

Will Asia Pulp & Paper default on its “zero deforestation” commitment?

An assessment of wood supply and plantation risk for PT OKI Pulp & Paper Mills’ mega-scale project in South Sumatra, Indonesia



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Executive Summary

On February 5, 2013, Asia Pulp & Paper (APP) announced “an end to the clearing of natural forest across its entire supply chain in Indonesia, with immediate effect.” The group’s “no deforestation” pledge and other sustainability commitments appeared to mark a sharp change from APP’s practices over the preceding three decades. Since developing two large pulp mills in Sumatra in the mid-1990s (its first pulp mill began operation in the 1980s though at a lower capacity), Indonesia’s leading pulp and paper producer and its affiliates had relied heavily on “mixed tropical hardwoods” (MTH) sourced from clearance of natural forests. APP and its parent conglomerate, the Sinar Mas Group, have been criticized for destroying forest ecosystems and habitat for critically endangered species such as the Sumatran tiger, displacing rural communities from customary lands, and contributing to global warming by developing high-carbon peatlands.

The OKI pulp and paper mill

Five months after making these sustainability commitments, APP announced in July 2013 it is building a third, mega-scale pulp mill in Indonesia, financed by \$2.5 billion in loans from China’s state-owned banks. The PT OKI Pulp & Paper Mills (OKI) project in South Sumatra will increase APP’s overall wood demand in Indonesia by more than 50% if, as indicated by the company, the mill’s pulp production capacity is 2.0 million tons/yr. However, OKI’s Director recently stated that APP plans to increase the mill’s capacity to 2.8 million tons/yr, and the pulp industry press has reported that key machinery ordered for OKI can be upgraded to allow the mill to produce 3.2 million tons/yr. These higher production capacities are in line with media reports claiming that OKI will be one of the world’s largest pulp mills. Should the capacity be 2.8 million tons/yr, the group’s wood demand will increase by nearly 75%; and if the ultimate capacity is 3.2 million tons/yr, it would expand by 85% to nearly 33 million cubic meters.

Given APP’s commitment to source wood fiber entirely from plantations, many stakeholders are now asking: Will the group’s plantations produce enough wood to meet the demand of the three Sumatra pulp mills’ once OKI begins production? And if Sinar Mas/APP’s plantations do not produce enough wood, will the group resume clearing natural forests?

Projected shortfall of plantation wood

This report examines whether Sinar Mas/APP concessions in South Sumatra have established enough planted area to produce the volumes of wood fiber that OKI will require under pulp production capacities of 2.0 million, 2.8 million, and 3.2 million tons/yr. Based on the planted areas that APP reported in 2015, the analysis finds the group’s South Sumatra concessions are at least 59,000 hectares short of the planted areas needed to produce the volumes of fiber OKI will consume, even under a high-growth scenario and with 2.0 million tons/yr of pulp capacity. The size of the shortfall is projected to become significantly greater under medium-growth or low-growth plantation scenarios and/or if OKI’s pulp capacity is expanded to 2.8 million or 3.2 million tons/yr. Following the catastrophic fires of 2015 – in which an estimated 86,000 ha of planted Acacia burned within Sinar Mas/APP’s concessions – this deficit is far greater today than even a year ago.

On a group-wide basis, the analysis indicates that APP’s reported developed plantation area across Indonesia will be insufficient to fully meet the wood fiber demand of the group’s two existing mills and the OKI mill. Even under a high-growth scenario for the plantations and with OKI’s pulp production capacity assumed to be 2.0 million tons/yr, it is projected that APP will face an annual shortfall of plantation wood of 3 million cubic meters (m³). This annual shortfall is projected to increase to more than 11 million m³ under a medium-growth scenario and/or if the OKI mill’s pulp production capacity increases to 2.8 million or 3.2 million tons/yr. Under a low-growth scenario, the shortfall would be far higher.

APP has failed to disclose many essential details about its future wood supply despite its claims of “unprecedented transparency.” Instead, the company has offered blanket assurances that its suppliers

will produce sufficient volumes of plantation-grown wood to meet the group's long-term fiber needs and maintain its sustainability commitments. To support these claims, APP has cited a growth and yield study by The Forest Trust and forestry consultancy Ata Marie that examined wood supply only through 2020. To put the scope of this study in context, the OKI mill could produce pulp for decades to come, while the study covers only the first four years of its operations. To the knowledge of the authors of the present report (as of April 10, 2016), the study and its underlying data have not been released for public review. Moreover, when the study's conclusion was announced in 2014, neither The Forest Trust nor APP indicated that it had examined the group's wood supply only through 2020.

Plantation risk factors

APP states that it is now working to improve tree growth and yields across its plantation base. But the plantations in South Sumatra intended to supply OKI and those in other provinces in Indonesia face major risks that could significantly affect their productivity. These risks suggest that average growth rates and overall production levels could stagnate or even decline.

During Indonesia's disastrous 2015 fires, over one-third of the high confidence hotspots in Sumatra were inside concessions that will supply OKI when it begins operation. The fires burned some 293,000 ha within those concessions and destroyed an estimated 26% of the area planted with pulpwood species. High susceptibility to fire will remain an ongoing and persistent threat to these plantations given that 77% of their concession area is on peatlands. When peatlands are drained for the development of pulpwood plantations, they become extremely susceptible to fires which are difficult to extinguish and produce significantly more haze than fires on mineral soils.

Drained peatlands are also subject to subsidence and associated flooding over time, which decrease productivity and eventually can lead to unviable plantations. Pests like macaques and diseases such as *Ganoderma* root rot and a stem wilt/canker called *Ceratocystis* have caused declining yields on Acacia plantations in Sumatra. APP suppliers across Sumatra are also facing hundreds of land tenure disputes and social conflicts. These can undermine productivity and profitability at plantation sites by causing disruption of operations, damage or destruction of planted areas, loss of concession area, and in some cases, violence. Taken together, these material plantation risks indicate a significantly more precarious wood supply situation than the company has acknowledged.

Effects on wood cost

APP officials claim that if its plantation suppliers in South Sumatra fail to produce enough wood for the OKI mill, then the company will import wood from outside the province. This could mean shipping in pulplogs or wood chips from Kalimantan or other regions within Indonesia, as APP has done in the past to supply the Indah Kiat mill in Riau. Or it could potentially mean that the Sumatra mills would rely on wood chips shipped in from producers in Australia, Vietnam, or other countries. Under any of these scenarios, shipping in wood from outside South Sumatra would likely make OKI's wood supply considerably more expensive than plantation fiber sourced locally. For lenders, investors, and other financial stakeholders, the possibility that the OKI mill could face higher than expected wood costs should raise questions about the mill's overall cost competitiveness and profitability.

For stakeholders of APP's sustainability commitments, the company's failure to disclose many basic details about its wood supply plans raises questions about whether APP will maintain these commitments after the OKI mill begins production. Company officials have repeatedly emphasized that APP will adhere to its commitments even in the event OKI or its other mills face wood supply shortages. But if maintaining these sustainability commitments jeopardizes the mill's profitability, which will APP's management and controlling shareholders prioritize?

Weighing the tradeoffs

Within this context, it is important for Indonesian stakeholders to assess how the stated economic benefits of OKI's mega-scale mill project compare to the considerable public resources that have been made available. This report shows how the extensive land area that has been licensed to support the mill – over ten times the size of Singapore – has resulted in only a limited number of jobs created by Sinar Mas/APP supplier concessions. Moreover, portions of these concessions overlap with land claimed by local communities. The report also shows how, despite the very large capital investment involved, the OKI project is likely to generate minimal tax and royalty revenues for the Government of Indonesia.

The OKI mill and associated plantations have already resulted in high externalized costs, which are expected to continue as the mill begins operations in late-2016. South Sumatra was one of the provinces worst affected by Indonesia's devastating 2015 fires, and a majority of the fires in the province occurred inside Sinar Mas/APP concessions. The resulting haze had major impacts on health across the region, causing hundreds of thousands of respiratory infections and in Palembang, the province's capital, the deaths of four babies. The World Bank estimated the 2015 fires caused economic losses to the province of US\$ 3.9 billion.

With a capital investment over US\$ 2.6 billion, APP's construction of the OKI mega-scale pulp and paper mill in the peatlands of South Sumatra also effectively locks in high levels of annual carbon emission, potentially for decades to come. And especially in El Niño years, CO₂ emissions from these sites can potentially reach globally significant levels, as they did in 2015.

Recommendations for APP and the Sinar Mas Group

Be transparent:

- Immediately release credible and verifiable long-term wood supply plans for OKI and other APP pulp mills to assure stakeholders that APP has enough plantation fiber to supply its mills and a responsible back-up plan to compensate for any short-fall.
- Disclose key information on material risk factors potentially affecting productivity and sustainability of HTI plantation resources.

