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Deforestation – why it matters for investors

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abrdn.com

Contents

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Executive summary

Global forests are important sources of commodities. The production of just seven commodities, with a market value of over 900bn USD in 2021,[1] has been linked to over 25% of global tree cover loss between 2001 and 2015. These are:

- Cattle produce
- Palm oil
- Soy
- Plantation rubber
- Cocoa
- Coffee
- Plantation wood fibre

Demand for these commodities continues to grow and prices are high for all but plantation rubber, lumber and cocoa. This continues to drive pressure for more conversion of natural forest to plantation or agricultural systems.

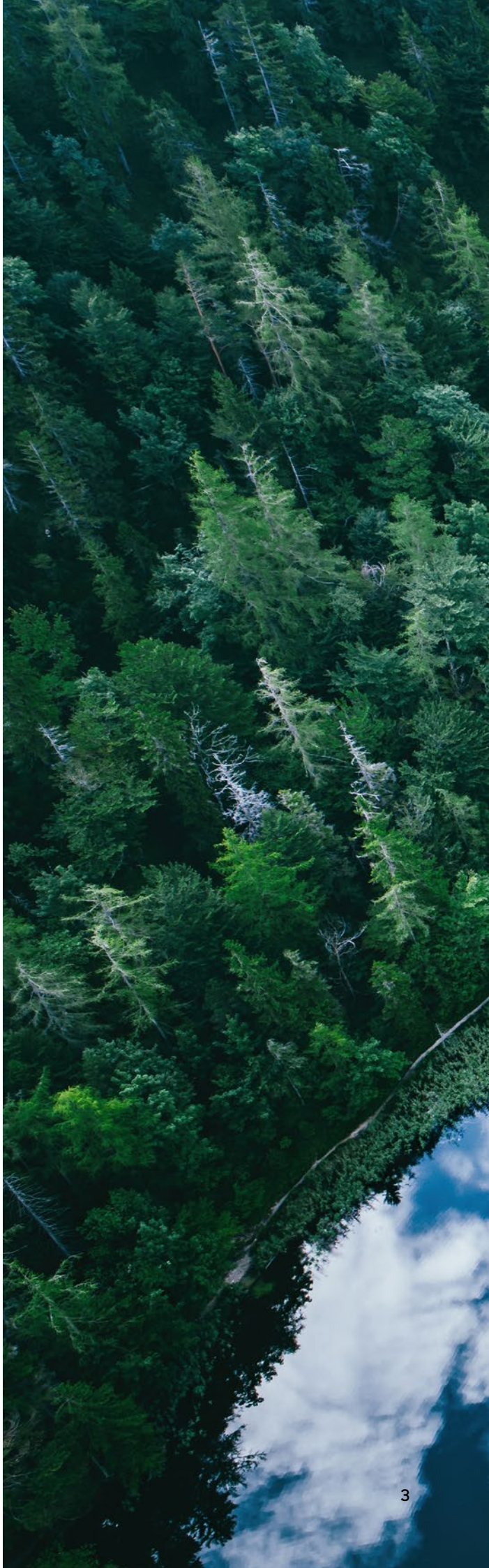
At the same time, growing awareness of the vital ecosystem services that global forests provide is driving political, regulatory, and consumer pressure to halt forest loss.

The EU deforestation-free regulation (EUDR) passed in April 2023 and is potentially a game changer. It requires EU companies sourcing certain forest risk commodities to undertake thorough due diligence and trace the origin of the commodity being imported. This creates both risks and opportunities, for investors exposed to sectors linked to forest commodities.

The financial risks stem from physical degradation, reputational damage and increasing regulatory and litigation pressures. Potential opportunities are solutions to enable better traceability, more sustainable land use practices and alternative materials.

Understanding how companies manage deforestation in their supply chain and prepare for meeting regulatory requirements is critical. The question is whether these forest risk commodities can be produced more sustainability.

[1] Based on the data in Chart 2.



29 football pitches
of tropical forest lost per minute in 2021[2]

25%
global tree cover loss was driven by the production of 7 commodities (2001 to 2015)

3rd largest
emitter of CO_2e[3] would be deforestation if it was a country

7.6 bn tonnes
CO_2 per year is absorbed by the world's forests[4]

80%
of terrestrial animal, plant and insect species call forests home[5]

[2] Global forest watch states the tropics lost 11.1 million hectares of tree cover in 2021.

[3] World Resource Institute, By the Numbers: The Value of Tropical Forests in the Climate Change Equation October 4, 2018 By David Gibbs, Nancy Harris and Frances Seymour, Mikaela Weisse and Liz Goldman, Published February 11, 2021. Accessed ONLINE 11/1/2022 **www.wri.org/insights/numbers-value-tropical-forests-climate-change-equation.**

[4] Harris, N.L., Gibbs, D.A., Baccini, A. et al. Global maps of twenty-first century forest carbon fluxes. Nat. Clim. Chang. 11, 234–240 (2021). Accessed 13/04/2023, ONLINE **www.nature.com/articles/s41558-020-00976-6.**

[5] FAO, The world's forests: a wealth of biodiversity, published 19/03/2020, accessed ONLINE 07/03/2023 **www.fao.org/publications/highlights-detail/en/c/1267161/.**

Introduction

Forest loss is an increasingly important consideration for investors and interest is growing due to:

1. Growing understanding of the importance of forests
2. Increasing regulation
3. Growing materiality for investors
4. Growing demand for key Forest Risk Commodities (FRCs).

Net zero isn't possible without protecting and restoring forests. The consideration of forest loss (the combination of deforestation and forest degradation) is important as carbon emissions from forest degradation, while less than deforestation, are still a significant global source of carbon. Researchers found that teak and eucalyptus plantations stored 30 to 50% less carbon than natural evergreen forests[i]. Further, forest loss has caused biodiversity loss on a level similar to deforestation especially within the tropics[ii].

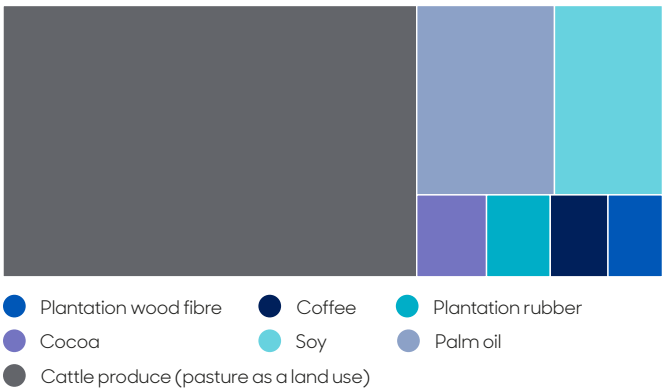
Currently forest loss rates are unsustainably high. In 2021 the world lost 11.1 million hectares of tree cover in the tropics, or around 29 football pitches a minute[1].

