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Climate and Nature's risk in Indonesia's pulp and paper sector.

A TCFD-aligned scoping exercise

February 2021

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Executive Summary

This paper applies a TCFD-aligned deforestation risk framework to scope the most salient risks and opportunities to the Indonesian pulp and paper sector.

DEFORESTATION accounts for 13 percent of human-caused CO_2 emissions, and all pathways to stabilize global warming at 2 degrees Celsius require reforestation and improved forest management. As the urgency to address climate change and deforestation is growing, all forest-risk commodity sectors may see substantial transformation in the coming years.

Developments in addressing deforestation in soft commodity supply chains have coincided with a growing awareness in the financial sector that climate change poses a systemic risk to the global financial system. Based on the experiences in other sectors and the growing attention to the global biodiversity and climate change crises, the pulp and paper sector may be at an early phase of transformation, whereby consideration for environmental and social impacts drive decision making around investments, procurement, business strategies and financial risk management.

For Indonesia's pulp and paper sector, two major physical risks stemming from climate change and nature may impact future business models. The first risk is the subsidence of plantations located on peatland. 2.6 million hectares of land that is given out as HTI concessions is peatland. Drainage of peatland for agricultural plantations causes land subsidence, which in turn increases the risk of flooding as land surfaces fall below river and sea water levels. Peatland subsidence will eventually make it impossible to keep groundwater levels in drained coastal peatland at levels required to maintain productive use of the concessions. The company groups that may be most exposed to subsidence risk include the large integrated pulp and paper companies that belong to Sinar Mas and Royal Golden Eagle (RGE) and Sumitomo Forestry.

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'Drainage of peatland for agricultural plantations causes land subsidence which in turn increases the risk of flooding.'

The second salient physical climate risk are fires on concessions. Following the fire and haze crisis in 2015, Indonesia witnessed another year of intense fires in 2019, when 1.6 million hectares of land went up in flames. Studies concluded that the pulpwood plantations that APP and APRIL either operate or source from have seen record numbers of fire alerts. In addition to the adverse climatic and health impacts of peatland fires, they may have negative implications for the productivity of industrial tree plantations.

In addition, it can also trigger governments to seal off plantations in response to the fires. The company groups with the most fire alerts on their concessions over the last five years include Sinar Mas, Royal Golden Eagle and the State-Owned Enterprise Perhutani.

Two salient sets of transition risks for Indonesia's pulp and paper sector have been identified.

The first are the policy risks stemming from government moratoria. In 2011, Indonesia's president Susilo Bambang Yudhoyono issued a moratorium on any new permits for the use of peatland and forests. There is significant overlap between areas under moratorium and HTI concessions.

Any development in these areas may create legal risks as contravening regulations may create uncertainty about the legal viability of land clearings. This legal risk appears to be material for Korea's Indoco Group in particular.

The second set of risks stem from evolving market demands for deforestation-free and sustainable products. There is more than 2.7 million hectares of natural forest remaining on land that has been given out for industrial tree plantations. As a result of the growing awareness among governments, industries and the financial sector, this forested land should be considered as stranded for the purpose of plantation-based production. Currently, 61 percent of the processing capacity for the various end uses of industrial trees are covered by some form of responsible sourcing policies.

A significant portion of HTI concessions is held by company groups that also have palm oil operations. Presently, the NDPE policies of Indonesia's largest palm oil refiners are restricted to palm oil, leaving their business partners the opportunity to continue deforestation in the industrial tree sector. There is however a possibility that palm oil refiners may establish cross-commodity NDPE policies in the near future. As a result, companies that operate both oil palm and industrial tree plantations may face increasing buyer scrutiny and may eventually be excluded from palm oil supply chains. Companies that operate oil palm concessions and have substantial standing forests on their HTI concessions include RGE, Sinar Mas, Medco, Korindo, Salim Group, KPN, Alas Kusuma Group, Djarum, United Malacca, Jhonlin, Sampoerna and Panca Eka.

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> **'The definition of deforestation-free is evolving and may not only apply to a company's current operations, but also it's past impacts.'**

There may exist a range of opportunities for companies with sustainable business models that would protect ecosystems, provide benefits for local communities and be economically viable. Production models and sourcing practices that consider climate and nature impacts may create more resilient production landscapes, provide access to new markets or offer premium prices, and enhance a company's reputation. Sustainable business models have been developed that aim to manage degraded peatland in an environmentally friendly and socially equitable manner. Some of these efforts have looked at the rewetting of drained and degraded peatlands while making use of wetland cropping systems (paludiculture).

Companies who can make credible claims about the deforestation-free nature of their pulp and paper products may have preferred access to markets, enjoy enhanced reputations and demand premium prices for their products.

The definition of deforestation-free is evolving and may not only apply to a company's current operations, but also to its past impacts. The Indonesian pulp and paper industry has been responsible for the conversion of large swaths of tropical rainforest in past decades. As such, stakeholders may demand recovery or compensation for past harm in order to accept corporate deforestation-free claims.

1

INTRODUCTION

Deforestation accounts for 13 percent of human-caused CO_2 emissions, and all pathways to stabilize global warming at 2 degrees Celsius require reforestation and improved forest management.

HOWEVER, global tropical deforestation rates continue to rise every year. Agricultural expansion and land use change drive tropical deforestation. In both South East Asia and in Latin America, the demand for soft commodities drives the conversion of forest into agricultural land. Globally, there are four commodities that are the main drivers of tropical deforestation; palm oil, soy, beef and timber products. All four are globally traded commodities with complex supply chains.

As the urgency to address climate change and deforestation is growing, forest-risk commodity sectors may see substantial transformation in the coming years. In order to project the future of these industries, Aidenvironment has developed an analytical framework to assess the deforestation risks and opportunities in agricultural commodity supply chains. This framework is aligned with the recommendations of the Taskforce for Climate Related Financial Disclosure (TCFD), the de-facto global standard for climate change risk reporting. The framework is intended to systematically translate environmental and social impacts into business risks, and to develop forward-looking scenarios to assess how sustainability may shape the structure and dynamics of sectors and companies.

