Bioenergy* 9:358–369 <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcbb.12327>

Lakehead University Faculty of Natural Resources Management (2014) 'World boreal forests: Mammals – Mammalia' <http://borealforest.org/world/mammals.htm> accessed 21 May 2019

Lane J (2019) 'Biofuels mandates around the world 2019' 1 January 2019 *Biofuels Digest* <https://www.biofuelsdigest.com/bdigest/2019/01/01/biofuels-mandates-around-the-world-2019/5/>

Lark T et al (2018) 'Cropland expansion in the United States, 2008–2016' University of Wisconsin–Madison research brief, 2 November 2018 http://www.gibbs-lab.com/wp-content/uploads/2018/11/Land-conversion-research-brief_11.2.18.pdf

Larsson A, ed (2011) 'Tillståndet i skogen – rödlistade arter i ett nordiskt perspektiv' ArtDatabanken SLU Rapporterar 9 https://www.artdatabanken.se/globalassets/ew/subw/artd/2.-var-verksamhet/publikationer/6.fillstandet-i-skogen/rapport_tillstandet_skogen.pdf

Larsson U (2017) 'Introduction to SCA' presentation 31 May 2017, time: 17:10–17:18, http://cloud.magneet.to/sca/2017_0531_cmd2017_2/view

Lee T (2015) 'China's growing thirst for dairy heralds golden era for Australian farmers, analysts say' 13 June 2015 ABC News <https://www.abc.net.au/news/2015-06-14/chinese-dairy-boom-heralds-golden-era-for-farmers/6539444>

Lewis SL et al (2019) 'Restoring natural forests is the best way to remove atmospheric carbon' 2 April 2019 *Nature* 568(7750): 25–28 <https://www.nature.com/articles/d41586-019-01026-8>

Logan B (2018) 'Starbucks is rolling out paper straws at some of its stores starting in September' 30 August 2018 *Business Insider* <https://www.businessinsider.com/starbucks-paper-straws-plastic-straws-south-korea-2018-8>

Lucas T & Horton R (2019) 'The 21st-century great food transformation' *The Lancet* 393:386–387 [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(18\)33179-9.pdf?utm_campaign=feat19&utm_source=HubPage](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(18)33179-9.pdf?utm_campaign=feat19&utm_source=HubPage)

Magnusson WE et al (2018) 'Effects of Brazil's political crisis on the science needed for biodiversity conservation' *Frontiers in Ecology and Evolution* 6: 1–6 <http://doi.org/10.3389/fevo.2018.00163>

Maisels F, Bergl RA & Williamson EA (2018) 'Gorilla gorilla (Western gorilla)' <https://www.iucnredlist.org/species/9404/136250858>

Mandela Centre (2017) 'Chaco: Graves irregularidades en las ventas de tierras fiscales y en el manejo del monte nativo' 5 June 2017 <http://www.centromandela.com/?p=20214>

Mano A (2019) 'Brazil's Amaggi and Big 4 grain traders mull road, railway venture' 11 March 2019 Reuters <https://www.reuters.com/article/us-brazil-logistics/brazils-amaggi-and-big-4-grain-traders-mull-road-railway-venture-idUSKBN1QS257>

MapBiomass Chaco Project (2019) 'Collection 1 of the annual Chaco coverage and land use series' downloaded 23 May 2019 <http://plataforma.chaco.mapbiomas.org/map>

MapBiomass Project v3.1 'Annual land use land cover maps of Brazil' <http://mapbiomas.org/stats> accessed 9 May 2019

Marinho CD et al (2014) 'Genetically modified crops: Brazilian law and overview' *Genetics and Molecular Research* 13: 5221–5240 <http://dx.doi.org/10.4238/2014.July.7.15>

Mayaux P et al (2013) 'State and evolution of the African rainforests between 1990 and 2010' *Philosophical Transactions of the Royal Society of London, Series B, Biological Sciences* 368(1625) <https://doi.org/10.1098/rstb.2012.0300>

Maziz L, Diedhiou Y & Lefhiou H (2012) 'Rapport de mission de suivi réactif de la Réserve de Faune du Dja, République du Cameroun, 27 février – 5 mars 2012' UNESCO World Heritage Committee <https://whc.unesco.org/document/117236>

Mbolo M (2013) Email to Arnaud Labrousse, 'Re: EU and Meyomessala Plantation?' 27 September 2013

McLellan E (2015) 'Fertilizer runoff is just one piece of the dead zone puzzle' *Environmental Defense Fund blog* 21 October 2015 <http://blogs.edf.org/growingreturns/2015/10/21/fertilizer-runoff-is-just-one-piece-of-the-dead-zone-puzzle/>

Meyer DE & Cederberg C (2010) 'Pesticide use and glyphosate resistant weeds – A case study of Brazilian soybean production' SIK-Rapport Nr 809 https://www.researchgate.net/publication/266329977_Pesticide_use_and_glyphosate-resistant_weeds_-_a_case_study_of_Brazilian_soybean_production

Meyer R (2018a) Email to Greenpeace Africa: 'Re: Sudcam Ownership?' 27 September 2018

Meyer R (2018b) Email to independent researcher Arnaud Labrousse, 'Re: Sudcam Ownership?' 11 September 2018, copy held by Greenpeace

Mielke (2018) *Oil World Weekly* 61(51–52) 21 December 2018 ISTA Mielke GmbH <https://www.oilworld.biz/t/publications/weekly>

Mighty Earth (2016) 'Submission to the FSC: Olam Rubber Gabon – Deforestation in the past 5 years' <https://www.mightyearth.org/wp-content/uploads/2016/07/Olam-Rubber-Gabon.pdf>