It is estimated that 40% of global deforestation is commodity-driven. With just 7 FRC's driving 25% global tree cover loss (2001-2015)[2] as shown in Chart 1.

While ambitions to tackle deforestation are increasing, the economic drivers (demand and a price cycle high) for FRC driven forest loss are strong.

Chart 1: Total forest replacement in million hectares (Mha) by analysed commodities[3] (2001 to 2015)

Deforestation (2001-15, Mha)



Source: World Resources Institute, Global Forest Review **https://research.wri.org/gfr/forest-extent-indicators/deforestation-agriculture#how-much-forest-has-been-replaced-by-specific-agricultural-commodities**.

Wood fibre data is only available for Argentina, Brazil, Cambodia, China, India, Indonesia, Malaysia, Rwanda, South Africa, and Vietnam.

This paper focuses on these FRCs:

- Cattle produce
- Palm oil
- Soy
- Rubber
- Cocoa
- Coffee
- Plantation wood fibre

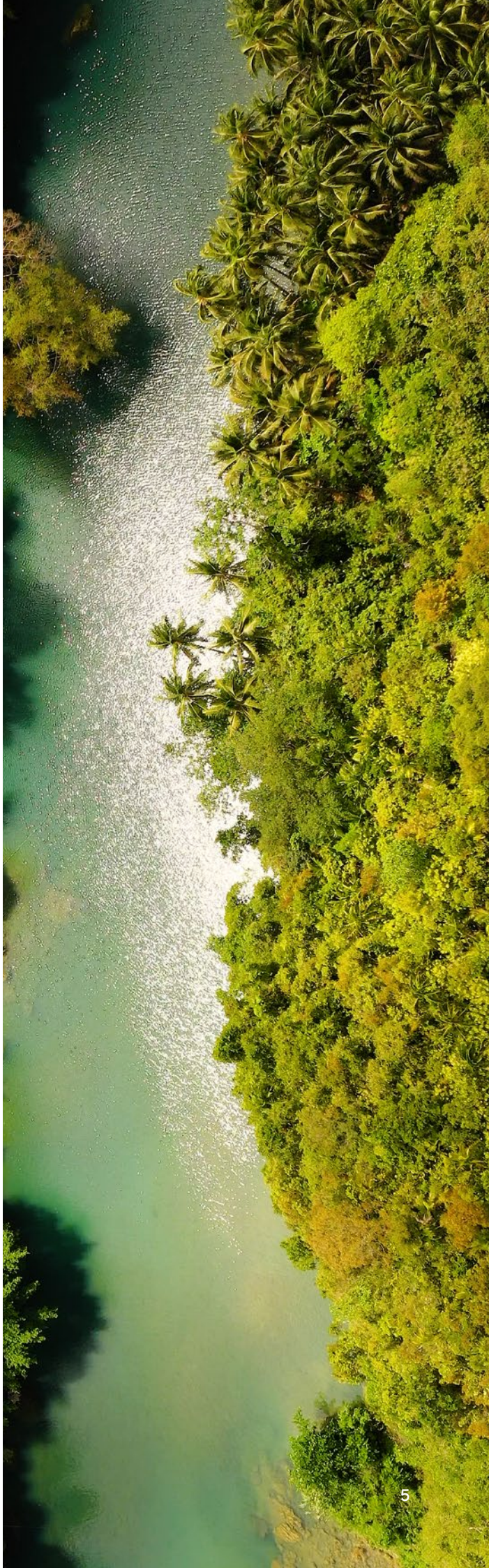
and the regions of highest forest loss risk. Deforestation predominately occurs in the tropics. Therefore, our research into the potential impacts of forest loss on investors has focused on commodity-driven forest loss, along with commodity supply chains linked to Latin America and Asia-Pacific. Any in-depth assessment focuses on the sectors most linked to the FRC value chain, namely

- Consumer staples
- Consumer discretionary
- Materials
- Healthcare
- Energy
- Utilities

Specific terms used in this paper are defined in Appendix 1.

What are the potential implications for investors?

- Forests provide vital ecosystem services, which are diminished either through deforestation or degradation. This creates physical risks for sectors reliant on these services.
- Globally policy makers are waking up to the importance of protecting forest biomes and this is creating increased transitional risks for sectors reliant on forest-based commodities.
- While there are risks, there are also potential opportunities for those companies leading on addressing forest loss, especially within their supply chain management.
- Investors can explore opportunities in potential areas of growth for technology which helps traceability, auditors, alternatives and nature-based solutions.



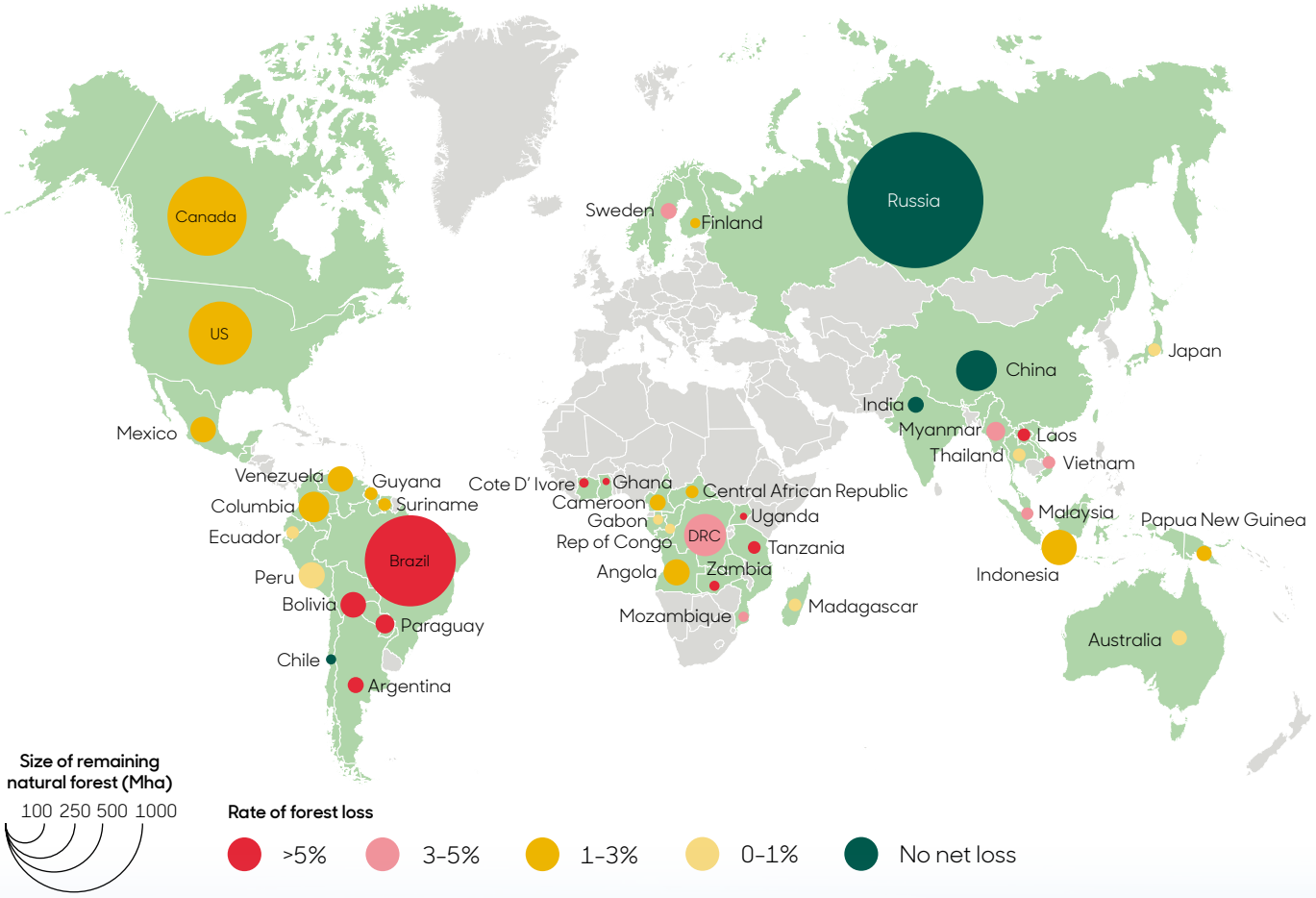
01
What current trends are we seeing?