Be responsible:

- Adopt an accountable plan to completely phase out pulpwood production on drained peatlands, publish a detailed map of peatlands on Sinar Mas/APP concessions, and phase-in paludiculture crops.
- Adopt a moratorium on further land acquisitions until pre-existing customary rights of indigenous peoples and local communities are respected and conflicts are resolved.

Recommendations for the Government of Indonesia

Ensure sustainability:

- Require APP to clarify the designed pulp production capacity of the OKI mill and to verify the long-term wood supply plans for each of the group's mills before OKI's operating permit is issued.
- Prohibit the use of "mixed tropical hardwoods" from clearing of natural forests by pulp producers.
- Impose a permanent ban on the development of new plantations on drained peatlands, including phasing-out of existing sites, and hold industrial plantation forest (HTI) license-holders legally accountable for creating conditions that are high risk for peatland fires and other environmental hazards.

Ensure equitable development:

- Convene an independent review of government policies to promote development of mega-scale pulp mills and HTI plantations in Indonesia.
- Support recognition of the customary rights of indigenous peoples and local communities living in and around HTI concession areas, and resolution of conflicts.

Recommendations for financial institutions, investors, and buyers

Understand the risks:

- Increase scrutiny of APP's corporate sustainability commitments, especially as the OKI mill project expands the group's social and environmental footprints.
- Improve due diligence practices to assess APP's wood supply plans, and understand material risks and social/environmental impacts associated with HTI plantation development as a source of wood supply.

Obtain independent verification:

- Before considering APP's operations to be sustainable or non-controversial, require genuinely independent third-party monitoring and verification of key performance indicators.

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Acronyms and abbreviations

APP	Asia Pulp & Paper
BHK	Bleached Hardwood Kraft
BKPM	<i>Badan Koordinasi Penanaman Modal</i> (Capital Investment Coordinating Board)
BMKG	<i>Badan Meteorologi, Klimatologi dan Geofisika</i> (Meteorology, Climatology, and Geophysics Agency)
BPPT	Badan Pengkajian dan Penerapan Teknologi (Agency for the Assessment and Application of Technology)
BRG	<i>Badan Restorasi Gambut</i> (Peatland Restoration Agency)
CDB	China Development Bank
ENSO	El Niño-Southern Oscillation
FCP	Forest Conservation Policy
FDL	Free Drainability Limit
FPIC	Free, Prior, and Informed Consent
GFED	Global Fire Emissions Database
GHG	Greenhouse Gas
GMT	Green Metric Ton
HCS	High Carbon Stock
HCV	High Conservation Value
HPH	<i>Hak Pengusahaan Hutan</i> (Commercial forestry concessions)
HTI	<i>Hutan Tanaman Industri</i> (Industrial plantation forest)
HWL	High Water Level
IBRA	Indonesia Bank Restructuring Authority
IUPHHK-HT	<i>Iuran Izin Usaha Pemanfaatan Hasil Hutan Kayu pada Hutan Tanaman</i> (HTI concession license fee)
INDC	Intended Nationally Determined Contributions
ISFMP	Integrated Sustainable Forest Management Plan
KPK	<i>Komisi Pemberantasan Korupsi</i> (Anti-Corruption Commission)
MAI	Mean Annual Increment (measured in m ³ /ha/year)
MTH	Mixed Tropical Hardwoods
ODMT	Oven-dried Metric Ton
OKI	PT OKI Pulp & Paper Mills
PBB	<i>Pajak Bumi Bangunan</i> (Land and Building Tax)
PSI	Pollutant Standards Index
RKT	<i>Rencana Kerja Tahunan</i> (Annual Work Plan)
RPBBI	<i>Realisasi Pemenuhan Bahan Baku Industri</i> (Industrial Wood Use)

RSPO	Roundtable on Sustainable Oil Palm
SBSA	PT Sarana Bina Semesta Alam Chip Mill
TFT	The Forest Trust
WKS	PT Wirakarya Sakti



Chapter One: Introduction

Section 1.1: APP's sustainability commitments

On February 5, 2013, Asia Pulp & Paper (APP) announced that it would end the use of wood fiber from natural forests and achieve “zero deforestation” in the supply chains of its pulp mills (see Box 1.1). APP, the largest pulp and paper producer in Indonesia and China, claimed that its mills will use “100% sustainable plantation wood for pulp” and not accept “natural forest wood” after the cut-off date of August 31, 2013 (APP 2014a). In making these sustainability commitments, APP has described itself as “playing a leading role in helping the world end deforestation” (APP 2014a).

This appears to mark a sharp change from APP's practices over the preceding three decades. Since developing two large pulp mills in Sumatra in the mid-1990s (its first pulp mill started operating in the 1980s albeit at a lower capacity), APP and its affiliates had relied heavily on “mixed tropical hardwoods” (MTH) sourced from clearance of natural forests (Eyes on the Forest 2011; IWGFF 2010; Barr 2001). For many years, the group has been criticized for destroying forest ecosystems and crucial habitat for critically endangered species such as the Sumatran tiger, displacing rural communities from customary lands, and contributing to global warming by developing high-carbon peatlands (Eilperin 2013; Eyes on the Forest 2011; Greenpeace 2010; RAN and JATAN 2010; Uryu et al. 2008; Uryu et al. 2010).

APP has made similar commitments to ending its use of wood fiber from natural forests in 2001, 2003, and 2007.¹ But in each case it failed to meet those “sustainability targets” (Eyes on the Forest 2011). Environmental organizations campaigned against the group in the years immediately preceding the 2013 sustainability commitments, and several major pulp and paper buyers and global retailers suspended or canceled contracts (Wright 2008; Kelly 2011; Eyes on the Forest 2011).

APP entered into a new relationship with one of its harshest critics, Greenpeace, when it announced its current sustainability commitments in February 2013. The global environmental advocacy organization publicly applauded APP's commitments and suspended its campaign for buyers and retailers to boycott APP's products (Kieman 2013). Greenpeace's endorsement sent a strong signal to market actors, financial institutions, consumers, and other stakeholders that APP's efforts to adopt more sustainable practices represent a credible model for corporate social and environmental responsibility in Indonesia's forestry sector. Greenpeace assured stakeholders that the risk of APP breaking its commitments was low, since doing so would be tantamount to “commercial suicide” (Maitar 2013).

Section 1.2: The OKI pulp and paper mill in South Sumatra

Just five months after introducing its sustainability commitments, APP announced in July 2013 it would build one of the world's largest pulp and paper mills in South Sumatra (APP 2013a). RISI, a leading paper industry intelligence service, had first reported plans for a mega-scale pulp mill project in that province in early 2012 (Schaefer 2012). The project's sponsor, PT OKI Pulp & Paper Mills (hereafter OKI), was widely reported to be affiliated with APP. However, as RISI has noted, until mid-2013 “APP kept its distance from anything that might link it to the pulp mill plan, despite rampant rumors in the industry. It claimed the facility was to be owned and built by an APP wood supplier, whilst declining to name the firm” (RISI 2013).

In retrospect, this was the period immediately before and after APP announced its sustainability commitments. When APP finally did announce its role in building the South Sumatra mill in July 2013, the group already held a 70.58% equity stake in OKI through affiliates PT Pabrik Kertas Tjiwi Kimia Tbk (hereafter Tjiwi Kimia) and PT Pindo Deli Pulp and Paper Mills (hereafter Pindo Deli) (RISI 2013).

¹ For example, *APP Sustainability Action Plan 2004* states: “The company has previously committed to becoming sustainable in 2007. This means that, after this date, APP/SMG will be fully reliant on renewable, plantation-grown fiber from socially, environmentally and legally responsible sources.”

Box 1.1: APP's Forest Conservation Policy (FPC)

APP's Forest Conservation Policy, adopted in February 2013, includes the following commitments:

- **Policy commitment 1:** APP and its suppliers will only develop areas that are not forested, identified through independent HCVF [High Conservation Value Forest] and HCS [High Carbon Stock] assessments.
- **Policy commitment 2:** APP will support the Government of Indonesia's low emission development goal and its target to reduce greenhouse gas emissions.
- **Policy commitment 3:** In order to avoid and resolve social conflicts across the supply chain, APP will actively seek and incorporate input and feedback from a wide range of stakeholders, including civil society as it implements . . . principles [of]: Free, Prior, and Informed Consent of indigenous people and local communities [and] respect for human rights [among other principles].
- **Policy commitment 4:** APP sources fiber from all around the world and is developing measures to ensure that this sourcing supports responsible forest management.

The company stated that the new policy would apply to: 1) APP and all its suppliers in Indonesia; 2) any Indonesian fiber utilized by APP's mills elsewhere, including China; and 3) all future expansion.

The full text of APP's Forest Conservation Policy appears in Appendix A.

APP has indicated that the OKI mill will have the capacity to produce 2.0 million tons per year (tons/yr) of bleached hardwood kraft (BHK) pulp and 500,000 tons/yr of tissue paper (APP 2013b). Assuming the OKI mill will operate at this capacity, the mill would expand APP's overall pulp production in Indonesia by over 50%, with a corresponding increase in the group's effective wood demand to 27.26 million m³/yr.² Recent media statements by Sinar Mas officials indicate that OKI is expected to begin pulp production in October 2016 (Amin 2016).