This paper applies the deforestation risk framework to the Indonesian pulp and paper sector, one of the more industrialized timber product sectors. Other climate impacts of the sector, including energy use, are outside of the scope of this paper. Aidenvironment has conducted data analysis on its dataset of HTI concessions and supply chain relationships, as well as conducted a literature review of academic, civil society and media reports.

AIDENVIRONMENT'S CONCESSION DATASET

For the analysis of this paper, Aidenvironment has developed an in-house geospatial dataset to assess the various sustainability risks, and to identify which company groups may be most exposed to these risks.

The starting point of the analysis is the publicly available dataset of industrial tree plantation concessions (HTI), published by Indonesia's Ministry of Environment and Forestry. Aidenvironment has matched these records with notary acts for each of the entities listed as the holders of HTI concessions. On the basis of such notary acts, Aidenvironment has grouped concessions by corporate ownership, on the basis of the company group definition that Aidenvironment and its partners apply in the palm oil sector. This definition includes subsidiaries, joint ventures and related entities. In order to assess the various risks per company group, the concession data was overlaid with various publicly available maps, including;

- Peatland map - Wetlands International - Indonesia Programme & Wildlife Habitat Canada (WHC), Map of Peatland Distribution Area and Carbon Content in Kalimantan, 2000-2002, 2004, & Ministry of Agriculture. "Indonesia peat lands." *Accessed through Global Forest Watch on 20/01/2021. www.globalforestwatch.org*
- Forest cover map 2016 of Indonesia's Ministry of Environment and Forestry.
- PIPPIB Moratorium map - Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia - Indonesia's Ministry of Environment and Forestry 2020
- GLAD Alerts - Hansen, M.C., A. Krylov, A. Tyukavina, P.V. Potapov, S. Turubanova, B. Zutta, S. Ifo, B. Margono, F. Stolle, and R. Moore. 2016. Humid tropical forest disturbance alerts using Landsat data. Environmental Research Letters, 11 (3). *Accessed through Global Forest Watch on 20/01/2021. www.globalforestwatch.org*
- NASA VIIRS - NASA FIRMS. Fire Informationof Resource Management System. "VIIRS Active Fires."

All figures presented in this report are cumulative for all entities considered to be part of the same company group.

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1.1

Climate and Nature impacts may affect future business decisions

THE issues of deforestation, fires and peatland conversion have been longstanding concerns in Indonesia for their environmental and social impacts. The loss of biodiversity, the loss of livelihood for local communities and the impacts on climate change has triggered media attention, regulatory and corporate responses and civil society campaigns. In more recent years, the issue has increasingly been recognized as a material business risk for companies that are directly or indirectly involved in deforestation. Past examples in the palm oil sector illustrate how evidence of involvement in deforestation can result in loss of customers and revenues, suspension of operating licenses and reputational damage.

In the palm oil sector, a tipping point was reached in 2016, when two large integrated palm oil companies, IOI and Felda Global Ventures, lost and withdrew their sustainability certification following publications about their involvement in deforestation in Indonesia. Subsequently, the customers of these companies responded by suspending purchases. In the case of IOI, the company lost 27 major clients after the Roundtable on Sustainable Palm Oil (RSPO) suspended the company. This caused IOI's share price to drop by 18 percent. Whereas the company later strengthened its zero-deforestation policies and was able to regain access to its clients, the event was a clear signal to the market that deforestation had become a market access risk. In following years, a slate of supply chain suspensions, stop work orders and divestments followed, with substantial impacts on the revenues and market values of companies that continued to deforest.

In Latin America's soy and beef sector, past evidence of financially material impacts from sustainability concerns are less apparent, but a number of recent trends suggest that a growing number of stakeholders are taking deforestation into account when making business decisions. These include public letters from responsible investor groups voicing concerns over deforestation in Brazil, the exclusion of soy traders from the supply chains of downstream seafood producers and regulatory developments in end user countries.

Indonesia's pulp and paper sector has been the target of longstanding civil society campaigns and has repeatedly faced reputational damage as a result of deforestation, the destruction of peatland ecosystems, community conflicts and the use of complex corporate structures and transfer pricing. To date, downstream clients of Indonesian paper producers and investors have been less forthcoming in their actions to ensure deforestation-free supply chains and investments, and knowledge gaps remain concerning the business risks associated with the adverse impacts of the pulp and paper sector.

Based on the experiences in other sectors and the growing attention to the global biodiversity and climate change crises, the pulp and paper sector may be at the early phase of similar transformational processes in which consideration for environmental and social impacts drive decision making around investments, procurement, business strategies and financial risk management.

1.2

Investors have recognized the financial risks of climate and nature impacts in global agricultural sectors

Figure 1
The TCFD categorization of risks and opportunities

DEVELOPMENTS in addressing deforestation in soft commodity supply chains have coincided with a growing awareness in the financial sector that climate change poses a systemic risk to the global financial system. Most notably, the work in the context of the Taskforce for Climate-Related Financial Disclosure (TCFD), set up in 2015, has been influential in furthering the thinking about climate risks. In 2017, the TCFD released a set of recommendations for climate-related disclosures in financial filings. Its recommendations represent the most robust framework to disclose the financial materiality of climate risks and opportunities.

The TCFD recommendations are designed to capture consistent, useful and forward-looking information to assist financial markets in their understanding of the financial implications of climate change. Enhanced and coherent disclosure of climate-related risks and opportunities provide investors with the information needed to undertake robust and consistent analyses. Having a common and consistent language to discuss climate-related risks and opportunities helps build a shared awareness. In turn, such awareness allows financiers to engage meaningfully with their investees.

A fundamental principle of the TCFD is the systematic translation of climate-related risks and opportunities into distinct categories and subcategories. Physical risks include the risks resulting from the direct impacts of climate change, while transition risks refer to the risks and opportunities associated with the transition to a low-carbon economy.

The growing awareness of climate and nature related risks may impact financial decision making. Companies across the pulp and paper supply chain that are seen to be less resilient to the physical and transition risks of climate change may face growing difficulties obtaining finance. Companies seen to make use of zero-deforestation opportunities may have access to sustainable finance at more favorable rates.