1.1 A geographic lens: Forest loss and geopolitics

57% of the world's tropical rainforests are found in Latin America and 25% in Southeast Asia and the Pacific islands. These locations are also important regions for the production of FRCs (see Figure 1). Commodities from locations that have high rates of forest loss are more likely to come under scrutiny.

In these areas, local government policies are key to the preservation or loss of forests. Nowhere has this played out more clearly than in Brazil, home to almost one-third of the world's remaining primary tropical rainforests.

Figure 1: The main remaining natural forests globally and the current rate of forest loss.



See Appendix 2 for detail on the material FRC driving forest loss by country.

Note: map only covers the 40 countries with the highest remain primary forest cover. All other countries are in grey.

01
What current trends are we seeing?

Brazil

The Bolsonaro administration led a policy landscape which lacked the enforcement necessary to prevent illegal deforestation; it also reduced the size of a number of conservation areas. Deforestation in the Brazilian Amazon in the first half of 2022 was 80% more than in the same period in 2018 (the year before Bolsonaro took office)[iii].

In contrast, the recently re-elected Lula da Silva's first period in office (2003 to 2010) saw a dramatic reduction (of 84%) in forest loss rates from 2004 to 2012[vi]. Lula's recent election campaign was run in part on an Amazon protection platform. It is therefore likely that the new administration's policies will lead to better protection of forest in Brazil. This could have implications for sectors exposed to FRCs and sovereign debt markets. The Norwegian government, the major donor to the Amazon Fund, has indicated that the fund – worth around $620 million – could be re-established in light of the new administration's strategies to reduce Amazon deforestation[v]. Other nations have also indicated support including the US, France and Spain.

Indonesia

Home to the world's third-largest tropical forest, agricultural products are a key component of Indonesia's economy. Recently Indonesia has maintained production growth of FRCs while reducing the deforestation rate. In 2014/2015 the country lost 1.09 million hectares of forest while in 2019/2020 the loss was 115,500 hectares, a drop of almost 90%[vi]. Policies including a permanent ban on issuing new permits to clear primary forests and peatlands and a moratorium on new oil palm plantation licenses have helped. But this period has also seen high rainfall, which has helped reduce forest loss rates as fire risk has been reduced. This lower deforestation rate was tested by recovering commodity prices; the Indonesian government's ending of the moratorium on issuing licenses for new oil palm plantations and a biofuels mandate also caused concern. Despite this, in 2022, Indonesia experienced its second-lowest annual deforestation caused by industrial palm oil production, following a record 22-year low in 2021.

1.2 Increasing Regulation

Historically regulation has been insufficiently funded, lacked enforcement and often faced issues because of the inadequate involvement of local and indigenous people. There has been a strong focus on illegal deforestation, which is needed, as illegal logging accounts for 15-30% of all wood traded globally[vii].

Regulation to counter illegal logging has looked beyond the boundaries of the regulating country itself and to imports. This includes the Lacey Act in the US, the Clean Wood Act in Japan, the Illegal Logging Prohibition Act in Australia and the Act on the Sustainable Use of Timbers in South Korea. While this regulation has been effective at reducing illegal timber being imported into these countries it does not tackle other commodities linked to deforestation.

However, legal deforestation is also a concern and there is a movement at least in the EU to address this. The **EU Deforestation-free Regulation (EUDR)** stands out for being broad in scope, not only in terms of the commodities covered but also the extension to cover legally produced FRCs and forest degradation. This ground breaking regulation has been put in place to tackle 'imported deforestation' - the deforestation linked to international trade. A report by WWF estimated that around 16% of deforestation associated with international trade could be linked to the EU (including the UK pre-Brexit), second only to China at 24%. Countries heavily dependent on the export of FRCs to the EU may see a reduction in export revenues (as is the case for Indonesia, Brazil and Malaysia). Although, given the demand in the market for these commodities, the flows could be diverted elsewhere (e.g. to China or the US).

Country-level commitments have also been made around reducing deforestation. Global policy of note includes:

- COP 26's Glasgow Leaders' Declaration on Forests and Land Use which recognises that land use change is responsible for about a quarter (23%) of global anthropogenic greenhouse gas emissions highlights the need to stop deforestation by 2030 and expand forest cover. Althoughsigned by over 145 countries so far progress towards this has been slow.
- The Global Biodiversity Framework signed at COP15 (the conference on biological diversity) set a global policy to protect 30% of Earth's lands, oceans, coastal areas, and inland waters by 2030.

Linked to these are reputational risks, and – in the case of the United Nations, REDD (Reducing Emissions from Deforestation and forest Degradation) programme- financial implications for countries if commitments are not met.

01
What current trends are we seeing?

What does the EUDR mean for investors?