Mighty Earth (2019) 'Mighty Earth complaint against KTS Group associated companies, for violations against the FSC "Policy for Association"' 14 May 2019 http://www.mightyearth.org/wp-content/uploads/KTS-draft-complaint_20190515_Final_short.pdf

Mijnheer D (2019) 'Je hangt een kroket in het vet en je kunt biodiesel maken' 27 May 2019 *Follow the Money* <https://www.ftm.nl/artikelen/je-gooit-er-een-kroket-in-en-het-is-biodiesel?share=1>

Milhorance F (2018) 'Cerrado: Traditional communities win back land from agribusiness firm' 5 July 2018 <https://news.mongabay.com/2018/07/cerrado-traditional-communities-win-back-land-from-agribusiness-firm/>

Milhorance F (2019) 'Video: Cerrado farmer shot amid escalating conflict with agribusiness' 21 February 2019 *Mongabay* <https://news.mongabay.com/2019/02/video-cerrado-farmer-shot-amid-escalating-conflict-with-agribusiness/>

Ministry of Environment and Sustainable Development (2017) 'Ley N° 26.331 de presupuestos mínimos de protección ambiental de los bosques nativos: Informe de estado de implementación 2010–2016' https://www.argentina.gob.ar/sites/default/files/informe_de_implementacion_2010_-_2016.pdf

Ministry of Land Policy and Agrarian Development (1999) 'Livro branco da grilagem de terras' http://www.incra.gov.br/media/servicos/publicacao/livros_revistas_e_cartilhas/Livro%20Branco%20da%20Grilagem%20de%20Terras.pdf

Ministry of the Environment (2017) 'Brazil's forest reference emission level for reducing emissions from deforestation in the Cerrado biome for results-based payments for REDD+ under the United Nations Framework Convention on Climate Change' https://redd.unfccc.int/files/brazil_frel-cerrado-en-20160106-final.pdf

Minority Rights Group International website 'Sami' <https://minorityrights.org/minorities/sami-3/> accessed 21 May 2019

Minow Smith D (2015) 'America has fewer and larger farms. Here's why that matters' 13 April 2015 *Grist* <https://grist.org/food/america-has-fewer-and-larger-farms-heres-why-that-matters/>

Mitchell AL, Rosenqvist A & Mora B (2017) 'Current remote sensing approaches to monitoring forest degradation in support of countries measurement, reporting and verification (MRV) systems for REDD+' *Carbon Balance and Management* 12(1):9 <https://doi.org/10.1186/s13021-017-0078-9>

Mondelez International (2018) 'Mondelez International opens \$90 million "factory of the future" in Bahrain' 17 April 2018 <https://ir.mondelezinternational.com/news-releases/news-release-details/mondelez-international-opens-90-million-factory-future-bahrain>

Morales-Hidalgo D, Oswalt SN & Somanathan E (2015) 'Status and trends in global primary forest, protected areas, and areas designated for conservation of biodiversity from the Global Forest Resources Assessment 2015' *Forest Ecology and Management* 352: 68–77 <https://www.sciencedirect.com/science/article/pii/S0378112715003370>

Moffet A et al (2017) 'Livestock: On our plates or eating at our table? A new analysis of the feed/food debate' *Global Food Security* 14: 1–8 https://www.researchgate.net/publication/312201313_Livestock_On_our_plates_or_eating_at_our_table_A_new_analysis_of_the_feedfood_debate

NASA Earth Observatory website 'Deforestation in Paraguay' <https://earthobservatory.nasa.gov/images/92078/deforestation-in-paraguay> accessed 13 March 2019

Nasi R, Taber A & van Vliet N (2011) 'Empty forests, empty stomachs? Bushmeat and livelihoods in the Congo and Amazon Basins' *International Forestry Review* 13: 355–368 <http://doi.org/10.1505/146554811798293872>

National Corn Growers Association website 'World of corn:

- Corn usage by segment 2018' <http://www.worldofcorn.com/#corn-usage-by-segment> accessed 13 May 2019
- National Forestry Department (2009), document held by Greenpeace Argentina
- National Forestry Department (2011) Letter to the Colonisation Institute, 21 October 2011, document held by Greenpeace Argentina
- National Oceanic and Atmospheric Administration (2017) 'Gulf of Mexico "dead zone" is the largest ever measured' 2 August 2017 <https://www.noaa.gov/media-release/gulf-of-mexico-dead-zone-is-largest-ever-measured>
- Natural Resources Defense Council, Dogwood Alliance and Southern Environmental Law Centre (2017) 'European imports of wood pellets for "green energy" devastating US forests' https://www.dogwoodalliance.org/wp-content/uploads/2017/05/NRDC_2014-2017Booklet_DigitalVersion-resize.pdf
- Nestlé (2017) 'Danone and Nestlé Waters launch NaturALL Bottle Alliance with California startup to develop 100% bio-based bottles' 2 March 2017 <https://www.nestleusa.com/media/pressreleases/nestle-waters-launch-alliance-naturall-bio-based-bottles>
- Nestlé (2019a) 'Nestlé accelerates action to tackle plastic waste' 15 January 2019 press release <https://www.nestle.com/media/pressreleases/allpressreleases/nestle-action-tackle-plastic-waste>
- Nestlé (2019b) 'Nestlé verifies three-quarters of its supply chains as deforestation-free' 30 April 2019 <https://www.nestle.com/media/pressreleases/allpressreleases/nestle-three-quarters-supply-chain-deforestation-free>
- Neto J (2019a) 'Empresa de segurança da fazenda Estrondo "prende" presidente de associação comunitária dos geraizeiros de Formosa do Rio Preto (BA)' 11 April 2019 Jornal GGN <https://jornalgnn.com.br/blog/josias-pires/empresa-de-seguranca-da-fazenda-estrondo-prende-presidente-de-associacao-comunitaria-dos-geraizeiros-de-formosa-do-rio-preto-ba/>
- Neto J (2019b) 'Juiza de Formosa de Rio Preto (BA) manda soltar líder de associação de geraizeiros' 13 April 2019 Jornal GGN https://jornalgnn.com.br/blog/josias-pires/juiza-de-formosa-de-rio-preto-ba-manda-soltar-lider-de-associacao-de-geraizeiros/?fbclid=IwAR1009o2Alw_8pZzV7fswvav4H-gSlgqWdpBE6Ft9DwSSTCA4nTZ3oweno
- Neto JCL (2018) 'Agravamento de instrumento' 13 November 2018, document no. 19021309463547200000002713017, process no. 8005930-18.2018.8.05.0000
- Neto MRC (2018) 'Ação discriminatória' 3 October 2018, document no. 18100911492239600000015196025, process no. 8000499-51-2018.8.05.0081
- New York Declaration on Forests (2014) https://nydfglobalplatform.org/wp-content/uploads/2017/10/NYDF_Declaration.pdf
- New York Declaration on Forests website 'Home' <https://nydfglobalplatform.org/> accessed 21 May 2019
- Norges Bank (2019) 'Decision to exclude company from the Government Pension Fund Global' 18 March 2019 <https://www.norges-bank.no/en/news-events/news-publications/News-items/2019/2019-03-18-spu/>
- NOVA Chaco (2019) 'Fallo del juez Flores ordena suspender desmontes en zonas amarillas' 1 June 2019 http://www.novachaco.com/nota.asp?n=2019_6_1&id=39874&id_tiponota=30
- Nowak MG et al (2017) 'Pongo tapanuliensis (Tapanuli orangutan)' <https://www.iucnredlist.org/species/120588639/120588662>, the IUCN Red List of Threatened Species, accessed 21 May 2019
- OFAC Monitoring System website 'Forest concessions' available at https://www.observatoire-comifac.net/monitoring_system/concessions, accessed 8 May 2018
- Oliveira G & Hecht S (2016) 'Sacred groves, sacrifice zones and soy production: Globalization, intensification and neo-nature in South America' *The Journal of Peasant Studies* 43: 251–285 <https://doi.org/10.1080/03066150.2016.1146705>
- Oliver M (2017) 'Amazon turns British cardboard box maker into FTSE giant: Rise of internet shopping causes DS Smith sales surge' 7 December 2017 *The Daily Mail* <https://www.dailymail.co.uk/money/markets/article-5157085/Amazon-turns-British-cardboard-box-maker-FTSE-giant.html>
- Osuna Orozco A & Salber M (2019) 'Palmed off: An investigation into three industrial palm oil and rubber projects in Cameroon and the Republic of Congo' Rainforest Foundation UK <https://www.rainforestfoundationuk.org/media/ashx/palmedofffinal.pdf>
- Página/12 (2019) 'Denuncia a Metrovías' 9 April 2019 <https://www.pagina12.com.ar/186153-denuncia-a-metrovias>
- Pan Y et al (2011) 'A large and persistent carbon sink in the world's forests' *Science* 333: 988–993 <https://doi.org/10.1126/science.1201609>