Physical Risks	Acute Risks	are event driven impacts resulting from increased occurrence and severity of extreme weather events, such as floods, droughts, hurricanes and cyclones
	Chronic Risks	are impacts resulting from longer-term shifts in climate, such as increased temperature, changes in precipitation patterns and rising sea levels

Transition Risks	Policy and legal risks	including policy actions to constrain behaviour that contributes to climate change as well as policies to adapt to climate change
	Technology Risks	including impacts on the comptetitiveness of companies because of innovations that support a low-carbon and energy-efficient economic system
	Market Risks	including the shift in supply and demand for certain commodities and products as climate-related concerns are taken into account during sourcing and consumption decisions
	Reputational Risks	including the relationship between a company's contribution to climate change and consumer perceptions of the organization

Climate Opportunities	Resource Efficiency	including reduced operating costs for organizations that successfully lower their energy, material and water use and waste management
	Energy Source	including improved competitive position for organizations that are able to develop low-emission products and services
	Markets	as companies that seek opportunities in new markets may be able to diversify and better position themselves
	Resilience	including the benefits for organizations that develop adaptive capacity in response to climate change, and their improved capacity to respond to risks and opportunities

2

THE PHYSICAL RISKS OF CLIMATE AND NATURE IMPACTS TO INDONESIA'S PULP AND PAPER SECTOR

The agricultural productivity of forest-risk commodities is sensitive to temperature and precipitation, and thus affected by climate change.

LARGE scale conversion of native vegetation into farmland can have significant impacts on local climate, including increased occurrence of droughts, floods and other erratic weather patterns. Tropical deforestation results in warmer and drier local conditions and may result in more extreme weather events. Such local climate changes can put future agricultural productivity at risk. For Indonesia's pulp and paper sector, two major physical risks are 1) the subsidence of plantations located on peatland, and 2) the occurrence of fires on or around plantations.

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2.1

Chronic risk: Peatland subsidence

AROUND 50 percent of all peatland on the Indonesian islands of Sumatra and Borneo are under some form of plantation management, either to produce agricultural commodities (mostly palm oil), or wood fiber (mostly acacia). Oil palm concessions require agricultural HGU permits, whereas industrial tree plantations require the HTI permits.

2.6 million hectares of land that is given out as HTI concessions is peatland. This constitutes 23 percent of all HTI concessions. The peatland on HTI is mostly located on coastal areas of Sumatra and West Kalimantan (see Figure 2). These are areas with the most mature industrial tree plantations and where the large pulp and paper producers source most of their raw materials.

In the Sumatran province of Riau, around two-thirds of the peat swamp forests has been cleared to make room for agriculture and pulpwood production. The pulpwood is used as the raw material to produce pulp and paper for domestic and international markets.

Drainage of peatland for agricultural plantations causes CO_2 emissions and land subsidence. In turn, subsidence increases the risk of flooding as land surfaces fall below river and sea water levels. A 2019 study on subsidence rates on pulpwood plantations operated by APRIL and its long-term partners found annual subsidence rates of 4.3 centimeters per year.

A 2015 study by Deltares assessed the physical flood risks at a 674,200 ha study area in the Kampar Peninsula in Riau, and found that 31 percent of plantation area is already at risk of flooding or drainage problems. The landscape consists of various plantation types, including both industrial and smallholder oil palm as well as acacia plantations used as feedstock for the pulp and paper industry. The acacia plantations tend to be located on higher elevation and deeper peat levels than the other crops. In 2015, the researchers assessed that 5.1 percent of acacia plantations were at risk of flooding by river water. However, these rates increased to 36.9% and 68.1% respectively in a 50-year and 100-year forecast. These figures are conservative estimates as best management practices were assumed.

Areas at risk may see flooding events at least every few years, for periods of months in the wet season. As flood occurrence increases, plantation productivity will decrease. It is expected that most plantations of the Kampar Peninsula will become economically unviable at some point and that land may be abandoned in response. Whereas acacia plantations face risks at a longer timeframe due to their higher elevation, the researchers predicted that the end result would be the same for all crops and management types.

Peatland subsidence will eventually make it impossible to keep groundwater levels in drained coastal peatland at levels required to maintain productive use of the concessions. Large tracts of land are at risk of regular and lengthy periods of inundation by river and ultimately sea water. The reducing productive use of drained peatland has led some researchers to regard agricultural production on peat as an 'extractive industry' that uses up a finite resource to produce food and fibers.