The EUDR was formally passed on the 20th of April 2023. Companies selling the following commodities into the block or exporting them from the EU block must now prove they are not linked to land deforestation or forest degradation as of the 31st of December 2020 :

- Cattle produce
- Palm oil
- Soy
- Plantation rubber
- Cocoa
- Coffee
- Plantation wood fibre.

Large and medium sized companies have 18 months to meet the due diligence requirements and smaller companies have 2 years to prepare.

The addition of plantation rubber and forest degradation to the legislation was a step further than many expected. The degradation element will impact EU-based products as conversion of primary forest will be in scope and likely to impact commercial forestry, the most common driver for forest degradation in the EU.

"The most ambitious legislative measure ever put forward by any country anywhere in the world to curb deforestation and forest degradation and to help us tackle the twin crises of global warming and biodiversity loss."[6]

Virginijus Sinkevicius, European commissioner for the environment, oceans and fisheries.

Due diligence requirements

Companies will be required to provide details on the commodities in products, the quantities, the country and region of origin, the geolocation and the time-range of production. Claims will be verified using satellite imagery.

Materiality focus

Additional scrutiny will be faced by countries ranked as posing a high risk of producing goods that are linked to deforestation. See Figure 1 for an indication of the countries and commodities most likely to be impacted.

[6] Carbon Brief,Q&A: What does the EU's new deforestation law mean for climate and biodiversity? Published 13/04/2023, accessed **ONLINE** 24/04/2023.

01
What current trends are we seeing?

1.3 Growing understanding of the importance of forests

There is a growing understanding of the links between climate change and biodiversity loss, including the important role of forests for both. Beyond their ability to store carbon, forests are crucial for the long-term health and stability of our planet. Forest assets provide a wide range of complex ecosystem services (see Table 1) which are currently undervalued despite the economic benefits they deliver. Due to forest loss these services are diminishing, which has wide-ranging economic and social implications both at local and global levels.

Table 1: Ecosystem services provided by forests, divided into two main categories

Provisioning services	**1.1 Water supply (rain makers)** – Called the 'biotic pump', it's thought that large expanses of forest pull in great amounts of water vapour. The water is then released via transpiration and condenses to form rain. This rain supports industries like forestry, agriculture and hydropower.
	1.2 Genetic material – From the rubber in car tyres to cosmetics and medicines, the diversity of genetic material from rainforests has contributed to discoveries worth billions of dollars and saved countless lives.
	1.3 Biomass provisioning – Forests provide biomass for fuel and global timber markets. The global bioenergy market was worth USD 116.5 billion in 2021.[7]
Regulating and maintaining services	**2.1 Soil quality regulation and soil and sediment retention** – Soils in rainforest generally survive and thrive through a closed loop system which recycles the nutrients formed. Without canopy cover and root systems, the soils quickly degrade, productivity drops, and yields become reliant on external nutrient inputs.
	2.2 Biological control – Deforestation, especially in the tropics, is linked to increased spread of zoonotic diseases. As forest loss occurs, the interaction between wildlife, livestock and people increases, while species diversity depletes. The species which remain are more likely to host pathogens transmittable to humans.
	2.3 Global climate control – Forests not only store vast quantities of carbon but also remove approximately 7.6 bn MtCO2 each year[8] from the atmosphere. But this isn't the only way forests reduce global temperatures. Through biophysical processes like transportation and canopy roughness, forests can act like air conditioning systems.[9]

[7] Source: Straits research, Bioenergy Market Bioenergy Market: Information by Type (Biomass and Renewable Municipal Waste, Biogas), Technology (Gasification, Fast Pyrolysis), and Region – Forecast till 2030. Published 2022, Accessed Online 13, April 2023 **https://straitsresearch.com/report/bioenergy-market**.

[8] Source: Harris, N.L., Gibbs, D.A., Baccini, A. et al. Global maps of twenty-first century forest carbon fluxes. Nat. Clim. Chang. 11, 234–240 (2021). Accessed 13/04/2023, ONLINE **www.nature.com/articles/s41558-020-00976-6**.

[9] Source: Lawrence D, Coe M, Walker W, Verchot L and Vandecar K (2022) The Unseen Effects of Deforestation: Biophysical Effects on Climate. Front. For. Glob. Change 5:756115. doi: 10.3389/ffgc.2022.756115. Published 24/03/2022. Accessed 13, April 2023, ONLINE **www.frontiersin.org/articles/10.3389/ffgc.2022.756115/full**.

01
What current trends are we seeing?

1.4 A sector lens: Growing demand and high commodity prices

Demand for FRCs continues to grow and prices are currently in a high cycle, creating an economic driver for further forest loss.

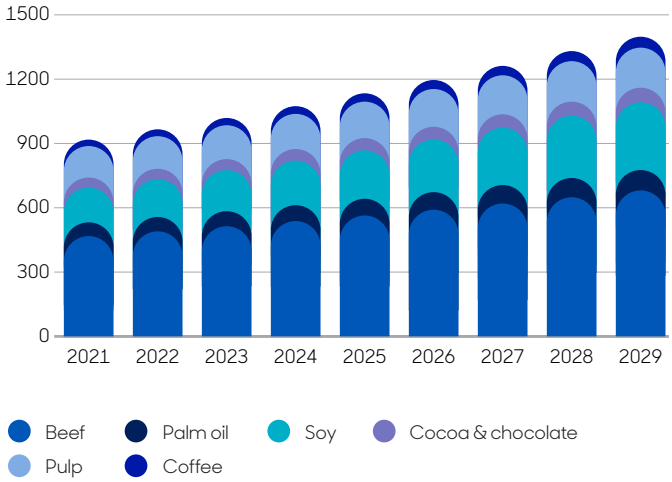
Table 2: Commodity price changes

Commodity & units	2018	2019	2020	2021	2022
Beef (BRL/Kg)	10	12	18	18	19
Palm oil (MYT/T)	2169	2454	3138	4258	4275
Soybeans (USd/Bu)	867	927	914	1242	1442
Plantation rubber USD/kg:	1.25	1.32	1.61	1.72	1.20
Cocoa (USD/T)	2253	2446	2163	2373	2343
Coffee (USD/lbs)	99	106	117	172	177
Lumber (USD/1000 board feet)	320	401	516	587	458