- Peiyu C, Lu C & Yu Z (2018) 'Historical nitrogen fertilizer use in agricultural ecosystems of the contiguous United States during 1850–2015: Application rate, timing, and fertilizer types' *Earth System Science Data* 10: 969–984 <https://doi.org/10.5194/essd-10-969-2018>
- Peltonen J (2016) 'Tall oil: Unlocking opportunities for pulp mills in the bioeconomy' 28 November 2016 Pöyry Point of View blog <https://www.poyry.com/news/articles/tall-oil-unlocking-opportunities-pulp-mills-bioeconomy>
- Penacca PA (2019) 'Formula denuncia penal sugiere diligencias de prueba' <http://www.noticiasurbanas.com.ar/wp-content/uploads/2019/04/Denuncia-penal-de-la-legisladora-Paula-Penacca-contr-SBASE-y-Metrovias.pdf>
- Pendrill F et al (2019) 'Agricultural and forestry trade drives large share of tropical deforestation emissions' *Global Environmental Change* 56: 1–10 <https://www.sciencedirect.com/science/article/pii/S0959378018314365>
- Pignati WA et al (2017) 'Spatial distribution of pesticide use in Brazil: A strategy for health surveillance' *Ciência e Saúde Coletiva* 22: 3281–3293 http://www.scielo.br/pdf/csc/v22n10/en_1413-8123-csc-22-10-3281.pdf
- POIG (2016) 'Verification Indicators' March 2016 http://poi.org/wp-content/uploads/2014/09/Def-POIG-Indicators_English_311017.pdf
- Potapov PV et al (2012) 'Forest cover change within the Russian European North after the breakdown of Soviet Union (1990–2005)' *International Journal of Forestry Research* 2012: 729614 <http://dx.doi.org/10.1155/2012/729614>
- Potapov PV et al (2014) 'Eastern Europe's forest cover dynamics from 1985 to 2012 quantified from the full Landsat archive' *Remote Sensing of Environment* 159: 28–43 <http://dx.doi.org/10.1016/j.rse.2014.11.027>
- Potapov PV et al (2017) 'The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013' *Science Advances*, 3(1): e1600821 <https://doi.org/10.1126/sciadv.1600821>
- Powers et al (1995) 'Effects of variable sources of distillers dried grains plus solubles on milkyield and composition' *Journal of Dairy Science* 78(2): 388–96 [https://www.journalofdairyscience.org/article/S0022-0302\(95\)76647-4/pdf](https://www.journalofdairyscience.org/article/S0022-0302(95)76647-4/pdf)
- Project Drawdown website 'Land Use Sector summary' <https://www.drawdown.org/solutions/land-use> accessed 21 May 2019
- Raguzzi MS (2017) 'Existencia y evolución ganadera bovina en la provincia de Formosa' Instituto Nacional de Tecnología Agropecuaria (INTA) <https://inta.gob.ar/documentos/existencia-y-evolucion-ganadera-bovina-en-la-provincia-de-formosa>
- Receita Federal website 'Consulta Quadro de Sócios e Administradores – QSA' https://www.receita.fazenda.gov.br/pessoajuridica/cnpj/cnpjreva/Cnpjreva_qsa.asp accessed 3 June 2019
- Receita Federal website 'Emissão de comprovante de inscrição e de situação cadastral' http://www.receita.fazenda.gov.br/PessoaJuridica/CNPJ/cnpjreva/Cnpjreva_Solicitacao.asp accessed 4 June 2019
- REDAF (2018) 'Monitoreo de deforestación en los bosques nativos de la región Chaqueña Argentina' <http://redaf.org.ar/wp-content/uploads/downloads/2019/03/Documeta-Final-Chaco-Sep.-2018.pdf>
- Reimberg M (2009) 'Fazenda Estrondo colecciona crimes trabalhistas e ambientais' 26 November 2009 Repórter Brasil <https://reporterbrasil.org.br/2009/11/fazenda-estrondo-colecciona-crimes-trabalhistas-e-ambientais/>
- Ren D (2017) 'New generation of chocoholics may turn China into a major chocolate market' 10 September 2017 *South China Morning Post* <https://www.scmp.com/business/companies/article/2110537/new-generation-chocoholics-may-turn-china-major-chocolate-market>
- Repórter Brasil (2017) 'Estrondo: A imposição da força do agronegócio na Bahia' 16 December 2017 <https://reporterbrasil.org.br/estrondo/>
- Repórter Brasil (2018) 'Slave labor in the Paraguayan Chaco' 17 September 2017 YouTube https://www.youtube.com/watch?time_continue=218&v=tkn1mRnJ0c
- Ricupero R et al (2019) 'Statement from Brazil's former ministers of the environment' 8 May 2019 <http://www.iea.usp.br/en/manifesto>
- Ritung S et al (2011) 'Peta lahan gambut Indonesia. Skala 1:250.000. Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian' prepared for online use by World Resources Institute
- Robinson TP et al (2011) 'Global livestock production systems' *Food and Agriculture Organization of the United Nations and International Livestock Research Institute (ILRI)* <http://www.fao.org/3/i2414e/i2414e.pdf>
- Rogers C (2018) 'Why Cadbury is taking "a glass and a half" into new global markets' 25 July 2018 *Marketing Week* <https://www.marketingweek.com/>