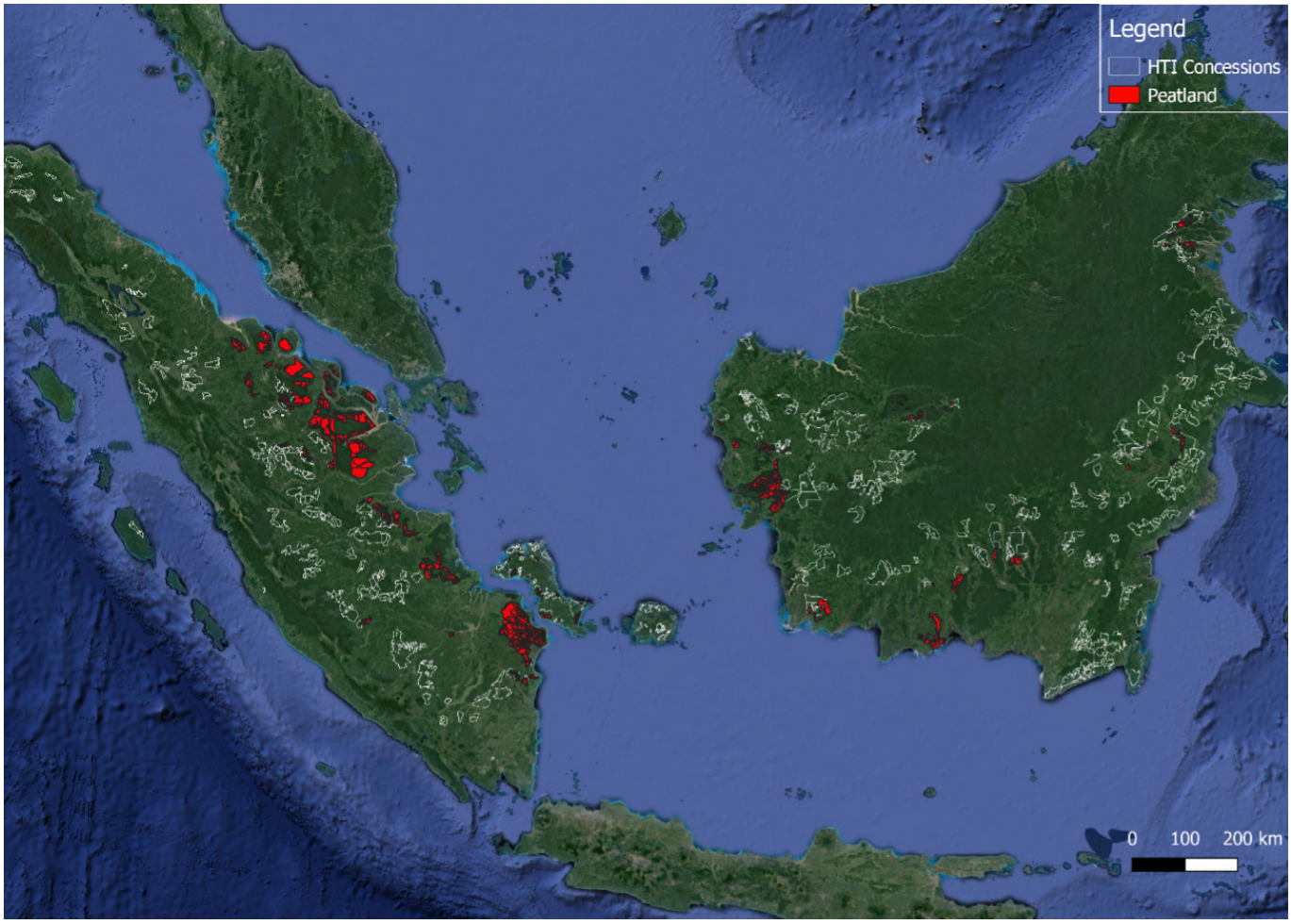

Figure 2
Industrial tree plantations located on peatland in Indonesia

Source
Wetlands International, Ministry of Agriculture, Ministry of Environment and Forestry

'Large tracts of land are at risk of regular and lengthly periods of inundation by river and ultimately sea water.'

Table 1
Company groups with the largest peatland areas within their HTI concessions.

COMPANY *	PEATLAND (HA)	PEATLAND (% OF TOTAL CONCESSION AREA)
Sinar Mas	1,391,062	48
RGE	580,534	34.9
Sumitomo Forestry	145,879	100
Panca Eka **	101,922	75.5
Alas Kusuma Group	86,528	61.9
Salim Group	43,873	20.3
Sinar Deli Group	39,651	98.8
Bativa Prosperindo	36,521	100
Moorim Group	33,664	52.2

*This table only includes data for company groups and excludes data from HTI concessions held by individuals or for which no group structure was identified.

** This includes the inactive concession company PT Rimba Rokan Lestari, in which the Panca Eka Group owners hold a 50 percent stake.

Using peatland on HTI as a proxy, the following company groups may be most exposed to subsidence risk. These include the large integrated pulp and paper companies that belong to Sinar Mas and Royal Golden Eagle (RGE).

Asia Pulp and Paper, a Sinar Mas company, holds the concessions to large tracts of land in Sumatra, a significant portion of which is located on peatland. In addition, other Sinar Mas companies such as PT Daya Tani Kalbar, PT Asia Tani Persada and PT Kalimantan Subur Permai hold over 75,000ha of HTI concessions in West Kalimantan that are predominantly located on peatland. For vertically integrated companies such as APP, peatland subsidence may also impact processing subsidiaries. To illustrate, APP's pulp producing arm PT Indah Kiat Pulp & Paper reports that it purchases a significant portion of its raw materials from the related entity PT Arara Abadi, whose concessions are located in the study areas discussed above.

In addition, PT Indah Kiat Pulp & Paper has issued advance payments to PT Arara Abadi of several hundreds of millions of dollars. Adverse impacts of peatland subsidence at PT Arara Abadi plantations could therefore both result in significant supply chain disruptions and debt write-offs.

RGE's APRIL operates PT Riau Andalan Pulp and Paper (PT RAPP), its plantation arm in and around the town of Pangkalan Kerinci in Riau. Around half of its owned concessions are located on peatland. In addition, a range of HTI concessions are controlled by companies that are ultimately owned by RGE-affiliated individuals and are located on peatland areas in Riau and Papua.

Sumitomo Forestry has the third-most peatland within its HTI concession area. Its entire landbank is located on peat. This includes Sumitomo's recent acquisitions in West Kalimantan.

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2.2

Acute risks: Fire and haze

FOLLOWING the fire and haze crisis in 2015, Indonesia witnessed another year of intense fires in 2019. That year, 1.6 million hectares of land went up in flames. The El Nino Southern Oscillation (ENSO) weather phenomenon exacerbated the fires, causing a hotter and longer dry period. The fires predominantly occurred in areas in Sumatra and Kalimantan that have been the center of agricultural expansion over the last decades. The fires release enormous amounts of CO_2 into the atmosphere, while the haze from the fires has detrimental effects on the health of people, in particular children across South East Asia. The earlier fires in 2015 released more greenhouse gases than the entire economies of Japan and the United Kingdom.
A 2019 report by Auriga discussed the contribution of Indonesia' pulp and paper industry to the fire crisis. It found that the pulpwood plantations that APP and APRIL either operate or source from have seen record numbers of fire alerts. Many of these active plantations are located on drained peatlands, areas that are particularly susceptible to fire risks. Once peatland is drained, peat fires can occur underground and continue for days to weeks. Given the low combustion due to limited oxygen supply, peatland fires create particularly high volumes of toxic smoke. Auriga found that approximately 10 percent of all fire alerts in Indonesia were detected on HTI concessions. Of all the HTI concession fires, 60 percent were detected on drained peatland.