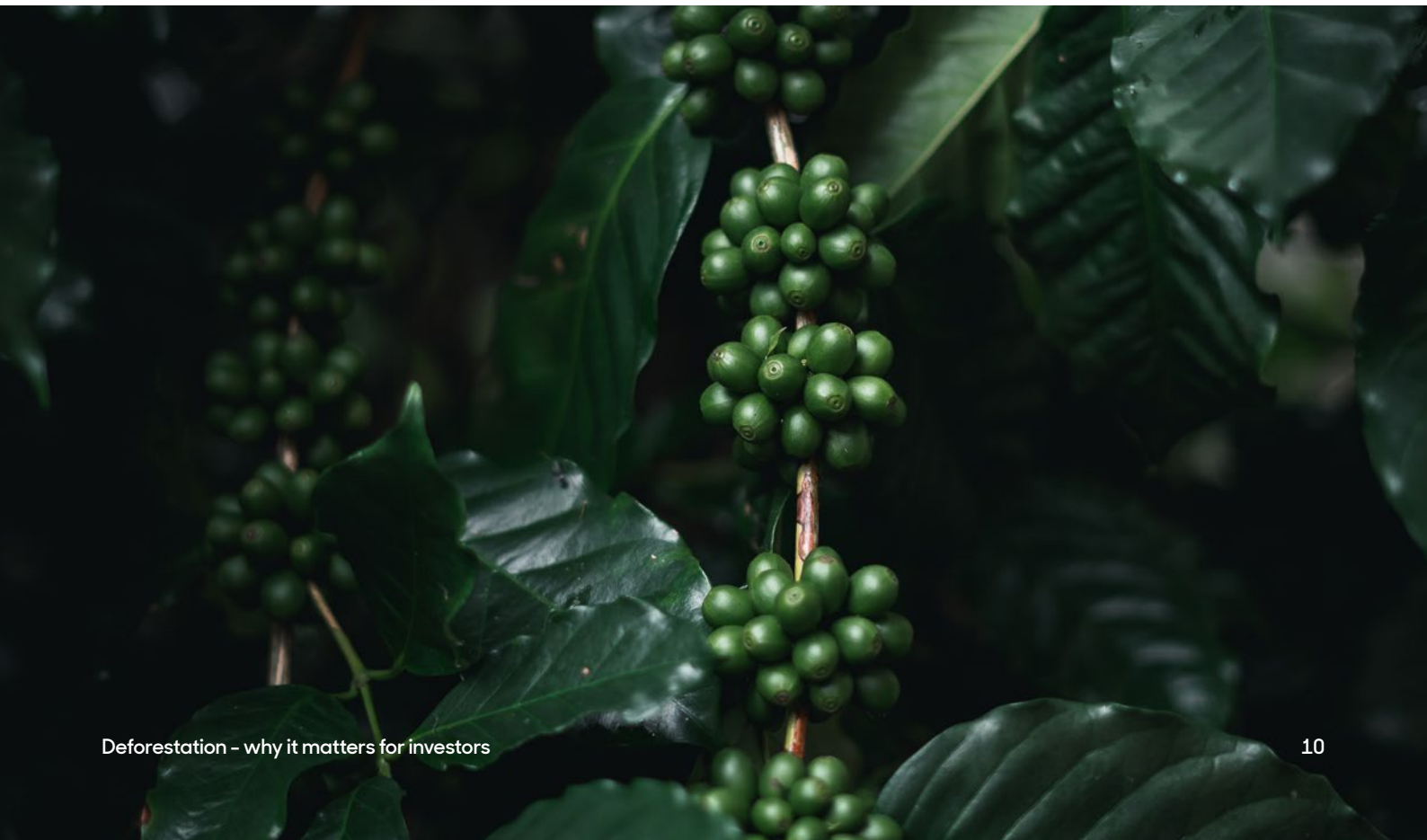
Sources: As of December 2022 Table 2: Trading Economics. As of 1st of November each year.

Chart 2: Estimated demand growth for key FRCs

Estimated market value $bn



Sources: abrdn and various see Appendix 2 - References for detail.



01
What current trends are we seeing?

Given the complexity of the value chains linked to FRCs, it's important to identify which sectors are likely to have exposure to FRCs in order to understand the risks, as summarised in Table 3. abrdn has reviewed its holdings exposed to the key FRCs by sector and identified potential laggards and leaders. We are now developing engagement priorities based on this work.

Table 3: Sectors most likely to be exposed to FRCs in the value chain

Sector	Industry	FRCs
Consumer staples	Food products	**Beef, cocoa, coffee, palm oil and soy** (mainly embedded as feed for livestock)
	Household products; personal products	**Palm oil, soy, cocoa and paper**
	Food & staples retailing	All **food commodities** but also **paper timber**
Consumer discretionary	Textiles, apparel & luxury goods	**Leather, rubber and wood pulp** (packaging and also fabrics)
	Household durables	**Leather** and **timber**
	Hotels & restaurants	**Paper** and **food commodities**
	Auto components	**Rubber** (70%) and **leather**
	Internet retail	**All commodities**
	Multiline retail; speciality retail	**Leather, rubber, timber** and **paper**
Materials	Containers & packaging	**Paper timber**
	Chemicals	**Palm oil, soy** and **paper**
	Paper & forest products	**Paper timber** and **timber**
Industrials	Construction & engineering	**Timber**
	Industrial conglomerates	**Paper**
	Trading companies & distributors	**Cattle, palm oil, soy** and **paper**
Healthcare	Pharmaceuticals	**Palm oil**
Energy	Oil, gas & consumable fuels	**Soy** and **palm oil** for biodiesel, **timber** for pellets
Financials	Financial services	**All commodities**

Source: abrdn 2023.

02
Why is this important to investors?

Forest loss is becoming more material to investors due to increasing reputational, regulatory and physical risks.

Investors expect and increasingly require products to consider the issue of forest loss. This is driven by concerns around reputation, increased regulation, and implications for Scope 3 (financed) emissions.

Asset owners are also interested in how asset managers are supporting the protection and restoration of forests through collaboration and initiatives.

2.1 Investment risks

Historically, financial risks have tended to focus on reputational damage to brands and retailers. However, this dynamic is changing as new regulation increases and transition and physical risks begin to materialise.

Transition risks

1. Reputational risks - short-term

Reputational risks due to controversies linked to FRCs can be high, and companies have lost key customers because of links to deforestation. This is not just limited to cases of illegal deforestation, but to legal deforestation, too. While controversies are often associated with poor management there are factors which increase the risk, such as more complex supply chains and exposure to specific FRCs. Palm oil is the commodity most linked to controversies. Reputational risk is also amplified when the controversy is linked to a large, well-known brand.

Controversies have also led to investors considering companies linked to high-risk commodities in high-risk regions as too risky. Beef from Brazil has been of specific concern for investors. Nordea divested $43 million from JBS Foods in 2020. Storebrand Asset Management sold its shares in Marfrig for the same reason.

There are several other sustainability risks-linked to FRCs. These differ by commodity type and location as outlined in table 4 below, and consideration of these can help frame engagements.