- [com/2018/07/25/cadburys-glass-and-a-half/](https://www.sca.com/globalassets/logistik/new-ways-magazine/2015/new-ways-3.pdf)
- Rosendahl J (2018) 'Biofuel firm Neste to invest \$1.6 billion in Singapore production' 12 December 2018 Reuters <https://www.reuters.com/article/us-neste-biofuels-singapore/biofuel-firm-neste-to-invest-1-6-billion-in-singapore-production-idUSKBN10B0Q1>
- Roy DB et al (2003) 'Invertebrates and vegetation of field margins adjacent to crops subject to contrasting herbicide regimes in the Farm Scale Evaluations of genetically modified herbicide-tolerant crops' *Philosophical Transactions of the Royal Society London B* 358: 1879–1898 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1693278/>
- Sámiid Riikkasearvi/SSR (2018) 'An exotic tree species destroys reindeer pastures and Sami reindeer herding' <https://www.sapmi.se/wp-content/uploads/2018/05/Contortaplantage-%C3%A4r-ett-rensk%C3%B6tseimpediment-engelsk-version.pdf>
- Sámiid Riikkasearvi/SSR website 'Nolltolerans mot Contorta i renskötseområdet' <https://www.sapmi.se/nolltolerans-mot-contorta-renskotseområdet/> accessed 21 May 2019
- Sánchez-Bayo F & Wyckhuys KAG (2019) 'Worldwide decline of the entomofauna: A review of its drivers' *Biological Conservation* 232: 8–27 <https://www.sciencedirect.com/science/article/pii/S0006320718313636>
- Saputro W (2019) 'Sempat bantah, Luhut akhirnya akui punya tanah HGU' 27 February 2019 kumparanBISNIS <https://kumparan.com/@kumparanbisnis/sempat-bantah-luhut-akhirnya-akui-punya-tanah-hgu-1551269426467139703>
- SCA (2015) 'New Ways 3 | 2015: Building a new future' <https://www.sca.com/globalassets/logistik/new-ways-magazine/2015/new-ways-3.pdf>
- SCA (2017) 'Annual report 2016' <http://reports.sca.com/2016/annual-report/>
- SCA (2018) 'St1 and SCA form partnership to produce renewable fuels' press release 21 May 2018 <https://www.sca.com/en/about-us/Investors/press-releases/2018-05/st1-and-sca-form-partnership-to-produce-renewable-fuels/>
- SCA (2019a) '20 years as FSC certified forest owner' 20 January 2019 <https://www.sca.com/en/top-news-startpage/2019-01/20-years-as-fsc-certified-forest-owner/>
- SCA (2019b) 'A Royal touch at the grand opening of the world's largest pulp mill' <https://www.sca.com/en/about-us/Investors/press-releases/2019-02/a-royal-touch-at-the-grand-opening-of-the-worlds-largest-pulp-mill/>
- SCA website 'Our business' <https://www.sca.com/en/about-us/This-is-sca/Our-businesses/> accessed 22 May 2019
- Schmidt S (2017) 'Enderecos e sócios interligam quatro firmas e um condomínio que alugam andares para o Legislativo' 6 August 2017 O Globo <https://oglobo.globo.com/rio/enderecos-socios-interligam-quatro-firmas-um-condominio-que-alugam-andares-para-legislativo-21674984>
- Scott-Villiers P et al (2016) 'Precarious lives: Food, work and care after the global food crisis' IDS-Oxfam Report https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/12190/PrecariousLives_Online.pdf?sequence=6
- Secretary of Agro-Industry & Ministry of Production and Labour (2018) 'Caracterización de la ganadería bovina, análisis por provincia 2017' https://www.agroindustria.gov.ar/sitio/areas/bovinos/?accion=noticia&id_info=18111515201
- Secretary of Environment and Sustainable Development (2018) 'Informe del estado del ambiente > 2017' <https://www.argentina.gob.ar/sites/default/files/informedelambiente2017.pdf>
- Serious Fraud Office (2019a) 'Greenery' 16 May 2019 <https://www.sfo.gov.uk/cases/greenery/>
- Serious Fraud Office (2019b) 'SFO opens investigation into Greenery and biodiesel trading' 16 May 2019 <https://www.sfo.gov.uk/2019/05/16/sfo-opens-investigation-into-greenery-and-biodiesel-trading/>
- Seymour F & Busch J (2016) 'Why forests? Why now? The science, economics and politics of tropical forests and climate change' (Washington DC: Center for Global Development) <https://www.cgdev.org/sites/default/files/Seymour-Busch-why-forests-why-now-full-book.PDF>
- SGS Qualifor (2016) 'Forest management certification report – Section A: Public summary' <http://fsc.force.com/servlet/servlet.FileDownload?file=00Pf300000wH1UNEAO>
- Shah V (2016) 'Indonesian Palm Oil Pledge disbands' 1 July 2016 Eco-Business <https://www.eco-business.com/news/indonesian-palm-oil-pledge-disbands/>
- Sharma S, IATP & Schlesinger S (2017) 'The rise of big meat: Brazil's extractive industry' https://www.iatp.org/sites/default/files/2017-11/2017_11_30_RiseBigMeat_f.pdf