In addition to the adverse climatic and health impacts of peatland fires, the large pulp and paper companies also acknowledge that they may have negative implications for their business. APRIL states in their 2019 sustainability report that "Fire poses a major business risk as fiber from plantations is the key raw material for a pulp and paper business. Fire damages plantations and reduces their value and productivity." In addition to the risk of fires on productivity, it can also trigger government responses. For example, in 2019 the Ministry of Environment and Forestry sealed off 17 plantations, including HTI concession holders in response to the fires. Such measures result in a ban on further plantation development for 3 to 5 years.

Aidenvironment has assessed the NASA VIIRS alerts over the last five years on HTI concessions. The company groups with the most fire alerts on their concessions include Sinar Mas, Royal Golden Eagle and the State-Owned Enterprise Perhutani.

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Figure 3
Top ten company groups with the most fire alerts on HTI concessions, 2016-2020

COMPANY GROUP	2016	2017	2018	2019	2020	TOTAL
Sinar Mas	1,859	733	1,826	12,189	1,195	**17,802**
RGE	1,940	433	759	3003	568	**6,703**
Perhutani	322	296	696	2305	236	**3,855**
Medco	121	144	881	383	91	**1,620**
Sungai Budi	206	117	256	563	78	**1,220**
Moorim Group	173	107	511	227	74	**1,092**
Marubeni Corporation	145	98	185	608	54	**1,090**
Sinar Deli Group	8	1	55	870	1	**935**
Multistrada Arah Sarana	212	66	140	398	116	**932**
Alas Kusuma Group	204	118	233	263	91	**909**

*This table only includes data for company groups and excludes data from HTI concessions held by individuals or for which no group structure was identified. Source: NASA VIIRS

'The El Nino Southern Oscillation weather phenomenon excarbated the fires, causing a hotter and longer dry period.'

3

THE TRANSITION RISKS OF ANTI-DEFORESTATION MEASURES TO INDONESIA'S PULP AND PAPER SECTOR

Restricting global warming to 2 degrees above pre-industrial levels requires fundamental changes in the global economy.

THESE changes will affect a range of different industries, including energy, construction, transportation and agriculture. Political and economic transformations create risks for companies as business models become untenable or outdated, while simultaneously creating opportunities for less carbon intensive companies and products. In a similar fashion, the transition towards deforestation-free commodity supply chains create business risks and opportunities. Following the TCFD framework, the most salient transition risks for Indonesia's pulp and paper sector are the policy risks stemming from government moratoria and the market access risk stemming from corporate responsible sourcing policies.

3.1

Policy and legal risk: HTI concessions under moratorium

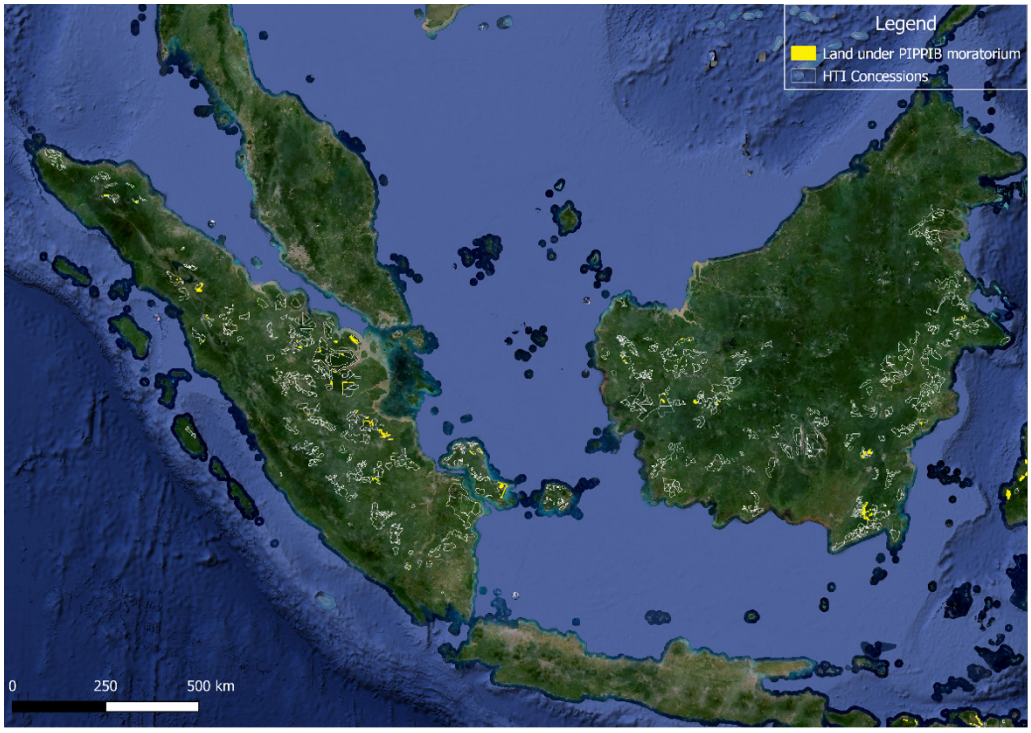


Figure 4
Overlap of moratoria with industrial tree plantations, Sumatra and Kalimantan