Table 4: Sustainability risks linked to analysed commodities

Forest risk commodity	Material sustainability risks							High risk regions
	Climate change	Land use change	Soil health & biodiversity	Water use	Water pollution	Land rights	Worker conditions	
Cattle produce	High	High	High	High	High	Medium	Medium	LATAM & Australia
Palm oil	High	High	High	Low[10]	Medium[10]	Medium	High	Southeast Asia
Soy[11]	Medium	High	High	Medium[10]	Medium[10]	Medium	Low	LATAM & Southeast Asia
Plantation rubber	Medium	Medium	Medium	Low	Medium	High	High	Southeast Asia
Cocoa	Medium	Medium	Medium	Low	Low	High	High	West Africa and LATAM
Coffee	Medium	Medium	Medium	Low	Low	High	High	LATAM, Southeast Asia
Plantation wood fibre	High	High	High	Medium[10]	Medium[10]	Medium	Low	LATAM & Southeast Asia

Source: Engage the Chain unless denoted with [10] where data is taken from ENCORE. As of December 2022. [11] Risks linked to soy are more hidden than for other commodities as >77% is used to feed livestock rather than in table-ready products.

02
Why is this important to investors?

2. Regulatory risks - short to medium-term

With increased regulation comes a higher risk of litigation. While historically fines have been linked to illegal deforestation, as in the case study below, these were often avoided. The political pressure is likely to change that; and with EUDR the focus moves from illegal to all deforestation and degradation. The potential penalties for non-compliance with the EUDR could reach up to 4% of a company's EU-wide turnover.

MPL avoid £900 million fine for deforestation

In 2016 Merbau Pelalawan Lestari (MPL), a timber company, was fined £900m for illegally deforesting nearly 2,000 hectares of Sumatran forest in Indonesia. However, the company then launched a case review against the court's decision which saw the fine unpaid.[12]

Physical risks - medium to longer-term

FRCs have either high direct or indirect dependencies as well as impacts on ecosystem services. Unsustainable sourcing therefore risks impacting both the resilience and security of the supply, especially in the longer term. Ecosystems don't degrade in a linear fashion – rather, they have thresholds and tipping points. There is no return to the original state once tipping points occur. While this has significant implications for greenhouse gas emissions, it also impacts other ecosystem services and therefore the economy.

"Ecosystems don't degrade in a linear fashion – rather, they have thresholds and tipping points. There is no return to the original state once tipping points occur."

[12] The Guardian, When fines fail, how can companies be made to pay for deforestation. Oliver Balch, published 27/9/2017. Accessed 13/04/20203.

The Amazon could reach a tipping point

The Amazon currently helps regulate regional temperatures and rainfall. Scientists are concerned that deforestation in the Amazon is leading to a tipping point that would cause the rainforest to dry out and turn into a "carbon-emitting savannah'. If a tipping point is reached it could put more than 39% of Brazil's exports at risk[viii]. It's estimated that soybeans, the country's largest agricultural export, could see yield declines of 66% under this scenario.

Changes to water availability and more frequent and persistent periods of drought and extreme heat, put other sectors in addition to agriculture at risk. These include the hydroelectric sector, which provides around 66% of Brazil's electricity, and companies with labour forces that work predominantly outdoors (18% of Brazil's workforce) [vii].This has the potential to impact investments in Brazilian sovereign bonds, equities and credit.

Plantations on peatlands led to subsidence in Riau, Indonesia

Approximately half of all known tropical peatlands and 84% of those in Southeast Asia are in Indonesia[ix]. These peatlands are important carbon sinks. According to the Intergovernmental Panel on Climate Change, when in a pristine state the peatlands have a mean depth of 5.5 m and store on average about 12 times more carbon than tropical rainforests on mineral soil in insular Asia[x]. Peatlands also help to maintain water flow, maintain soil quality, and improve water quality and are important habitats. One often overlooked risk of land-use change on peatlands is peat subsidence. It is triggered by a combination of the decomposition and compression of peat when it is burnt or drained to accommodate other land use such as plantations. When peat is burnt it is so carbon dense that it's estimated to release 10 times more carbon than a forest fire.

Riau, an area of Sumatra in Indonesia, has about 3.87 million hectares of peatland, equal to one-fifth of the total peatland in Indonesia. Much of Riau's peatland has been converted into private and smallholder oil palm, timber, and coconut palm estates. This has triggered peat subsidence. Some areas are sinking about 4 to 6 cm/year[xi].

02
Why is this important to investors?

2.2 Investment opportunities

Leaders

Given the increased regulatory focus, there are clear opportunities for companies able to provide evidence that FRCs have been sourced more sustainably. This is especially true in the EU, where the backdrop means such products could demand a premium and avoid regulatory fines. The regulatory pressure on financing companies linked to FRCs could also result in a green premium for companies seen as leaders in supply chain management.

Solutions

Traceability technology – The EUDR requires that the seven FRCs covered by the regulation are traceable to the plot of land where they were sourced. There could be opportunities in areas such as Radio-frequency Identification (RFID) and blockchain technology to track where commodities have come from. There has also been interest in using satellite and drone technology for monitoring activities.

Forest restoration – Historically, the restoration of forests was mainly managed by non-government organisations or governments, but now there are also investment funds developing in this space. Technology is also helping to enhance restoration. One company, for example, uses drones to map restoration and even plant seedlings.

The real asset opportunity for landowners around nature-based solutions offers another potential growth area, with carbon markets offering alternative income streams. The voluntary carbon market has seen an increase in value after being in the doldrums for several years. There are also signs of policy and financial support for restoration emerging.

Alternatives – Some FRCs can be replaced by materials with a lower environmental impact. Alternatives to beef (the largest driver of deforestation) have gained a lot of attention, examples being plant-based or cultured meat. The opportunities in this space are not just for pure play companies; incumbents and ingredient companies are among those which may increase their revenue share. Alternatives to leather (a derivative of cattle) are also growing, with many major brands providing vegan options.

Soy is predominately used in animal feed and especially for poultry and pork. Research into alternatives includes microalgae and insects, as well as additives to make soy-based feed more efficient. Alternatives to palm oil, cocoa or coffee are currently less developed. In the case of palm oil, there is no other widely used alternative that produces as much oil per Hectare. So alternatives could actually lead to great land-use change (see our **palm oil position statement**).

Moving to more circular economic models and replacing virgin material with recycled for some of these FRCs is one of the keyways to maintain the increasing global demand for paper pulp - without creating further pressure on global forests.

Auditors – The new regulatory landscape will require a far greater degree of due diligence, monitoring and auditing. Therefore, there are opportunities for companies positioned to take advantage of this growing market, like third-party auditors.