- Ship & Bunker (2019) 'Biofuel consortium sets sights on Singapore bunker market' 11 March 2019 <https://shipandbunker.com/news/apac/412733-biofuel-consortium-sets-sights-on-singapore-bunker-market>
- Silva JF (2018) 'Brazil: Livestock and products annual, annual livestock 2018' USDA Foreign Agricultural Service GAIN Report 4 September 2018 https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Annual_Brasilia_Brazil_9-4-2018.pdf
- Silva U (2019) 'Seguranças atiram e ferem ribeirinho em fazenda na Bahia. Veja vídeo' 8 February 2019 Metrôpoles <https://www.metropoles.com/brasil/seguranças-atiram-e-ferem-ribeirinho-em-fazenda-na-bahia-veja-video>
- Silva V et al (2019) 'Pesticide residues in European agricultural soils – A hidden reality unfolded' *The Science of the Total Environment* 653: 1532–1545 <https://www.sciencedirect.com/science/article/pii/S0048969718343420>
- Singleton I et al (2017) 'Pongo abelii (Sumatran orangutan)' <https://www.iucnredlist.org/species/121097935/123797627>, the IUCN Red List of Threatened Species, accessed 21 May 2019
- Smit LAM & Heederik D (2017) 'Impacts of intensive livestock production on human health in densely populated regions' *GeoHealth* 1(7): 272–277 <https://doi.org/10.1002/2017GH000103>
- Smith LH (2015) 'Wheat prices hinge on corn as animal feed drives market' 16 April 2015 AgWeb <https://www.agweb.com/article/wheat-prices-hinge-on-corn-as-animal-feed-drives-market-naa-linda-h-smith/>
- Smith P et al (2014) 'Agriculture, forestry and other land use (AFOLU)' in *Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)* <https://www.ipcc.ch/report/ar5/wg3/>
- Smithers R (2018) 'Iceland to be first UK supermarket to cut palm oil from own-brand products' 10 April 2018 *The Guardian* <https://www.theguardian.com/environment/2018/apr/10/iceland-to-be-first-uk-supermarket-to-cut-palm-oil-from-own-brand-products>
- Soares de Almeida V (2017) 'Use of genetically modified crops and pesticides in Brazil: Growing hazards' *Ciência & Saúde Coletiva* 22(10): 3333–3339 <http://www.scielo.br/pdf/csc/v22n10/1413-8123-csc-22-10-3333.pdf>
- Sofidel website 'Brands & products' <http://www.sofidel.com/en/brands-products/consumer-brands> accessed 21 May 2019
- Spawn SA, Lark TJ & Gibbs HK (2019) 'Carbon emissions from cropland expansion in the United States' *Environmental Research Letters* 14(4): 045009 <https://doi.org/10.1088/1748-9326/ab0399>
- Spring J (2018a) 'Brazil fines five grain trading firms, farmers connected to deforestation' 23 May 2018 Reuters <https://uk.reuters.com/article/us-brazil-deforestation-bunge-carg/brazil-fines-five-grain-trading-firms-farmers-connected-to-deforestation-idUKKCN1101NV>
- Spring J (2018b) 'Soy boom devours Brazil's tropical savanna' Reuters special report <https://www.reuters.com/investigates/special-report/brazil-deforestation/>
- Starbucks (2018) 'Starbucks to eliminate plastic straws globally by 2020' 9 July 2018 press release <https://stories.starbucks.com/press/2018/starbucks-to-eliminate-plastic-straws-globally-by-2020/>
- Steffen W et al (2015) 'Planetary boundaries: Guiding human development on a changing planet' *Science* 347: 1259855 <http://dx.doi.org/10.1126/science.1259855>
- Stephenson A & MacKay D (2014) 'Lifecycle impacts of biomass electricity in 2020' Department for Energy and Climate Change https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/349024/BEAC_Report_290814.pdf
- Strassburg B, Brooks T & Feltran-Barbieri R (2017) 'Moment of truth for the Cerrado hotspot' *Nature Ecology & Evolution* 1: 1–3 https://www.researchgate.net/publication/315549179_Moment_of_truth_for_the_Cerrado_hotspot
- Suaria G et al (2016) 'The Mediterranean plastic soup: Synthetic polymers in Mediterranean surface waters' *Scientific Reports* 6: 37551 <https://www.nature.com/articles/srep37551>
- Subsecretary of Natural Resources of Chaco Province (2017a) Disposición No. 010-2017, 11 January 2017, document held by Greenpeace Argentina
- Subsecretary of Natural Resources of Chaco Province (2017b) Disposición No. 0431-2017, 5 June 2017, document held by Greenpeace Argentina
- Suroyo G & Diela T (2018) 'New biodiesel recipe can cut Indonesia's fuel imports: Industry minister' 24 July 2018 Reuters <https://www.reuters.com/article/us-indonesia-biodiesel/new-biodiesel-recipe-can-cut-indonesia-fuel-imports-industry-minister-idUSKBN1KE1AW>