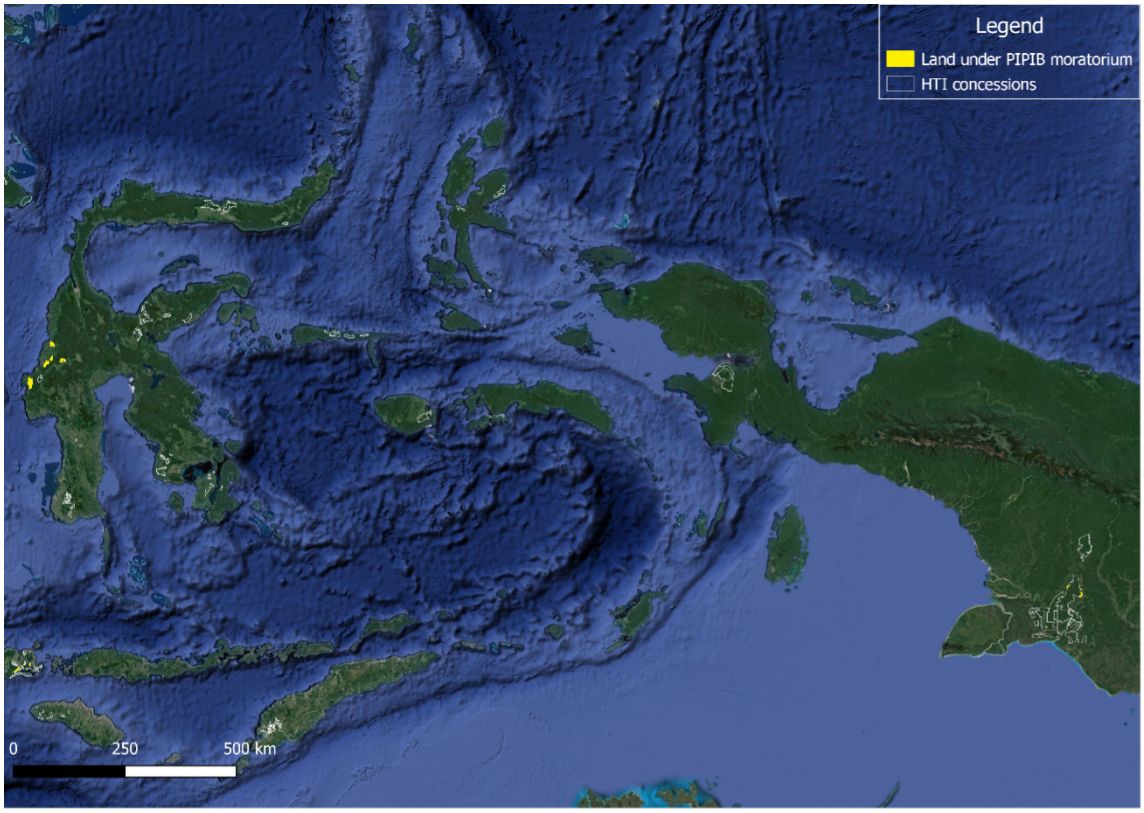
Source
Ministry of Environment and Forestry

In 2011, Indonesia's president Susilo Bambang Yudhoyono issued a moratorium on any new permits for the use of peatland and forests. This moratorium is still in place today and one way that the Indonesian government implements this regulation is by issuing bi-annual moratorium maps. These PIPPIB maps indicate the areas where peatland and forests remain, and where local and regional governments are not allowed to issue permits for new industrial tree, oil palm or other concessions.

In theory, the moratorium applies to land for which no concession permit has been granted yet. However, there is significant overlap between areas under moratorium and HTI concessions. There are overlaps in the more developed areas in Sumatra, as well as in South Kalimantan and Sulawesi (see Figure 4 and Figure 5).

Figure 5
Overlap of moratoria and industrial tree plantations, Sulawesi and Papua

Source
Ministry of Environment and Forestry



'Any development in these areas may create legal risks as contravening regulations may create uncertainty about the legal viability of land clearings.'

Any development in these areas may create legal risks as contravening regulations may create uncertainty about the legal viability of land clearings. Several of these HTI concessions may be dormant or stalled, but the overlap with PIPPIB maps does indicate a restriction for the expansion potential of industrial tree plantations on issued HTI concessions.

The legal risk stemming from the PIPPIB maps overlapping HTI concessions appears to be material for one company in particular.

Korea's Indoco Group holds HTI concession rights for approximately 36,000 ha in Sulawesi of which 60 percent falls under the peatland and forest moratorium. In 2011, Indoco Group announced an investment to develop a 200,000 ha HTI concession, as part of a larger plan that included the construction of a wood pellet factory. The wood pellet factory is intended to supply biomass feedstock to power plants in Korea, a country that is converting away from coal power.

'... approximately 36,000 ha in Sulawesi of which 60 percent falls under the peatland and forest moratorium.'

Table 2
Company groups with the most land under PIPPIB moratorium within HTI concessions

Source
Ministry of Environment and Forestry

COMPANY *	PIPPIB MORATORIUM (HA)	PIPPIB MORATORIUM (% OF TOTAL CONCESSION AREA)
Sinar Mas	28,848	1.0
Indoco Group	22,276	60.2
Panca Eka	14,909	11
RGE	13,177	0.8
Jhonlin	3,553	6.3
Texmaco Group	2,676	1.3
Perhutani	2,261	0.5
Sungai Budi	1,710	1.0
GPS Group	1,550	4.9

*This table only includes data for company groups and excludes data from HTI concessions held by individuals or for which no group structure was identified.

3.2

Market risks: NDPE requirements

THE expansion of pulp and paper production capacity in the 1990s and early 2000s created significant overcapacity and shortage of raw material supply. The HTI concessions on which these factories relied were unable to supply adequate quantities of wood products to meet the growing pulp and paper demand from neighboring countries. As a result, the sector was heavily criticized for its use of tropical timber in order to maintain production rates.

Partially as a result, plans for additional pulp processing capacity in Kalimantan was made conditional on companies having sufficient raw material supply.

In 2011, plans by Korindo, Djarum and Sumitomo Forestry to develop new pulp and paper factories were preceded by the awarding of HTI concession rights to the companies. Djarum received a concession area of 200,000 ha in East Kalimantan, while Sumitomo formed a joint venture with the Alas Kusuma Group for a 200,000 ha concession in West Kalimantan. More recently, Sumitomo took a controlling stake in these concessions, and currently reports managing 151,287 ha, of which 5,031ha are planted. To date, no pulp and paper factories have been built in Kalimantan. At the same time, over 10,000 hectares has been deforested on Djarum's Kalimantan concessions since 2016.