A prominent industry media source reported in April 2015 that APP may, in fact, be planning to install pulp capacity of 2.8 million tons/yr at the OKI mill and that the equipment purchased could potentially be upgraded to enable the mill to produce 3.2 million tons/yr of pulp (*PPI Magazine* 2015). OKI Director Suhendra Wiriadinata confirmed plans to increase the capacity to 2.8 million tons/yr in a statement published in *The Jakarta Post* on March 2, 2016: "Suhendra said his firm would increase the pulp mill's capacity to 2.8 million tons when everything was on track" (Amin 2016). If OKI has an annual pulp production capacity of 2.8 million tons, this will increase APP's overall pulp production in Indonesia by approximately 73%, raising the group's effective wood demand to 31.02 million m³/yr.

Section 1.3: Purpose and structure of this study

Given the increase in wood demand, this report seeks to answer a critical question many stakeholders are now asking: Will Sinar Mas/APP's supplier plantations produce enough wood for the group's Sumatra pulp mills once OKI begins production *and* maintain its commitment to use only plantation-grown fiber? The

² In Indonesia APP's current effective wood demand of approximately 17.86 million m³/yr would increase to 27.26 million m³/yr, based on an assumed conversion factor of 4.7 m³ per ton of pulp (see Box 3.1).

answer to that question appears to be far from certain, despite APP's and its supporters' strong assurances that its plantations will do so.

The report presents the authors' review of available data and analysis on APP's expansion plans and sustainability commitments, especially as they relate to future wood supply for the OKI mill and the two existing mills. This is intended to help stakeholders in the OKI project – including, among others, government policymakers, financial institutions, pulp and paper buyers, local communities, and the broader Indonesian public – to better understand the challenges, risks, and tradeoffs associated with the South Sumatra project. On a broader level, the report also seeks to encourage discussion about whether mega-scale pulp and paper mills are a sustainable development model for Indonesia, especially in relation to the government's economic equity and low-carbon development targets.

The report considers the “independent assessment” that Asia Pulp & Paper has used to support its claim for having sufficient plantation resources for a long-term and sustainable wood supply (APP 2014b). The Forest Trust (TFT) and forestry consultant Ata Marie produced this assessment, which has been widely cited in the media, though (as of April 10, 2016) it has yet to be released for public review. Based on what the authors know about the limited scope of the assessment, this report explains how the TFT/Ata Marie study has not definitively demonstrated that APP has sufficient plantation resources to meet its sustainability commitments over the long term.

That APP could build a mega-scale pulp mill involving a multi-billion dollar capital investment without explaining in detail where the wood fiber will come from is not without precedent (Spek 2006). Indeed, the company did just this in the 1990s when it constructed the Indah Kiat and Lontar Papyrus mills in Riau and Jambi provinces, respectively (Barr 2001). APP built both of these mills – and carried out multiple capacity expansions – while providing only limited transparency on issues related to wood supply. In its prospectuses, APP and its affiliates signaled to lenders and investors that the group's pulp producers had a competitive advantage in being able to source their wood fiber from sustainably managed, fast-growing plantations (Fallon 2003; Shari 2001). Through the 1990s and 2000s, however, while the group was certainly developing extensive areas of plantations, it relied heavily on MTH harvested from the clearing of primary and degraded natural forests, including extensive peatland ecosystems (IWGFF 2010; Barr 2001).

This report calculates projected wood demand and land requirements for the OKI mill under different pulp production capacity scenarios: 2.0 million, 2.8 million, and 3.2 million tons/yr. Using official company reports submitted to the Government of Indonesia, the study documents reported wood production from 2011 to 2014 by Sinar Mas/APP's pulpwood concessions in South Sumatra. APP has indicated that it will rely on these concessions in South Sumatra province to cost-effectively source fiber in close proximity to the mill (APP 2013c).

The report also examines key risk factors that could affect the South Sumatra plantations' ability to produce enough fiber for the OKI mill over the long-term. Major risks factors include: catastrophic fires; peatland subsidence and related risks of flooding and exposure of potential acid sulphate soils; pests and diseases; and social conflict and land tenure claims. The risk of catastrophic fires became readily apparent in 2015 when an estimated 293,000 hectares (ha) of Sinar Mas/APP's plantation base in South Sumatra burned, including approximately one-quarter of the group's planted area in the province (Hutan Kita Institute et al. 2016). Moreover, many of these areas are prone to subsidence, flooding, and the damaging effects of underlying acid sulphate soils.

On both mineral soils and peatlands, Sinar Mas/APP's plantations are vulnerable to a host of pests and diseases. A growing body of research has documented that these have long-term negative impacts on plantation growth rates, mortality levels, and per hectare yields (Harwood and Nambiar 2014a). In addition, Sinar Mas/APP is facing several hundred conflicts with rural communities over land tenure and

other issues (Rainforest Alliance 2015b). Although APP has committed to resolving such conflicts with local communities, this process has been extremely slow and of limited effectiveness (Rainforest Alliance 2015b).

The final section of the report addresses the benefits and costs of the mill for the people of South Sumatra and Indonesia. APP claims that the mill will create direct employment for 3,500 people and indirect employment for an additional 15,000 people (Amin 2016). These employment figures are analyzed in relation to the expansive land area of the concessions expected to supply the mill with fiber. The report also explains that the Government of Indonesia has provided OKI with a ten-year tax holiday, thereby forfeiting corporate tax revenues for the first eight years of production and one-half of corporate tax revenues for the following two years (Himawan 2015). In addition, the report considers the history of corporate tax payments by APP's flagship producer, PT Indah Kiat Pulp and Paper Tbk, which suggest that even without such a tax holiday mega-scale pulp mills may generate only limited tax revenues for the government.

The report also discusses major externalized costs associated with the OKI mill. Chief among these are public health problems from smoke and haze caused by fires on drained peatlands. Though Sinar Mas/APP suppliers may not have started fires inside their plantations, a growing body of evidence shows the development of commercial plantations on drained peatlands is often associated with the creation of a high fire-risk environment (Hooijer et al. 2010). According to a recent analysis, some 78% of hotspots in South Sumatra during the 2015 fire season occurred inside Sinar Mas/APP supplier concessions (Hutan Kita Institute et al. 2015), and this province was one of the worst affected by the fires and associated haze. The Sinar Mas/APP supplier concessions on drained peatlands also contribute to Indonesia's high levels of carbon emissions, which impact climate change and reduce potential future revenues from carbon sequestration.

Box 1.2: Relationship between APP and the Sinar Mas Group

This report considers APP to be an entity that encompasses the group's pulp and paper mill operations in Indonesia. The Sinar Mas Group is considered to be APP's parent conglomerate, which through Sinar Mas Forestry controls the forestry concessions which supply wood to the group's mills. As APP and the Sinar Mas Group are widely reported to have both common ownership and a close operational relationship, this report treats them as a single entity with the designation Sinar Mas/APP, unless otherwise indicated. This treatment is consistent with that used by APP itself in the group's 2004 Sustainability Action Plan:

APP is a Singapore-registered company encompassing all of the pulp and paper mill operations in Indonesia. It relates to the Sinar Mas Group (SMG) by common ownership. In the context of this report, SMG refers to the collective management of the SMG forestry companies of PT. Arara Abadi and PT. Wirakarya Sakti, which respectively supply the mills in Riau and Jambi. SMG is the main supplier of wood fiber to both of these mills. The common ownership and close relationship between APP and SMG enable effective cooperation. Such cooperation also serves to facilitate management changes and efforts to achieve sustainability. Although the two entities are not legally related, there is a strong market perception that they are one. For this reason APP and SMG are treated as one entity in this Plan unless specifically indicated otherwise. (APP 2004)



Chapter Two: Sinar Mas/APP and PT OKI Pulp & Paper Mills

This chapter examines the corporate structure of PT OKI Pulp & Paper Mills and its relationship with APP and the Sinar Mas Group. It also reviews what has been reported about the financing and the anticipated production capacity of OKI's mega-scale mill project in South Sumatra. Significantly, industry sources have indicated that Sinar Mas/APP may be planning to build a much larger pulp mill at the OKI site than the 2.0 million tons/yr mentioned repeatedly in company statements and related media coverage since 2013. Moreover, the government's investment approval for the OKI mill suggests the construction currently underway may simply be the first phase of a much larger project, involving the installation of several additional paper production lines.

China's state banks have reportedly provided loans covering over 70% of the US\$ 2.639 billion investment being made in the initial phase of the OKI project, giving them a substantial stake in what may ultimately become the world's largest pulp and paper mill. The Government of Indonesia is also supporting development of the South Sumatra mill by providing OKI with a ten-year tax holiday.