- Talaei M et al (2017) 'Meat, dietary heme iron, and risk of type 2 diabetes mellitus: The Singapore Chinese Health Study' *American Journal of Epidemiology* 186: 824–833 <https://doi.org/10.1093/aje/kwx156>
- Tandon S (2016) 'KFC is ditching Indian vegetarians to do what it does best: Sell fried chicken' 25 July 2016 Yahoo! Finance <https://finance.yahoo.com/news/kfc-ditching-indian-vegetarians-does-063402281.html>
- Tharrey M et al (2018) 'Patterns of plant and animal protein intake are strongly associated with cardiovascular mortality: The Adventist Health Study-2 cohort' *International Journal of Epidemiology* 47: 1603–1612 <https://academic.oup.com/ije/article/47/5/1603/4924399>
- The Economic Times (2018) 'India a key "accelerate" market: Chocolate maker Mars' 23 September 2018 <https://economictimes.indiatimes.com/industry/cons-products/food/india-a-key-accelerate-market-chocolate-maker-mars/articleshow/65921264.cms?from=mdr>
- The Gecko Project & Mongabay (2019) 'What we learned from two years of investigating corrupt land deals in Indonesia' 8 May 2019 <https://news.mongabay.com/2019/05/what-we-learned-from-two-years-of-investigating-corrupt-land-deals-in-indonesia/>
- Total (nd) 'La Mède: A facility focused on the energies of tomorrow' <https://www.total.com/en/energy-expertise/projects/bioenergies/la-mede-a-forward-looking-facility>
- Transparency International (2018) 'Corruption perceptions index 2018' https://files.transparency.org/content/download/2383/14554/file/2018_CPI_Executive_Summary.pdf
- Transport & Environment (2018) 'Up in smoke: Europe's cars driving deforestation in South East Asia' <https://www.transportenvironment.org/sites/te/files/Europe%E2%80%99s%20cars%20driving%20deforestation%20in%20South%20East%20Asia.pdf>
- Trase (2018a) 'New data on Trase shows soy trade from Brazil's Cerrado driving climate emissions' 13 December 2018 <https://medium.com/trase/new-data-on-trase-shows-soy-trade-from-brazils-cerrado-driving-climate-emissions-10cc949a04c4>
- Trase (2018b) 'Who is buying soy from MATOPIBA?' <http://resources.trase.earth/documents/infobriefs/Infobrief2.pdf>
- Trefon T (2016) *Congo's Environmental Paradox: Potential and Predation in a Land of Plenty* (London: Zed Books)
- Treiblmaier H (2018) 'The impact of the blockchain on the supply chain: A theory-based research framework and a call for action' *Supply Chain Management* 23(6): 545–559 <https://doi.org/10.1108/SCM-03-2018-0143>
- Turubanova S et al (2018) 'Ongoing primary forest loss in Brazil, Democratic Republic of the Congo, and Indonesia' *Environmental Research Letters* 13(7): 074028 <https://iopscience.iop.org/article/10.1088/1748-9326/aac11c/meta>
- Tyukavina A et al (2017) 'Supplementary materials for "Types and rates of forest disturbance in Brazilian Legal Amazon, 2000–2013"' *Science Advances* 3(4): e1601047 <https://advances.sciencemag.org/content/suppl/2017/04/10/3.4.e1601047.DC1>
- Tyukavina A et al (2018) 'Congo Basin forest loss dominated by increasing smallholder clearing' *Science Advances* 4(1): eaat2993 <https://advances.sciencemag.org/content/4/1/eaat2993>
- UN (2007) 'United Nations declaration on the rights of indigenous peoples' United Nations General Assembly https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf
- UN (2011) 'Guiding principles on business and human rights: Implementing the United Nations "Protect, Respect and Remedy" framework' United Nations Human Rights Office of the High Commissioner https://www.ohchr.org/documents/publications/GuidingPrinciplesBusinesshr_eN.pdf
- UN (2018) 'Special climate report: 1.5°C is possible but requires unprecedented and urgent action' 8 October 2018 <https://www.un.org/sustainabledevelopment/blog/2018/10/special-climate-report-1-5oc-is-possible-but-requires-unprecedented-and-urgent-action/>
- UN (2019) 'UN report: Nature's dangerous decline "unprecedented"; species extinction rates "accelerating"' 6 May 2019 <https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/>
- UN Comtrade Database <https://comtrade.un.org/data/>, accessed 7 June 2019
- UN Convention to Combat Desertification (2017) 'Global land outlook: First edition' https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf
- UN Environment (2017) 'Frontiers 2017: Emerging issues of environmental concern' <https://www.unenvironment.org/resources/frontiers-2017-emerging-issues-environmental-concern>
- UNESCO World Heritage Centre website 'Dja Faunal Reserve' <http://whc.unesco.org/en/list/407/>, accessed 21 May 2019
- UNESCO World Heritage Centre website 'State of conservation: Dja Faunal Reserve (Cameroon)' <https://whc.unesco.org/en/SOC/78/>, accessed 21 May 2019
- United Soybean Board (2018) 'Issue brief: Biodiesel' 1 November 2018 <https://unitedsoybean.org/media-center/issue-briefs/biodiesel/>
- University of Maryland (2019) 'Global forest change 2000–2018' http://earthenginepartners.appspot.com/science-2013-global-forest/download_v1.6.html
- USDA (2012) 'Brazil's latest agriculture frontier in Western Bahia and MATOPIBA' Foreign Agricultural Service Commodity Intelligence Report 12 July 2012 https://ipad.fas.usda.gov/highlights/2012/07/Brazil_MATOPIBA/
- USDA website 'Soybeans & Oil Crops' <https://www.ers.usda.gov/topics/crops/soybeans-oil-crops.aspx>, accessed 21 May 2019
- USDA Foreign Agricultural Service (2018) 'Marketing year final report' for marketing year ending 31 August 2018 <https://apps.fas.usda.gov/export-sales/myfiaug.htm>, accessed 22 May 2019
- USDA Foreign Agricultural Service (2019) 'Oilseeds: World markets and trade' May 2019 <https://apps.fas.usda.gov/psdonline/circulars/oilseeds.pdf>
- USDA Foreign Agricultural Service website 'PSD Online' <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>, accessed 20 May 2019
- USDA National Agricultural Statistics Service (2018a) 'Chapter I: Statistics of grain and feed' in *Agricultural Statistics 2018* https://www.nass.usda.gov/Publications/Ag_Statistics/2018/Chapter01.pdf
- USDA National Agricultural Statistics Service (2018b) 'Chapter III: Statistics of oilseeds, fats, and oils' in *Agricultural Statistics 2018* https://www.nass.usda.gov/Publications/Ag_Statistics/2018/Chapter03.pdf
- USGCRP (2017) 'Climate science special report: Fourth national climate assessment, volume I' [Wuebbles DJ et al, eds], US Global Change Research Program https://science.2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf
- Veja (2016) 'Justiça torna réus 16 suspeitos por desvios nos fundos Petrobras e Postalis' 5 July 2016 <https://veja.abril.com.br/brasil/justica-torna-reus-16-suspeitos-por-desvios-nos-fundos-petrobras-e-postalis/>
- Vieira L & Araújo V (2014) 'Polícia Federal investiga possível esquema fraudulento na Universidade Gama Filho' 18 January 2014 *O Globo* <https://oglobo.globo.com/rio/policia-federal-investiga-possivel-esquema-fraudulento-na-universidade-gama-filho-11343181>
- Volante J & Seghezze L (2017) 'Can't See the Forest for the Trees: Can Declining Deforestation Trends in the Argentinian Chaco Region be Ascribed to Efficient Law Enforcement?' *Ecological Economics* 146: 408–413 <https://doi.org/10.1016/j.ecolecon.2017.12.007>
- Watson R (2019) 'Loss of biodiversity is just as catastrophic as climate change' 6 May 2019 *The Guardian* <https://www.theguardian.com/commentisfree/2019/may/06/biodiversity-climate-change-mass-extinctions>
- Watts J (2017) 'Operation Car Wash: Is this the biggest corruption scandal in history?' 1 June 2017 *The Guardian* <https://www.theguardian.com/world/2017/jun/01/brazil-operation-car-wash-is-this-the-biggest-corruption-scandal-in-history>
- Weinberger H (2014) 'Biodegradable plastics: too good to be true?' 12 June 2014 *KQED* <https://www.kqed.org/quest/2014/06/12/biodegradable-plastics-too-good-to-be-true/>
- Weisse M & Dow Goldman E (2019) 'The world lost a Belgium-sized area of primary rainforests last year' 25 April 2019 *World Resources Institute blog* <https://www.wri.org/blog/2019/04/world-lost-belgium-sized-area-primary-rainforests-last-year>
- Wilkins B (2018) 'Danish pork exports increase in early 2018' *AHDB Pork* <https://pork.ahdb.org.uk/prices-stats/news/2018/july/danish-pork-exports-increase-in-early-2018/>
- Willet H et al (2019) 'Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems' *The Lancet* 393: 447–492 https://www.researchgate.net/publication/330443133_Food_in_the_Anthropocene_the_EAT-Lancet_Commission_on_healthy_diets_from_sustainable_food_systems
- Wilmar International (2013) 'No deforestation, no peat, no exploitation policy' <https://www.wilmar-international.com/wp-content/uploads/2012/11/No-Deforestation-No-Peat-No-Exploitation-Policy.pdf>
- Wilmar International (2018) 'Wilmar leads palm oil industry to be deforestation-free' news release 10 December 2018 <https://ir-media.wilmar-international.com/app/>