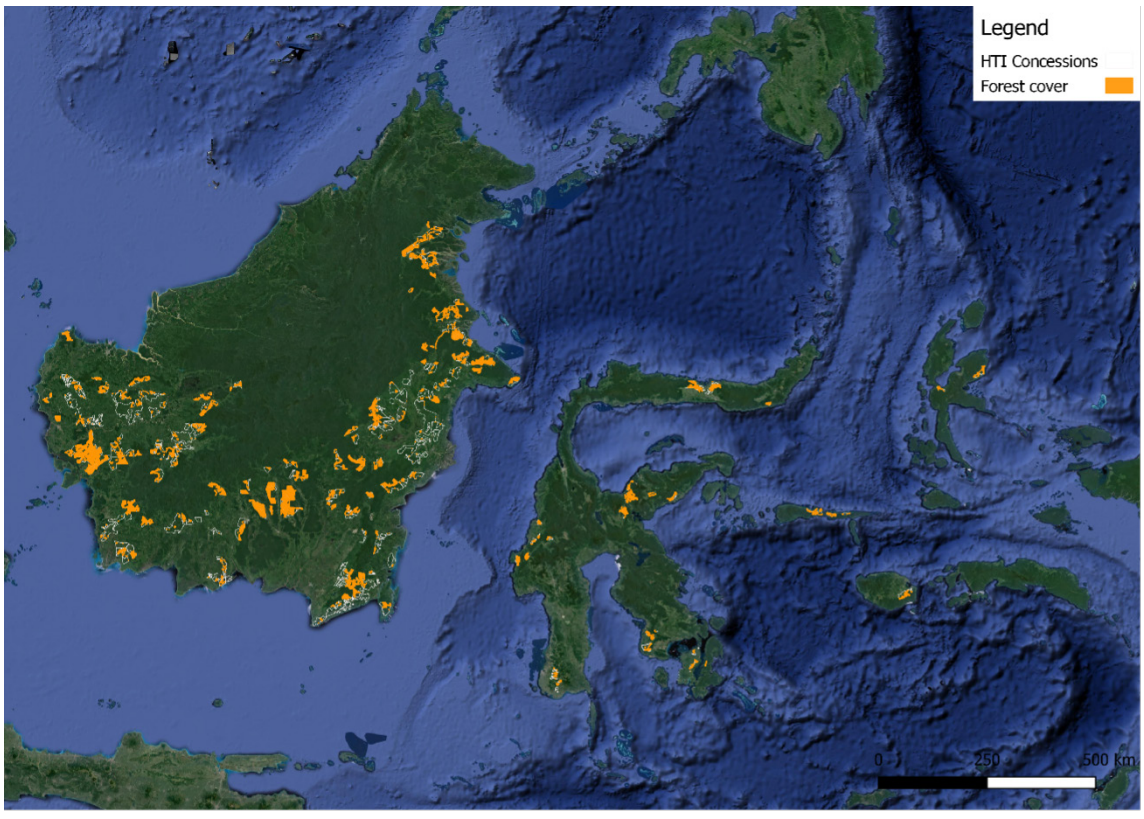


Figure 6
Standing forests on industrial tree plantations, Kalimantan and Sulawesi

Source
Ministry of Environment and Forestry

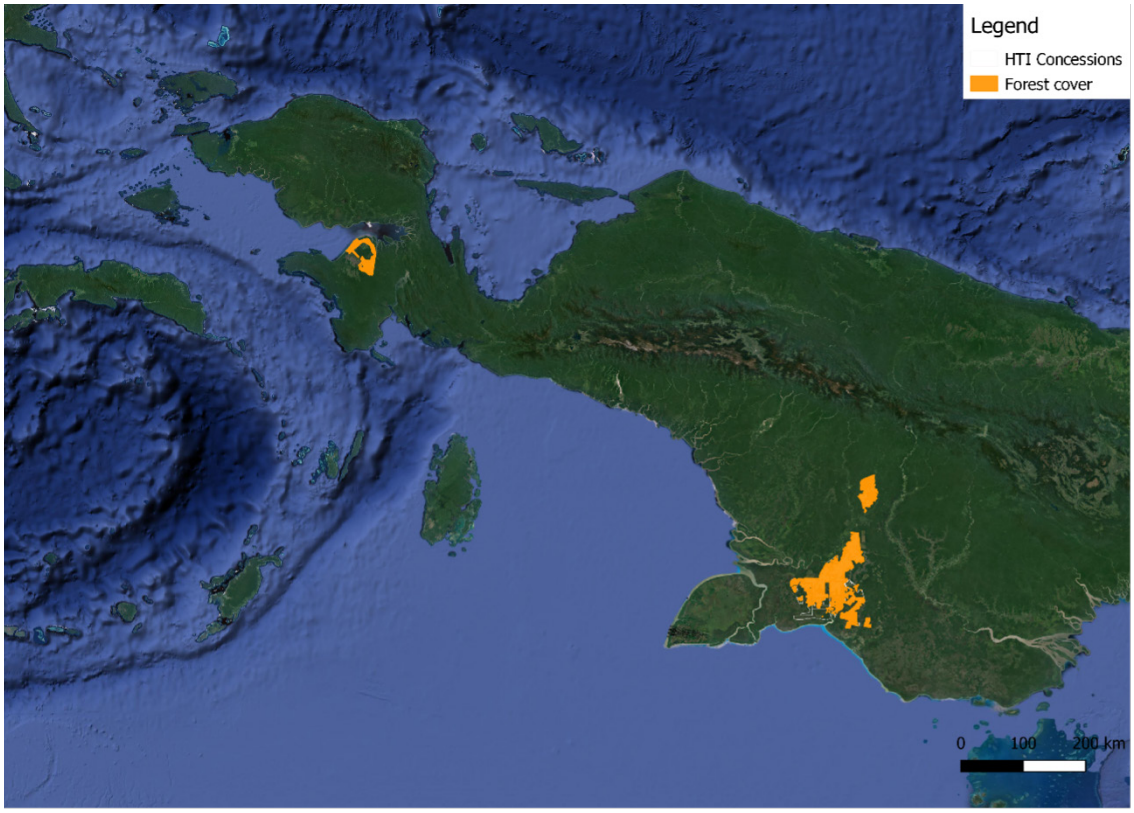


Figure 7
Standing forests of industrial tree plantations, Papua

Source
Ministry of Environment and Forestry

A loss of productivity of the long-established acacia plantations in Sumatra may increase the pressure to produce more pulpwood in other regions, including Kalimantan and Papua. Any expansion of industrial tree plantations over natural forests can be expected to come with significant civil society pressure. Recent deforestation cases on HTI concessions have resulted in complaints filed at sustainability certification bodies, media campaigns and other NGO actions. Several of these cases related to deforestation of APP and APRIL suppliers in East Kalimantan.