Summary of key points

- The OKI South Sumatra mill project is the first greenfield pulp mill to be built in Indonesia since the late-1990s, and it represents a milestone for Sinar Mas/APP given the group's US\$ 13.9 billion financial default in 2001.
- Since 2013, Sinar Mas/APP has indicated that the OKI mill will have the capacity to produce 2.0 million tons/yr of pulp and 500,000 tons/yr of tissue.
- A 2013 investment permit issued by Indonesia's Capital Investment Coordinating Board indicates the project may include two additional phases involving: 1) tissue production of 2.0 million tons/yr in the second phase; and 2) a culture paper production line with a capacity of 600,000 tons/year in the third phase.
- Industry media reports indicate Sinar Mas/APP may also plan to increase the pulp capacity at the OKI mill to 2.8 million tons/yr, and possibly to 3.2 million tons/yr in the future. A recent statement by OKI's Director has confirmed the company's plan to expand OKI's pulp capacity at an undetermined date.
- Sinar Mas/APP has reportedly secured US\$ 2.5 billion in financing for the OKI mill project through loans from the China Development Bank and ICBC Financial Leasing.
- Sinar Mas/APP is providing equity investment in the project through affiliates Tjiwi Kimia and Pindo Deli.
- The Government of Indonesia has provided OKI with a full corporate tax holiday for the first eight years of operations and a 50% tax holiday for the ensuing two years.

Section 2.1: Profile of APP and the Sinar Mas Group

Asia Pulp & Paper reports describe the entity as a trade name for a group of pulp and paper manufacturing companies in Indonesia and China affiliated with the Sinar Mas Group (APP 2015a). Sinar Mas is a diversified conglomerate with activities in a range of sectors, including pulp and paper, agribusiness, energy and infrastructure, telecommunications, real estate and development, and financial services (Sinar Mas 2015). Indonesian entrepreneur Eka Tjipta Widjaja, whose commercial activities date back to the late 1930s, founded Sinar Mas, and he and his family members control the group's core companies (Sinar Mas 2015).

APP is the largest pulp and paper producer in Indonesia (Lee 2015). The group’s companies own nine pulp and paper mills, with a combined pulp production capacity of 3.8 million tons/yr and paper and paperboard capacity of 6.8 million tons/yr (see Table 2.1). In 2014, APP’s Indonesia mills generated US\$ 5.569 billion in sales revenues (APP 2015a). PT Purinusa Ekapersada, a holding company controlled by members of the Widjaja family, owns a controlling share in each of the group’s Indonesia pulp and paper operating companies (APP 2015a).

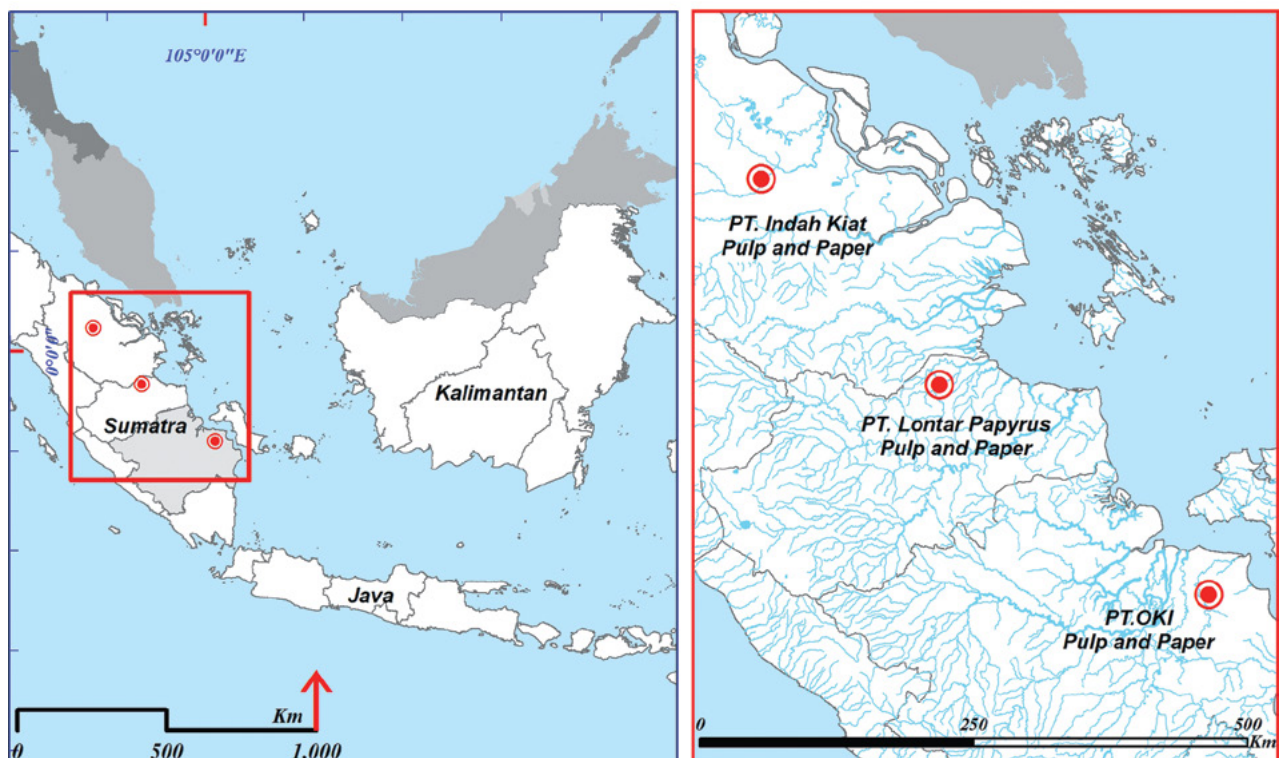
APP currently operates two large pulp mills in Sumatra, accounting for approximately 45.0% of the Indonesian industry’s total BHK pulp capacity: PT Indah Kiat Pulp & Paper Tbk (hereafter Indah Kiat), the group’s flagship mill, located in Riau Province; and PT Lontar Papyrus Pulp and Paper Industry (hereafter Lontar Papyrus), located in Jambi Province (see Map 2.1). These mills currently have installed pulp production capacities of 2.8 million tons/yr and 1.0 million tons/yr, respectively (PT Indah Kiat 2015; PT Lontar Papyrus 2012).

APP’s sustainability reports identify Sinar Mas Forestry, a wholly owned company belonging to PT Purinusa Ekapersada, as APP Indonesia’s sole supplier of wood fiber (APP 2015a). Sinar Mas Forestry is currently affiliated through ties of ownership and/or commercial contracts with 33 pulpwood suppliers, which manage 38 forest plantation concessions covering 2.6 million ha across five provinces: Riau, Jambi, South Sumatra, West Kalimantan, and East Kalimantan (APP 2013e).

APP also ranks among the largest pulp and paper producers in China. Through Hainan Jinhai Pulp & Paper, the group owns China’s largest BHK pulp mill, located in Hainan province, with a production capacity of approximately 2.0 million tons/yr (RISI 2016a).

In March 2001, Asia Pulp & Paper halted payments on approximately US\$ 13.9 billion in corporate bonds, loans, and trade payables triggering the largest emerging market debt default in history (Webb 2016a; Webb 2001). For APP and its subsidiaries, this set in motion a protracted debt restructuring process with a complex network of creditors, which included many of the world’s most prominent lending and investment

Map 2.1: Asia Pulp & Paper’s Indonesia pulp mill locations



Source: VLK Certificates.

Table 2.1: Asia Pulp & Paper's Indonesia mill locations and production capacity

Company Name	Mill Locations	Production Lines	Capacity (tons/yr)	Products
Pulp				
PT Indah Kiat Pulp & Paper Tbk	Perawang, Riau Province	4 pulp lines	2,800,000	Bleached hardwood kraft pulp
PT Lontar Papyrus Pulp and Paper Industry	Jambi Province	2 pulp lines	1,020,800	Bleached hardwood kraft pulp
Total Pulp		6 pulp lines	3,820,800	
Paper and paperboard				
PT Indah Kiat Pulp & Paper Tbk	Perawang, Riau Province	9 paper machines	1,535,000	Wood free printing, writing, copier and coated papers
PT Indah Kiat Pulp & Paper Tbk	Serang, Banten Province	6 paper machines	1,570,000	Coated boxboards, test linerboards, corrugating medium, corrugated cartons
PT Indah Kiat Pulp & Paper Tbk	Tangerang, West Java Province	3 paper machines	105,000	Coloured printing, writing and copier, computer and duplicator paper
PT Lontar Papyrus Pulp and Paper Industry	Jambi Province	6 tissue machines	180,200	Tissue
PT Pabrik Kertas Tjiwi Kimi Tbk	Sidoarjo, East Java Province	13 paper machines	1,677,000	Printing, writing, copier, carbon-less, exercise books, writing pads, envelopes, computer forms, gift wrapping paper and shopping bags
PT Pindo Deli Pulp and Paper Mills	Perawang, Riau Province	20 tissue machines; 25 tissue converting machines	407,000	Tissue
PT Pindo Deli Pulp and Paper Mills	Karawang, West Java Province	10 paper; 2 tissue; 1 chipboard machine	1,176,000	Writing, printing, copier, pre-print and other premium wood-free papers, cast-coated paper, paperboards, carbon-less, thermal and art paper and tissue.
PT Ekamas Fotruna	East Java Province	2 paper machines	180,000	Corrugated medium, wrapping papers, chipboard, core board, Kraft liner, paper core, paper tube, paper sheet, and heavy board
PT Univenus	Perawang, Riau Province	1 tissue machine	18,250	Tissue
Total Paper and Paperboard		43 paper; 27 tissue; 1 chipboard machines	6,848,450	

Source: APP Sustainability Report (2014).

institutions (Webb 2016b; Shari 2001). Two of the largest creditor groups included four of China’s state-owned banks, which were owed US\$ 1.0 billion (Paperloop.com 2001); and the Government of Indonesia’s Bank Restructuring Agency (IBRA) which was owed US\$ 1.2 billion, secured with asset pledges from APP and affiliates and personal guarantees from the beneficial owners of the Sinar Mas Group (Guerin 2003).