03
What can investors do?

To reduce investor exposure to physical and transition risks linked to forest loss via FRCs, it's important to understand the material risks and opportunities related to holdings and how effectively these are being managed.

For investors who want to understand the potential impacts and dependencies that activities could have on ecosystems then the Exploring Natural Capital Opportunities, Risks and Exposure (**ENCORE**) tool[13] is a useful starting point.

3.1 Assessing Materiality

The financial materiality of risks linked to FRCs for businesses can be hard to determine. Higher up the value chain, procurement spend or revenue dependency is a good indication, but it isn't the only consideration. Well-known retailers or brands may only have a small proportion of procurement spend or revenue linked to a specific FRC but still be exposed to high reputational risks.

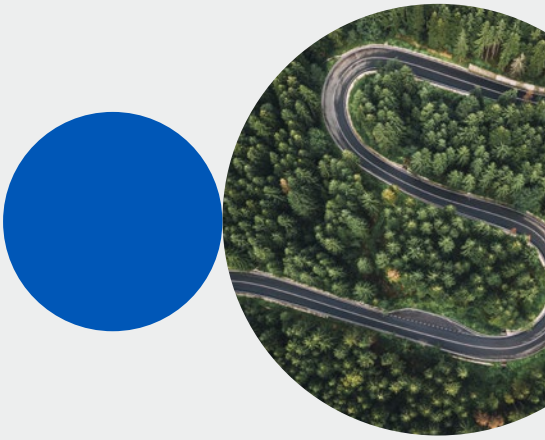
Another consideration is geographic location, with certain countries being considered higher risk (as highlighted in Figure 1). But even beyond the country level specific biomes are an important factor. Companies should be aware of and transparent about sourcing from High Conservation Value (HCV)[14] areas.

According to the High Conservation Value Network there are six main values used to define HCVs[xii]:

1. **High species diversity**: Including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.
2. **High landscape-level ecosystems and mosaics**: Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.
3. **Ecosystems and habitats**: Rare, threatened, or endangered ecosystems, habitats or refugia.
4. **Ecosystems services**: Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.
5. **Community needs**: Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc...), identified through engagement with these communities or indigenous peoples.
6. **Cultural values**: Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

Nestle – Towards a Forest Positive Future

Through programmes such as **Towards a Forest Positive Future**, Nestle is working to ensure that the key FRCs it uses are not linked to forest loss. The company has a clearly defined definition of what deforestation-free means, which includes a supplier requirement to protect and avoid producing on High Conservation Value (HCV) areas. Nestle discloses its sourcing regions and maps these against at risk regions and priority landscapes, enabling it to focus on the supplies that come from areas of high risk.



[13] ENCORE was developed by the Natural Capital Finance Alliance in partnership with UNEP-WCMC and was financed by the Swiss State Secretariat for Economic Affairs (SECO) and the MAVA Foundation.

[14] High Conservation Value Areas (HCVAs) are natural habitats, which are of outstanding significance or critical importance due to their high biological, ecological, social or cultural values.

03
What can investors do?

3.2 Assessing Management of Risks and Opportunities

When analysing companies and actively engaging with firms, investors can set expectations around management of forest loss related risks and opportunities.

Policy

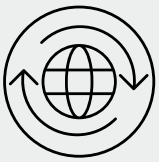
Companies producing or sourcing FRCs should have clear policies on forest loss, which include legal deforestation. Policies focused on 'no deforestation or conversion (covering peatlands and other important biomes) are stronger than those on 'no net deforestation'[15]. Netting off the damage to primary forests is far more difficult than netting off greenhouse gas emissions and is not recommended.

Certification

Policy alone is not enough; companies should be able to provide evidence of how much of their supply chain is deforestation- and conversion-free. No one certification covers all FRCs, and many of the certifications that cover FRCs have faced controversy. But we still believe that certification is a useful starting point in setting standards and will encourage independent third-party review.

Traceability - disclosure, monitoring and auditing

Where a commodity is high-risk and sourced from a high-risk area, mapping it to the plot where it was sourced is the only robust way to ensure no deforestation has occurred. This level of traceability will be increasingly important to meet regulatory requirements in some markets and for some customers. Once plot traceability is established, monitoring is the next key stage to ensure a plot isn't linked to forest loss. This can either be done on the ground or via satellite. Traceability is easier for plant-based commodities, but for cattle – which are often moved through ranches – it can become more complex.



Brazilian beef – tools to prevent 'cattle laundering'

One major issue with understanding if cattle products are linked to forest loss is the fact that cattle are often moved between ranches. This has led to so called 'cattle laundering', where animals are farmed on land cleared for pasture but then moved on to 'clean' ranches untainted by forest loss. This laundering is commonplace and complicated to track.

The big three beef producers Marfrig, Minerva and JBS (representing around 25% of the Brazilian beef market) are trialing the free source tool VISIPEC to better understand their exposure to forest loss through their indirect supply chains. This tool uses data from Animal Transport Guides (ATGs), forms that are completed for sanitation reasons when cattle are moved from one farm to another. Overlaid with satellite images, the tool gives timely information on whether cattle throughout the supply chain are linked to forest loss.

[15] No-deforestation and no-conversion policies and commitments should include a cut-off date, which is the date after which deforestation or conversion on a given site renders the materials produced on that site non-compliant with the policy. Cut-off dates should align with existing sectoral or regional cut-off dates where they exist, such as the Amazon Soy Moratorium. The framework states that cut-off dates for deforestation should be no later than 2020.

03
What can investors do?

Collaboration

Collaboration with industry initiatives is positive, but collaboration with suppliers from hot spots is seen as best in class. While some companies have opted to avoid sourcing from high-risk areas, demand is such that the commodities are still likely to find markets, just ones which are less well regulated. Therefore, collaboration with producers and the development of longer-term partnerships is more likely to help reduce forest loss.

Ferrero – beyond certification

Ferrero recognizes that forest loss is a critical issue for the global cocoa supply chain. As of 2015, 100% of palm oil the company sourced is RSPO segregated[16]. Going further, the firm mapped all the farms in its supply chain and used a satellite system to monitor forest loss. Because Ferrero had already mapped its supply chain, it was able to focus on very targeted deforestation risk alerts. The firm has also distributed about 500,000 multi-purpose trees to farmers to plant on their farms, and trained over 90,000 farmers and organizations in good agricultural practice and over 32,000 farmers in Climate Smart Cocoa.

3.3 Making space for nature

The primary producers of FRCs face 'double materiality' as they are both highly dependent on nature and are highly impacting nature through their activities. To ensure that supply chains remain resilient, maintaining robust ecosystem services is key. This is very much the next phase of the sustainable production of FRCs and central to helping maintain resilient production.