An overlay of natural forest cover and HTI concessions shows that there is more than 2.7 million hectares of natural forest remaining on land that has been given out for industrial tree plantations. This area is primarily located in Kalimantan and Papua. In Kalimantan alone, over 25 percent of all HTI concessions is covered with natural forests. The remaining 75 percent is either already in use for industrial trees, overlaps with operating oil palm or mining concessions, or in use by local communities.

While Aidenvironment has been unable to calculate the potential non-forested expansion potential in Kalimantan, this figure is expected to be low.

As a result of the growing awareness among governments, industries and the financial sector, any forested land should be considered as stranded for the purpose of plantation-based production. The reputational, regulatory and market access risks may outweigh any future revenue streams coming from plantation development. With growing technological advancements and improved transparency over the beneficial ownership of concessions, detection of deforestation has become more likely.

The risk of stranded land applies to only a part of all land under HTI concession, as not all areas are intended for agricultural development. For example, APRIL has committed to set aside one hectare of forest for conservation against each hectare of tree plantation. It currently reports an area of 365,733 ha under conservation, or 82 percent of its planted area.

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Furthermore, several HTI concessions are dormant and are not subject to active development plans. HTI concessions may be held for speculative or other purposes and may not be affected by increased sustainability criteria from buyers.

The concept of stranded land has gained acceptance in the global palm oil industry, and a range of initiatives have been initiated in recent years to seek solutions for stranded land. Companies that choose to clear land regardless of the mainstreaming of NDPE policies have faced significant financial consequences.

In the industrial tree sector, the coverage of meaningful NDPE policies is lower. Based on the cumulative production capacity of the pulp, plywood, veneer, wood chips, rubber and other processing facilities in Indonesia (78 million cubic meters), Aidenvironment estimates that 61 percent of the processing capacity for the various end uses of industrial trees are covered by some form of responsible sourcing policies. These policies are not always implemented with rigor, nor do they meet all principles of the Accountability Framework.

A significant portion of HTI concessions is held by company groups that also have palm oil operations. Presently, the NDPE policies of Indonesia's largest palm oil refiners are restricted to palm oil, leaving their business partners the opportunity to continue deforestation in the industrial tree sector. There is however a risk the palm oil refiners may establish a cross-commodity NDPE policy in the near future, in order to create deforestation-free business partners.

As a result, companies that operate both oil palm and industrial tree plantations may face increasing buyer scrutiny in the future, and may eventually be excluded from palm oil supply chains. This risk has already materialized for Malaysia-based Samling Group, who has seen palm oil supply chain exclusions as a result of deforestation for wood products at a concession in Sarawak.

Companies that operate oil palm concessions and have substantial standing forests on their HTI concessions include RGE, Sinar Mas, Medco, Korindo, Salim Group, KPN, Alas Kusuma Group, Djarum, United Malacca, Jhonlin, Sampoerna and Panca Eka.

Table 3
Company groups with the most standing forests within HTI concessions

Source
Ministry of Environment and Forestry

COMPANY GROUP	FOREST COVER (HA)	PIPPIB MORATORIUM (% OF TOTAL CONCESSION AREA)
RGE **	371,911	22.3
Sinar Mas	235,921	8.1
Texmaco Group	189,949	91.9
Modern Group	184,019	87.1
Medco	133,099	56.0
Korindo	104,561	90.0
Salim Group	82,682	38.3
KPN Corp	80,242	52.4
Alas Kusuma Group	77,573	56.7
Diarum	68,594	29.9

*This table only includes data for company groups and excludes data from HTI concessions held by individuals or for which no group structure was identified.

** Including forests that may have been set aside for conservation purposes.

4

ZERO-DEFORESTATION OPPORTUNITIES FOR INDONESIA'S PULP AND PAPER SECTOR

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AS is the case with other forest risk commodities, there may exist a range of opportunities for companies with sustainable business models that would protect ecosystems, provide benefits for local communities and be economically viable. Production models and sourcing practices that take into account climate and nature impacts may create more resilient production landscapes, provide access to new markets or offer premium prices, and enhance a company's reputation.

4.1

Resilience: Recovery and alternative production models on peatland

SUSTAINABLE business models have been developed that aim to manage degraded peatland in an environmentally friendly and socially equitable manner. Some of these efforts have looked at the rewetting of drained and degraded peatlands while making use of wetland cropping systems (paludiculture). Winrock International, a nonprofit agricultural development organization, conducted a pilot project at a 2,000ha former acacia plantation in Riau. This area experienced frequent fires and had been repatriated to local communities under an Indonesian government's reform program (TORA). Through a "mixed-use" approach of planting various wetland-tolerant crops in some areas while protecting other areas, the pilot aimed to prove that successful restoration and developments of degraded peatlands could both be economically viable and capture and retain significant volumes of carbon.

'... the pilot aimed to prove that successful restoration could be economically viable and retain carbon.'

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4.2

Markets: Credible deforestation-free claims through recovery

COMPANIES who can make credible claims about the deforestation-free nature of their pulp and paper products may have preferred access to markets, enjoy enhanced reputations and demand premium prices for their products. However, unsubstantiated claims may create the opposite effect, and may significantly harm a company's reputation and market standing.

The definition of deforestation-free is evolving and may not only apply to a company's current operations, but also to its past impacts. The Indonesian pulp and paper industry has been responsible for the conversion of large swaths of tropical rainforest in past decades.

As such, stakeholders may demand recovery or compensation for past harm in order to accept corporate deforestation-free claims.

Discussions are ongoing in the palm oil sector about recovery plans for past deforestation and peat development. In 2018, Wilmar, the world's largest palm oil trader recognized the need for remediation measures and committed to contribute to the development of industry-wide remediation and restoration guidelines. Models to assess deforestation liabilities and criteria for acceptable recovery plans are currently underway.

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