In the debt restructuring process, IBRA coordinated with a group of export credit agencies representing the governments of Austria, Denmark, Finland, France, Italy, Spain, Sweden, and Japan in its negotiations with APP. In October 2003, the parties entered into a “Master Restructuring Agreement” which covered approximately US\$ 6.7 billion associated with the group’s Indonesia-related debt (Tempo 2003). When the agreement was finalized in December 2004, many offshore creditors expressed concerns that the terms on which the debt was restructured made it unlikely they would ever recover the money they were owed (Mapes 2004). As the *Wall Street Journal* reported:

The terms of the deal are controversial, however, and they have prompted some creditors – including the U.S. government’s Export-Import Bank – to sue in an effort to block the deal. Just \$1.2 billion of the debt covered by the plan will be fully repaid, while the rest will be refinanced by new debt – including an element of debt-forgiveness – or exchanged for new bonds that would mature in as long as 22 years. (Mapes 2004)

Significantly, the Master Restructuring Agreement reportedly included a legally binding environmental covenant in which APP agreed to protect areas identified to be “high conservation value forest” within its forestry concessions (Eyes on the Forest 2012).

Section 2.2: Corporate structure of PT OKI Pulp & Paper Mills

PT OKI Pulp & Paper Mills was incorporated in Jakarta in May 2012.¹ The company was established with the stated purpose of engaging in industrial, trade, and forestry activities described as follows:

1. Construction of a mill to produce paper, pulp, and wood chips, as well as products associated with paper, pulp, and wood chips, including wood processing industries.
2. Packaging and trade of the abovementioned products, both at home and abroad, including managing special port facilities to support the business activities of OKI.
3. Commercial forestry activities both through the operation of Industrial Plantation Forest (*Hutan Tanaman Industri, HTI*) and Commercial Forestry Concessions (*Hak Pengusahaan Hutan, HPH*) (PT Pabrik Kertas Tjiwi Kimia Tbk 2014).

Asia Pulp & Paper controls a 97.51% interest in OKI through two subsidiaries: PT Pabrik Kertas Tjiwi Kimia Tbk (hereafter Tjiwi Kimia) and PT Pindo Deli Pulp and Paper Mills (hereafter Pindo Deli) (Ditjen AHU 2016a). As of March 18, 2016, OKI had issued 10,042,970 shares with a total nominal value of Rp 10.04 trillion (approximately US\$ 752 million²), and Tjiwi Kimia and Pindo Deli each held a 48.76% interest (see Table 2.2).

PT Muba Green Indonesia (hereafter Muba Green) holds the remaining 250,000 shares in OKI, representing an equity interest of 2.49%. Muba Green was incorporated in Indonesia as a foreign investment corporation (*Penanaman Modal Asing*, or PMA) on May 1, 2012 (Ditjen AHU 2016b). As of March 18, 2016, 99% of Muba Green’s shares are held by Green Unity Holding Pte., Ltd of Singapore; and the remaining 1% are held by PT Tirtamulia Prima (Ditjen AHU 2016b).

1 As noted in Tjiwi Kimia’s prospectus of June 26, 2014, “OKI was incorporated under the name PT Oki Pulp & Paper Mills as set forth in the Articles of Incorporation No. 2 dated May 2, 2012 made in the presence of Sri Adi Hidianingsih Adi Sugijanto, SH., Notary in West Jakarta and been approved by the Ministry of Law and Human Rights in accordance with Decree No. AHU-0041805. AH.01.09.Tahun 2012 dated 9 Mei 2012 (“Act No. 2/2012”).”

2 This figure is based on an exchange rate of Rp 13,350 per US\$.

Table 2.2: Composition of shareholders for PT OKI Pulp & Paper Mills, as of March 18, 2016

Shareholder	Number of Shares	Nominal Total Value (Rp)	Percent of Total (%)
PT Pabrik Kertas Tjiwi Kimia Tbk	4,896,485	4,896,485,000,000	48.76
PT Pindo Deli Pulp and Paper Mills	4,896,485	4,896,485,000,000	48.76
PT Muba Green Indonesia	250,000	250,000,000,000	2.49
Total	10,042,970	10,042,970,000,000	100.00

Source: Dirketorat Jenderal AHU (2016) “Profil PT OKI Pulp & Paper Mills” (March 18, 2016)

Section 2.3: Mega-scale mill project in South Sumatra

OKI is now building a mega-scale pulp and paper mill in Ogan Kemiring Ilir District, South Sumatra. In numerous statements since mid-2013, APP has indicated the mill will have an initial capacity to produce 2.0 million tons/yr of BHK pulp and 500,000 tons/year of tissue. APP has said the total investment for the project will be US\$ 2.639 billion (PT Pabrik Kertas Tjiwi Kimia Tbk 2014). The government’s Capital Investment Coordinating Board (*Badan Koordinasi Penanaman Modal*, or BKPM) initially provided in-principle approval for the project in June 2012.³

At this level of capacity, OKI’s pulp mill would be Indonesia’s third largest once it begins production, surpassed only by APP’s Indah Kiat and APRIL’s Riau Andalan Pulp & Paper mills in Riau Province (PT Indah Kiat 2015; APRIL 2013). In press comments, company officials have claimed that the OKI mill will generate annual foreign exchange revenues of Rp. 14.84 trillion and tax payments of Rp. 3.79 trillion (BNI Securities 2014). They have projected the South Sumatra mill will generate direct employment for 3,450 workers and indirect employment for 15,000 workers (Primadhyta 2015).

There are indications that OKI’s owners may be planning a much larger project than what APP and Tjiwi Kimia’s public announcements have described.⁴ In March 2013, the BKPM issued an in-principle approval for a change in OKI’s original investment permit that gives OKI a license in-principle to develop facilities to manufacture pulp, tissue paper, and culture paper, with construction to be carried out in three stages and completed by June 2018. The BKPM approval notes that OKI had requested these changes.⁵

As Table 2.3 shows, construction of the pulp mill with a capacity of 2.0 million tons/yr—the capacity disclosed by APP in its July 16, 2013 press release – appears to be Phase I of the project. Phase II involves constructing tissue production facilities with a capacity of 2.0 million tons/yr; and Phase III involves installing a culture paper production line with a capacity of 600,000 tons/yr. The approved capital investment over the three phases totals Rp. 52.4 trillion (or US\$ 5.4 billion at the prevailing exchange rate of Rp. 9,700 per US\$ in March 2013), including US\$ 4.86 billion for purchases of machinery and equipment. At these levels, the overall value of the investment would be more than double the US\$ 2.639 billion previously announced by APP and Tjiwi Kimia, which apparently may include only the cost of building the pulp mill during Phase I.

3 Badan Koordinasi Penanaman Modal, Izin Prinsip Penanaman Modal Nomor 361/1/IP/I/PMA/2012, dated 5 June 2012. Notably, this initial approval apparently was only for a pulp mill with a capacity of 2.0 million tons/year and did not include tissue production.

4 See APP press release dated July 16, 2013, “Asia Pulp & Paper statement on acquisition to develop a plantation-based pulp and paper mill in Sumatra.”

5 Badan Koordinasi Penanaman Modal, Izin Prinsip Penanaman Modal Nomor 153/1/IP/III/PMA/2013, dated 26 March 2013.

Table 2.3: PT OKI Pulp & Paper Mills’ planned capital investment, as approved by BKPM on 28 March 2013

Phase	Product	Planned Capacity	Total Planned Investment ('000 Rp)	Cost of Machine Imports (US\$)	Domestic employment	Schedule for completion
I	Pulp	2,000,000	25,220,000,000	2,340,000,000	2,200	No later than 5 June 2016
II	Tissue	2,000,000	19,440,000,000	1,800,000,000	5,000	No later than 5 June 2017
III	Culture papers (photocopy, printing & writing)	600,000	7,760,000,000	720,000,000	1,000	No later than 5 June 2018
Total			52,420,000,000	4,860,000,000	8,200	

Source: BKPM Izin Prinsip Penanaman Modal Nomor 153/1/IP/III/PMA/2013, dated 26 March 2013.