Through nature-based solutions, the carbon credit market offers an alternative income stream while helping ensure more resilience for land-based production activities.

Suzano

The world's largest eucalyptus pulp producer Suzano has an innovative restoration programe. The firm works to restore degraded habitats and promote environmental conservation of ecosystems in the Amazon rainforest, Atlantic Forest, Cerrado and Caatinga. Over a decade, more than 10.7 million native seedlings were planted, starting the restoration process for 31,200 hectares. Suzano also maintains preservation areas covering over 925,600 hectares (38% of its total area). By increasing afforestation and reforestation, the company is not only helping the conservation of important habitat, including its biodiversity, but also helping to protect watersheds and strengthen Suzano's capacity to adapt to climate change.

[16] Roundtable on Sustainable Palm Oil Certified Sustainable Palm Oil from different certified sources that is kept separate from ordinary palm oil throughout the supply chain.

03
What can investors do?

Management engagement question framework

The following engagement questions can be used to understand how well an investee company is mitigating its risks and leveraging opportunities:

Materiality	**Understand exposure**	Is your business linked to any of the following FRCs and their derivatives: cattle, soy, palm oil, plantation rubber, cocoa, coffee, or timber? If so how are you preparing for the EUD
		What is the annual revenue dependent on these FRCs, or procurement spend?
		Is there a strategy in place to reduce any material financial risks linked to FRCs within your business model?
		Are the FRCs sourced from high-risk countries?
		Are the FRCs from High Conservation Value (HCV) areas?
		What proportion or FRCs are of unknown origin?
Management	**Governance**	If financially material, do you have board-level oversight of forest-related issues? If so, how is this incentivised?
	Policy	Do you have a no deforestation or no conversion policy? If so, is this linked to a target to achieve this for all the FRCs in your value chain?
	Verification	What proportion of FRCs are verified as being deforestation free? What verification is used?
	Traceability	Can the FRCs be traced back to point of origin?
	Monitoring	Are the production locations monitored for deforestation?
	Collaboration	Are you part of any collaborations on FRCs?
Make space for nature	**Restoration**	Is there a strategy for restoration and protection? What proportion of the land managed/supply chain does this cover?
	Nature-based solutions	Are there plans for nature-based solutions? (only for companies who manage land)

Conclusion – Can FRCs be sustainable?

We believe that FRCs can be sourced sustainably but only if those businesses linked to them are aware of the materiality of the issues, managing these effectively and ensuring they make space for nature.

We have outlined our expectations for the companies in which we invest in our **Deforestation Position Statement**.

Appendix 1 – Definitions and terms

Forests – The UN's Food and Agriculture Organization (FAO) defines forests as "land spanning more than 0.5Ha with trees higher than 5m and a canopy cover of more than 10%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural use or urbanised". More specifically, for the purposes of this paper, the detailed definition includes:

- Areas that are temporarily un-stocked due to clear-cutting as part of a forest management practice or to help prevent natural disasters, and which are expected to be regenerated within 5 years.
- Abandoned shifting cultivation land with a regeneration of trees that have, or are expected to reach, a canopy cover of at least 10% and tree height of at least 5m.
- Rubberwood, cork oak, Christmas tree plantations, bamboo and palms - provided that the land use, height and canopy cover criteria are met.

Primary forest – The FAO definition of a primary forest is a naturally regenerated forest of native species where there are no clearly visible indications of human activities, and the ecological processes are not significantly disturbed.

Forest degradation – 'Forest degradation' means structural changes to forest cover, taking the form of the conversion of primary forests or naturally regenerating forests into plantation forests or into other wooded land and the conversion of primary forests into planted forests.[17]

Forest loss– Forest loss is a combination of deforestation and forest degradation. It's the most useful term when thinking about the ecosystem services that a forest provides.

Deforestation – Defined by the FAO as the permanent conversion of forest to another land use. This doesn't include logging of plantations, or wildfires, which cause a temporary thinning of the canopy.

Afforestation – The FAO defines afforestation as the "establishment of forest through planting and/or deliberate seeding on land that, until then, was under a different land use, imply[ing] a transformation of land use from non-forest to forest". From a biodiversity viewpoint, this has been an area of contention as it would include plantations and non-native species.

Restoration – Defined as "actions to re-instate ecological processes, which accelerate recovery of forest structure, ecological functioning and biodiversity levels towards those typical of climax forest"[xiii].

[17] Forest degradation, as defined in the new EU deforestation law. **EU** (2022).

Appendix 2 – Key drivers of forest loss by FRC's and country

Country	Cattle produce	Soy	Palm	Plantation rubber	Cocoa	Coffee	Timber and paper pulp
Argentina	–	✔	–	–	–	–	✔
Australia	✔	–	–	–	–	–	✔
Bolivia	–	✔	–	–	–	–	–
Brazil	✔	✔	✔	–	✔	✔	✔
Cameroon	–	–	–	–	✔	–	✔
Canada	–	–	–	–	–	–	✔
Central African Republic	–	–	✔	–	–	–	✔
Chile	–	–	–	–	–	–	✔
China	–	–	–	–	–	–	✔
Columbia	✔	–	✔	–	✔	✔	✔
Cote D'Ivoire	–	–	–	✔	✔	–	✔
DRC	–	–	✔	–	✔	–	✔
Ecuador	✔	✔	✔	–	–	–	–
Finland	–	–	–	–	–	–	✔
Gabon	–	–	✔	–	–	–	✔
India	–	–	–	–	–	–	–
Indonesia	–	✔	✔	✔	✔	✔	✔
Japan	–	–	–	–	–	–	✔
Laos	✔	–	–	–	–	–	✔
Madagascar	✔	–	–	–	–	✔	–
Malaysia	–	✔	✔	✔	–	–	–
Mexico	✔	✔	–	–	✔	–	–
Mozambique	–	–	✔	–	–	–	–
Myanmar	–	✔	✔	–	–	–	–
Papua New Guinea	–	–	✔	–	–	✔	–
Paraguay	✔	✔	✔	–	–	–	–
Peru	–	–	–	–	✔	✔	✔
Republic of Congo	–	–	–	–	–	–	✔
Russia	–	–	–	–	–	–	✔
Sweden	–	–	–	–	–	–	✔
Tanzania	–	–	✔	–	–	–	–
Thailand	–	–	✔	✔	–	–	–
United States	–	–	–	–	–	–	✔
Venezuela	–	✔	–	–	–	–	✔
Vietnam	✔	–	–	✔	–	✔	–
Zambia	–	–	–	–	–	–	–

Sources: Global Forest Watch, FAO data and Engage the Chain, created by abrdn as of December 2022.

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