[uploads/2018/12/News-Release-10-Dec-18-Wilmar-Leads-Palm-Oil-Industry-to-be-Deforestation-Free.pdf](#)
<https://www.wilmar-international.com/sustainability/wp-content/uploads/2018/12/JOINT-STATEMENT-FINAL-07122018-with-Signatures-v3.pdf>

World Bank Group (2016) 'The cost of fire: An economic analysis of Indonesia's 2015 fire crisis' Indonesia Sustainable Landscapes Knowledge Note 1 <http://pubdocs.worldbank.org/en/643781465442350600/Indonesia-forest-fire-notes.pdf>

World Cancer Research Fund/American Institute for Cancer Research (2018) 'Continuous Update Project expert report 2018: Meat, fish and dairy products and the risk of cancer' <https://www.wcrf.org/sites/default/files/Meat-Fish-and-Dairy-products.pdf>

World Cocoa Foundation website 'Cocoa & Forests Initiative' <https://www.worldcocoafoundation.org/initiative/cocoa-forests-initiative/> accessed 1 June 2019

World Economic Forum (2018) 'An open letter from business to world leaders: "Be ambitious, and together we can address climate change"' 29 November 2018 <https://www.weforum.org/agenda/2018/11/alliance-ceos-open-letter-climate-change-action>

World Atlas website 'Animals of the Congo Basin in Africa' <https://www.worldatlas.com/articles/what-animals-live-in-the-congo-basin-of-africa.html> accessed 29 May 2019

Wright CK & Wimberly MC (2013) 'Recent land use change in the Western Corn Belt threatens grasslands and wetlands' PNAS 110(10): 4134–4139 <https://doi.org/10.1073/pnas.1215404110>

WWF (2016) '2016 plowprint report' https://c402277.ssl.cf1.rackcdn.com/publications/946/files/original/plowprint_AnnualReport_2016_GenInfo_FINAL_112016.pdf?1479923301

WWF (2017a) 'An inside view of MATOPIBA' <https://www.wwf.org.br/?60466/An-Inside-View-of-Matopiba#>

WWF (2017b) 'Appetite for destruction: Summary report' <https://www.wwf.org.uk/updates/appetite-for-destruction>

WWF (2018a) 'Living planet report 2018: Aiming higher' <https://www.wwf.org.uk/updates/living-planet-report-2018>

WWF (2018b) 'The plowprint report: 2018' https://c402277.ssl.cf1.rackcdn.com/publications/1171/files/original/PlowprintReport_2018_FINAL_082318LowRes.pdf?1535470091

WWF website 'Gran Chaco' <https://www.worldwildlife.org/places/gran-chaco> accessed 13 March 2019

WWF website 'Transforming the global rubber market' <https://www.worldwildlife.org/projects/transforming-the-global-rubber-market> accessed 20 May 2019

Matted Fur Dance Company
in co-operation with
The United Nations Intergovernmental Science-Policy
Platform on Biodiversity and Ecosystem Services

presents

The Bitter Waltz of Climate Futility

Featuring The ABC Interpretive
Dance Bandicoot

Concept, direction and
choreography by
The ABC Interpretive
Dance Bandicoot



In this rancorous pre-dystopian age we struggle and yearn to save our beloved planet from climate collapse. Yet all will be ashes! OR WILL IT?! Greed and denial rampage across the wasted landscape, the Earth veers wildly toward the death of the oceans and millions of species spiral to their untimely doom. Let us caper and dance the truth of our hubris.



Also feat. The SBS Interpretive Dance Tribite

Earth's temperature has increased by about 0.8C since 1880



(dramatic glockenspiel)



83% of Earth's wetlands have been drained since 1700

If we can't keep climate change below 2C all the coral will die



whispering
all the coral
all the coral

We lose a football field of forest every second



Two fifths of all amphibian species are at risk of extinction!



(lizard noises)

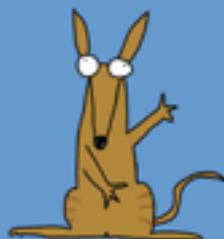
80% of wastewater is poured into rivers and oceans untreated



Greta Thunberg!!



A third of global fish stocks are overfished



Wither the polar bears!?



(a single gong sounds)



The biomass of wild mammals has fallen by 82% since like ages ago



MONSTER STORMS!
HUMONGOUS DROUGHTS!
(thunder, lights flashing)

Yet we know all this, and so we must dance.



The end

First Dog on the Moon



NICE MEMORIES

Země není pro mě

NENÍ ČAS ZTRACET ČAS

PLANT NOT PROFIT SUMMER IS COMING TIME IS RUNNING

CHOOSE THE RIGHT ONE

UŽ NEMŮŽU!

SAVE THE EARTH IT'S THE ONLY PLANET WITH CHOCOLATE

BE THE CHANGE YOU WANT TO SEE IN THE WORLD

KLIMA S MŮJ?

KLIMA TED ÚKOLY POZDĚJ

THERE IS NO PLANET B

NAŠE PŘETVA NAŠE

SAVE OUR SAVE OUR

KDO? KDO KOCARE NE MŮJ

KEEP CALM AND SAVE THE PLANET!

FRIDAY FOR FUTURE

THERE IS NO PLANET B

SCHOOL STRIKE CLIMATE MATTERS

JE ČAS NA ZMĚNY

THERE IS NO PLANET B

TOZA

KAISE NOT The Sea Level

STOP DESTROYING THE BACKS IT'S MESSY



GREENPEACE

June 2019

Published by Greenpeace International

Otto Heldringstraat 5

1066 AZ Amsterdam

The Netherlands

enquiries@greenpeace.org

www.greenpeace.org/extinction

Printed on recycled paper

Front cover:
©Beltrá/Greenpeace
©Dott/Greenpeace
©Beltrá/Greenpeace