Section 2.4: Questions about planned pulp capacity

Since early-2015, questions have emerged in the media about whether OKI is building, or planning to build, a pulp mill that has a designed production capacity substantially larger than the 2.0 million tons/yr that APP announced. In April 2015, *PPI Magazine* – published by RISI, a leading global pulp and paper industry intelligence service – reported that APP’s machinery and equipment purchases indicate it is installing two pulp production lines, each with an initial capacity of 1.4 million tons/yr and the potential to expand to 1.6 million tons/yr (*PPI Magazine* 2015). According to the report in *PPI Magazine*:

Key equipment APP ordered for the pulp facility has come in pairs, including two biogas gasifiers, two biomass boilers, two kilns and two pulp dryers from Valmet. In early 2014, the firm signed up Andritz to supply what will be the world’s largest recovery boiler for the plant, at a black liquor firing capacity of 11,600 tons of dry solids per day. Such a huge recovery boiler is capable of handling 3.2 million tons/yr of pulp production. Moreover, APP has decided to build the cooking plant for the pulp facility by itself. This includes a big digester with a cooking process capable of churning out at least 6,000 tons/day, according to APP. All these factors point to an even larger pulp plant than previously announced being erected. Various sources have confirmed that, indicating that the facility will house two BHK [bleached hardwood kraft pulp] lines, with each having a capacity of 1.4 million tons/yr. With the mill’s large recovery boiler and digester, the individual capacity of the two pulp lines could potentially be upgraded to 1.6 million tons/yr. The startup of the pulp facility has also been pushed back from the originally planned mid-2016 to late 2016 or early 2017. APP has declined to comment on the details of the expansion scheme. (*PPI Magazine* 2015)

For nearly one year after this article appeared in *PPI Magazine*, to the knowledge of the authors of this report, APP did not publicly clarify whether the pulp production capacity it plans to install at the OKI mill may ultimately reach 2.8 million tons/yr or more. In the interim, media articles have continued to report the planned pulp capacity of the OKI mill as 2.0 million tons/yr. Aida Greenbury, APP’s Director of Sustainability and Stakeholder Engagement, recently reiterated this figure in response to questions posed by authors of this report during APP’s third anniversary event for its FCP, held in Jakarta on February 4, 2016.

However, an article published in *The Jakarta Post* on March 2, 2016 indicated that Sinar Mas plans to produce 2.0 million tons of pulp annually during the OKI mill’s initial phase of operations and to expand

the mill's pulp capacity to 2.8 million tons/yr at an unspecified later date. Citing OKI Director Suhendra Wiriadinata, the article states that "Suhendra said his firm would increase the pulp mill's capacity to 2.8 million tons when everything was on track" (Amin 2016). RISI similarly reported on March 3, 2016:

Suhendra indicated that the new plant is set to produce bleached hardwood kraft (BHK) pulp at a rate of 2 million tons/yr. That capacity is expected to increase to 2.8 million tons/yr, depending on the performance of the mill's recovery boiler. Andritz is supplying what will be the world's largest recovery boiler for the plant, at a black liquor firing capacity of 11,600 tons of dry solids per day. Other key equipment APP ordered for the pulp facility is coming in pairs, including two biogas gasifiers, two biomass boilers, two kilns and two pulp dryers from Valmet with capacities of 1.4 million tons/yr each. The firm is also itself building two digesters for the mill, instead the one previously reported. (RISI 2016b)

In the event the OKI mill's installed pulp production capacity is ultimately in the range of 2.8 million to 3.2 million tons/yr, it will rank among the largest BHK pulp mills in the world, as media reports and machinery supplier press releases have indicated (ABB 2014; *Jakarta Globe* 2015). As will be discussed in Chapter Three, such an expansion of the mill's planned production capacity would have enormous implications for the resources OKI would require and the potential extent of its environmental and social footprints.

Section 2.5: Loans from China's state banks

In filings with the Indonesia Stock Exchange during 2013 and 2014, Tjiwi Kimia indicated that OKI will use US\$ 1.9 billion in bank loans and US\$ 839 million in shareholder capital to finance the US\$ 2.639 billion total investment in its mill project (PT Pabrik Kertas Tjiwi Kimia Tbk 2014).

In October 2013, APP announced it had completed a US\$ 1.8 billion loan agreement with the China Development Bank (CDB) to construct the South Sumatra mill (APP 2013b). This loan transaction was one of 21 projects, valued at US\$ 21.8 billion, announced during meetings between Presidents Xi Jinping and Susilo Bambang Yudhoyono. The CDB's credit facility for OKI has a 12-year repayment period and is guaranteed by pledged shares from each of OKI's share-holders (Tjiwi Kimia, December 17, 2013). This initial loan with the CDB has been described as "one of the largest financings ever signed between Indonesian and Chinese interests" (O'Melveny and Myers 2015).

In April 2015, *PPI Magazine* reported that APP's parent conglomerate, the Sinar Mas Group, had secured a new US\$ 1.5 billion loan from the CDB and ICBC Financial Leasing to fund investments in power, pulp and paper, and telecommunications in Indonesia (*PPI Magazine* 2015). Of this total, PPI reported that US\$ 700 million is earmarked for pulp and paper investments, and is expected to be directed to OKI's mill project (*PPI Magazine* 2015). This new agreement was signed during a visit by President Joko Widodo to Beijing.⁶

Media reports have speculated that the second loan may signal that the scale of the OKI mill project has expanded well beyond what was originally disclosed for Phase I (*PPI Magazine* 2015). More recently, a March 2016 RISI article reports that OKI Director Suhendra Wiriadinata claims "total investment for the mega pulp and paper project is expected to hit \$3 billion" (RISI 2016b).

Section 2.6: Equity financing by APP

OKI's shareholders have collectively agreed to contribute US\$ 839 million, or approximately 30% of the stated investment costs for the initial phase of the South Sumatra project, in the form of equity contributions by 2016 (PT Tjiwi Kimia 2014). APP subsidiaries Tjiwi Kimia and Pindo Deli reportedly

⁶ It is unknown to the authors of this report whether the Government of Indonesia has issued sovereign guarantees for these loans.

have committed to contribute US\$ 407 million each, and Muba Green will contribute the remaining US\$ 25 million.

Tjiwi Kimia, a listed company on the Indonesia Stock Exchange, has obtained at least a portion of the funds it has contributed to OKI from the investing public. In July 2014, Tjiwi Kimia raised Rp. 1.33 trillion (US\$ 108.4 million) through a rights issue, which the company subsequently used to cover a portion of its equity investment in OKI (*Investor Daily* 2014).

In March 2016, it was also reported that Pindo Deli and other companies affiliated with the Sinar Mas Group have obtained sizeable loans from a credit facility provided by the China Development Bank to three of Indonesia's state-owned banks: Bank Mandiri, Bank Rakyat Indonesia, and Bank Negara Indonesia (Kamaludin 2016). Although this facility was established to finance infrastructure projects, Sinar Mas companies have reportedly obtained multiple loans with a total value of US\$ 561 million and Rp. 1.067 trillion.⁷ For Pindo Deli, this has included loans of US\$ 221 million from Bank Rakyat Indonesia and US\$ 15 million from Bank Mandiri.

It is not known to the authors of the present report whether Pindo Deli has used these loans to finance its equity contributions to the OKI project. However, the size and timing of these loans suggests that the corporate owners of OKI may have secured greater levels of financing ultimately originating from the CDB than the loans mentioned in Section 2.5 above.

Section 2.7: Ten-year corporate tax holiday

In August 2015, the Government of Indonesia approved a 10-year tax holiday for the OKI mill (Himawan 2015). Under the terms of the tax holiday, OKI will not be required to pay corporate tax for its initial eight years of operation and will pay 50% of the normal tax rate for the following two years (Himawan 2015). The stated purpose of the tax holiday is to promote capital investment in Indonesia's pulp and paper industry, a priority sector. In media statements, neither the government nor APP has disclosed the projected economic value of the tax holiday.

⁷ Citing a report entitled, "Credit Allocation to Debtor Position January 2016," Kamaludin (2016) notes that the Sinar Mas Group and its affiliates are the single largest corporate interest to benefit from this loan facility. In addition to the loans obtained by Pindo Deli, PT Indah Kiat Pulp & Paper Tbk received a loan of US\$ 175 million from Bank Rakyat Indonesia; a loan of US\$ 50 million from Bank Mandiri; and a loan of Rp. 1.067 trillion from Bank Negara Indonesia. Given that the credit facility was originally established with the stated purpose of financing infrastructure projects, members of the Financial Commission in the DPR (Indonesia's House of Representatives) have questioned their allocation for manufacturing projects (Kamaludin 2016).



Chapter Three: Wood supply plans and plantation land base

The availability of low-cost wood fiber is a key variable shaping the profitability and cost competitiveness of BHK pulp mills. Over much of the past two decades, APP’s pulp mills in Sumatra – as well as those of its main competitor, the APRIL Group – have benefitted from the use of low-cost MTH obtained by clearing natural forests. However, with APP’s commitments to “zero deforestation” in its supply chain and the use of “100% sustainable plantation wood for pulp” from 2015 onward, the group has assured stakeholders that “natural forest wood” will no longer enter its mills.

APP has affirmed that these commitments apply to all the group’s existing pulp mills and to any pulp production facilities it develops in the future. This has given the impression that APP has committed to sourcing all the wood fiber that PT OKI Pulp & Paper Mills will consume from sustainably managed plantations, starting from the outset of its operations. This chapter examines what is publicly known about APP’s wood supply plans for the OKI pulp mill and the extent to which Sinar Mas/APP’s existing HTI plantation concessions in South Sumatra are likely to produce sufficient volumes of wood for the mill to operate at potential capacity levels. This section also assesses whether the disclosed APP suppliers in Indonesia have sufficient plantation area to supply the two existing mills and the new OKI mill based on available information.

Summary of key points

- To the best of the authors’ knowledge, APP has not released a long-term wood supply plan either for the OKI mill or for the group’s two existing mills in Sumatra for public review and independent verification (as of April 10, 2016), despite claims of “unprecedented” transparency.
- An “independent wood supply assessment” completed by TFT/Ata Marie in 2014 only covered the period through 2020, four years after the OKI mill will begin operating. The assessment followed a 2013 study by Ata Marie, which largely relied on client-supplied data and used a stated growth rate of 25 tons/ha/yr at the age of harvest. These assessments have not been released for public review, and it is unclear what production capacity they assumed for the OKI mill.
- If the OKI mill ultimately has a pulp production capacity as high as 2.8 million or 3.2 million tons/yr, it would require a much larger wood fiber requirement and land base than a mill with a pulp capacity of 2.0 million tons/yr as described in APP’s statements on the OKI project.
- Wood fiber production by Sinar Mas/APP’s plantation companies in South Sumatra has been growing steadily, but is still well below what the OKI mill would need, even with a pulp production capacity of 2.0 million tons/yr.
- Sinar Mas/APP has only limited options to expand the plantation area within its South Sumatra concessions due to the group’s commitment to set aside areas identified as having High Conservation Value and/or High Carbon Stock.
- Shipping in wood from outside South Sumatra could be considerably more expensive than the current cost of sourcing wood locally. Doing so could significantly increase the mill’s pulp production costs, thereby raising questions about OKI’s overall competitiveness as a low-cost producer.
- APP’s commitments to “zero deforestation,” “100% sustainable plantation wood for pulp,” and cut-off of “natural forest wood” are structured in ways that leave the door open to continued land clearing within the group’s HTI concessions and continued use of substantial volumes of MTH by its pulp mills.

Section 3.1: Lack of transparency on wood supply plans until 2020 and over the long term

When Asia Pulp & Paper announced its Forest Conservation Policy in February 2013, the company sought to assure stakeholders that it was capable of meeting its commitments to “zero deforestation” and “100% sustainable plantation wood for pulp” on a sustained basis. Focusing on future wood supply for its pulp production facilities in Sumatra, APP stated that “recent independent assessments of the growth and yields of APP suppliers’ plantation areas [in Indonesia] confirms that the company has sufficient plantation resources to meet the long term forecast demand for its pulp mills” (APP 2013d).¹

Despite these claims, to the best of the authors’ knowledge (as of April 10, 2016), APP has not yet released for public review and independent verification a long-term wood supply plan that explains where its Sumatra pulp mills will source their fiber once the OKI mill starts operating. APP’s failure to publicly disclose a detailed and up-to-date wood supply plan – either for the OKI mill or for the group as a whole – is especially striking given the enormous scale of the South Sumatra project. At the stated initial pulp production capacity of 2.0 million tons/yr, OKI can be expected to consume approximately 9.4 million m³ of wood fiber annually.² This suggests that APP’s overall wood fiber requirement in Sumatra will increase by more than 50% once OKI reaches its stated initial production capacity, as compared to the 17.8 million m³/yr the group currently needs to consume if the Indah Kiat (Riau) and Lontar Papyrus (Jambi) pulp mills operate at full capacity.³ Should the ultimate pulp production capacity be 2.8 million tons/yr, then the group’s wood demand would increase by nearly 73%. If the production capacity is eventually 3.2 million tons/yr, then it will increase by 84%.

In February 2013, APP commissioned TFT and Ata Marie Forestry Experts to conduct a new “Growth & Yield – Wood Supply Study” to provide stakeholders with further assurances that Sinar Mas/APP could meet its commitments to “zero deforestation” and “100% sustainable plantation wood” over the long-term. When the study was completed in September 2014, the company pointedly did not release the full report for public review by independent technical experts and civil society stakeholders. Instead, it simply issued a press release with the title: “The Forest Trust and Ata Marie’s ‘Growth and Yield’ study shows APP has sufficient plantation for its Zero Deforestation commitment” (APP 2014b). Significantly, APP’s press release included a statement from Scott Poynton, Executive Director of TFT, supporting the company’s conclusion:

We are pleased to be able to reassure everyone that APP and its suppliers have sufficient resource for the company’s 100 per cent plantation target. We have identified one minor gap in 2020 but this can be easily filled by increasing the productivity of the plantation operations between now and then. (APP 2014b)

This statement was put forth by APP as independent verification of its claim to having “sufficient plantation to meet its Zero Deforestation commitment,” and it was widely reported as such in the media.

Crucially, Mr. Poynton and the associated media coverage failed to mention that the TFT/Ata Marie Wood Supply Study only covered the period until the end of 2020. Despite this omission, APP has presented the

1 In the company’s “Sustainability Roadmap Vision 2020” (2013), APP stated: “In 2012 and early 2013, independent Growth & Yield assessments were undertaken to review the long-term availability of plantation fibre to feed APP pulp mills. The assessments focused on the plantation growth and pulpwood log yields of APP suppliers’ plantations. In addition to an APP internal assessment, one initial assessment was conducted by TFT and a second was done by Ata Marie Group, a professional services group specialising in forest inventory, growth and yield modelling and wood supply forecasting. These provisional evaluations were completed in January 2013 and indicated that APP will have sufficient plantation resources to meet the long-term demand of its pulp mills. For more information, including an Ata Marie statement on APP wood flow projections, please visit our FCP monitoring dashboard.”

2 This figure is based on a conversion factor of 4.7 m³ of green wood to produce 1.0 air-dried tons of BHK pulp (see Box 3.1).

3 According to PT Indah Kiat Pulp & Paper Tbk’s Annual Report for 2014, the company’s Riau mill has a pulp production capacity of 2.8 million tons/yr. Similarly, PT Lontar Papyrus Pulp & Paper Industry’s annual report for 2011 (the most recent posted on APP’s website, as of March 1, 2016) indicates the Jambi mill has a pulp production capacity of 1.0 million tons/yr. At a conversion rate of 4.7 m³ of wood fiber to produce a ton of pulp, the two mills require approximately 17.8 million m³ of pulpwood to operate at full capacity.

assessment as evidence that the company can meet its FCP commitments and not revert to clearing natural forests once the OKI mill begins operating. To put this in context, it must be understood that much of OKI's machinery and equipment will likely depreciate for accounting purposes over 25 years, but the operational life of the mill could extend for decades longer. With the OKI mill scheduled to begin pulp production in late-2016, this means that APP is using a study that covers only the first four years of the mill's operations to demonstrate it has sufficient plantation resources for the medium- and long-term. Moreover, with these plantations being managed on a five-year rotation, the TFT/Ata Marie Wood Supply Study apparently did not assess either the anticipated productivity of new areas that will need to be planted after 2015 or potential changes in productivity at currently planted sites during future rotations.

The first public acknowledgement that the TFT/Ata Marie study only covered the period through 2020 came almost a full year after TFT's assurance that APP has enough plantation fiber to keep its FCP commitments. In August 2015, The Rainforest Alliance issued a "Public Briefing Paper" that evaluated the TFT/Ata Marie Wood Supply Study, which noted that the study only assessed "the capability of [APP's] current plantation base to provide sufficient pulpwood to its three pulp mills each year up until 2020" (Rainforest Alliance 2015a). The briefing paper further indicates that the TFT/Ata Marie Wood Supply Study should be treated with caution and not be viewed as conclusive evidence that APP has sufficient plantation resources to meet its future FCP commitments:

The Rainforest Alliance evaluation team notes that plantations are a dynamic and ever changing resource, as a result, any modeling of potential growth and yield rates comes with an element of imprecision or estimation. Therefore a definitive answer of whether APP has enough plantation wood supply based on estimates from data gathered and analyzed 1.5 years ago is not possible. Rather, the TFT/Ata Marie Wood Supply report presents a baseline from which APP can make management decisions to close any potential gap [. . .] The question of whether APP has sufficient wood supply to meet the demands of its mills deserves to be continually asked particularly by APP management. (Rainforest Alliance 2015a)

This statement takes on added significance now that over two years have passed since the TFT/Ata Marie Wood Supply Study's data collection and analysis was completed, as there are reasons to believe the study's value and relevance may have diminished in the intervening period.⁴ It is not publicly known (as of April 10, 2016), for instance, how much of Sinar Mas/APP's plantations may have been harvested since 2013 when the group adopted its internal moratorium on forest conversion (Rainforest Alliance 2015b). Moreover, as discussed in greater detail below, Sinar Mas/APP's plantations in South Sumatra and Jambi experienced extensive damage during the 2015 fires.

At APP's third anniversary event for the FCP commitments (held in Jakarta on February 4, 2016), the authors of the present report requested that APP release the TFT/Ata Marie Wood Supply Study for public review. In response, APP's Director of Sustainability and Stakeholder Engagement stated that the company had chosen not to release the full report of the TFT/Ata Marie study because it contains commercially confidential information.⁵ Without access to the study, however, external stakeholders have little basis to

4 "APP Forest Conservation Policy Update" of September 2014 states, "The scope of the study [independent Growth and Yield study for which APP commissioned TFT and Ata Marie] is based on concession date from 2005–2012."

5 In her response, Aida Greenbury indicated that TFT had prepared a summary that omitted the confidential information and released it in late-2015. In response to a written request for a copy of that summary, however, the authors of the present study received an email from a member of TFT's senior management team on March 4, 2016 stating: "The publicly available information regarding the result of the study as follows:

1. RA evaluation summary on the GY – that describes the independence, technical robustness and reliability of the study: <http://www.rainforest-alliance.org/sites/default/files/uploads/3/150716-Public-Briefing-Paper-Wood-Supply-Study-Evaluation.pdf>
2. APP press release – that welcomes TFT/Ata Marie study and RA evaluation: <https://www.asiapulppaper.com/news-media/press-releases/app-statement-rainforest-alliances-evaluation-forest-trustata-marie-wood-supply-study>

The current version of the summary of the TFT/Ata Marie study itself contains commercially sensitive information. TFT and APP are currently working together to remove these and, at the same time, ensuring that the message and original content remain consistent. We'll get back to you once it's published."

assess the credibility of either the conclusions that were announced or the underlying data and assumptions on which these were based.

In a statement dated 15 January 2013, Ata Marie mentions that its study conducted between June 2012 to January 2013 assumed growth and yields of existing plantations to be approximately 25 tons/ha/yr at the age of harvest (Ata Marie 2013). The statement also notes that the client (APP) supplied the data on plantation area and forest inventory in 21 of the group's 38 concessions, from which growth and yield figures were derived. It further indicates that the study team checked realized harvest yields in the field and that "some adjustments to yield tables were made based on field observations" (Ata Marie 2013). However, it does not say how many field sites were checked, how the sites were chosen, or how they assessed growth and yield at those locations. The Ata Marie statement says flyovers were "conducted to verify the existence and general extent of plantation resources," but does not explain what techniques might have been used during these flyovers to verify the client-supplied data with any precision (Ata Marie 2013). It appears to the authors of this report that this earlier study was the basis for the later TFT/Ata Marie Wood Supply Study referenced in the TFT announcement in September 2014.

Beyond the 2013 Ata Marie study and the subsequent TFT/Ata Marie Wood Supply Study, the authors of the present report are unaware (as of April 10, 2016) of APP publicly releasing any independently verified assessment or plan that shows the group has enough planted production area and has achieved sufficient growth rates and yields on these sites to meet its commitment to use only plantation fiber on a sustained basis. Instead of presenting a long-term wood supply plan for at least the next 15 to 20 years (three to four rotations), the company has repeatedly referred to the TFT/Ata Marie study, which reportedly covers only the period through 2020 and relies largely on data supplied by the company. Until APP publicly releases detailed, accurate and verifiable data on the productivity of its plantations and the projected wood fiber requirements for each of the group's pulp mills over the medium- to long-term, external stakeholders will have no way to know whether APP can meet its commitments to "100% sustainable plantation wood" and "zero deforestation" on a sustained basis once the OKI mill begins production.

Section 3.2: Uncertainty over wood fiber and plantation requirements for the OKI mill

Given the ongoing uncertainties regarding the pulp production capacity at which the OKI mill will ultimately operate, the absence of a detailed wood supply plan for public review has meant that many stakeholders have only limited information on how much wood fiber and plantation land the OKI mill will require once it begins production. This section examines the volumes of wood fiber and the area of land that would be needed to enable a BHK pulp mill at each of these three production levels – 2.0 million tons/yr, 2.8 million tons/yr, and 3.2 million tons/yr – to operate at full capacity. These estimates are presented to support improved due diligence and informed decision-making, given that OKI's Director has now confirmed the company's plans to operate initially at 2.0 million tons/yr and to increase the mill's capacity to 2.8 million tons/yr at an unspecified time in the future.

Projected wood demand

The volume of wood that the OKI mill will consume annually, once it is fully operational, will largely depend on: 1) the mill's installed pulp production capacity; and 2) the efficiency with which it converts wood into pulp. For the purposes of this analysis, it is assumed that OKI will operate with a conversion efficiency level of 4.7 m³ per air-dried metric ton of pulp (see Box 3.1).

As Table 3.1 shows, if the OKI mill produces 2.0 million tons of pulp per year, this implies it will consume 9.4 million m³ of wood on an annual basis. Similarly, if the OKI mill ultimately produces 2.8 million or 3.2 million tons of pulp per year, this implies it would consume either 13.1 million or 15.0 million m³ of wood on an annual basis, respectively.

Table 3.1: Effective wood demand for the OKI pulp mill at 2.0 million, 2.8 million, and 3.2 million tons/yr of capacity

Pulp capacity	Tons/yr	2,000,000	2,800,000	3,200,000
Wood to pulp conversion	m ³ /ton	4.7	4.7	4.7
Wood demand at full capacity	m ³ /yr	9,400,000	13,160,000	15,040,000

Projected plantation requirements

The critical question of whether Sinar Mas/APP will have sufficient plantation-grown fiber to fully meet the group’s overall wood requirement after the OKI mill begins production is difficult to answer with the information currently available in the public domain (see Box 3.2). Since APP announced its FCP commitments in 2013, the company has demonstrated increased transparency by reporting the “developed production area” (assumed to be equivalent to net planted area) at each of the 38 HTI plantation concessions managed by Sinar Mas/APP. However, the company’s failure to release detailed and verifiable data on the age class, growth rates and per hectare yields achieved on these sites makes it extremely difficult for independent analysts to calculate what volumes of wood fiber the plantations have produced historically or to project future production levels.

In its 2004 Sustainability Action Plan, APP published indicative growth rates for Sinar Mas/APP Acacia plantations for areas that would be harvested during 2004-2010. For *Acacia mangium*, APP reported annual growth rates or ‘mean annual increments’ (MAI’s) ranging from 20.5 m³/ha/yr for plantations developed by PT Wira Karya Sakti in Jambi to 23.2 m³/ha/yr for plantations developed by PT Arara Abadi in Riau (APP 2004). For *Acacia crassicarpa*, the company reported MAI’s ranging between 18.4 m³/ha/yr for plantations developed by PT Wira Karya Sakti and 19.6 m³/ha/yr for plantations developed by PT Arara Abadi (APP 2004).

Box 3.1: A note on conversion factors

The assumed conversion efficiency level of 4.7 m³ per air-dried ton of pulp has been derived as follows.

In APP’s February 2004 Sustainability Action Plan, the company reported that Indah Kiat, its flagship mill, was then producing pulp with an efficiency level of 4.17 green metric tons (GMT) per ton of pulp; and Lontar Papyrus was converting 4.4 GMT per ton of pulp (APP 2004). With Acacia having an average moisture content of 50%, APP reported that 1.0 GMT (wood weight) is equivalent to 1.142 m³ over bark (wood volume). This means that Indah Kiat was then consuming almost 4.8 m³ and Lontar Papyrus was consuming 5.0 m³ to produce 1.0 ton of pulp (APP 2004).

The 2004 Sustainability Action Plan indicated that APP was then aiming to reduce the conversion efficiency at both mills to 4.1 GMT – equivalent to 4.7 m³ over bark – per ton of pulp (APP 2004). The plan outlined a number of steps APP planned to take to achieve efficiency gains, including improvements in: log storage and handling operations; debarking operations; and chipping and screening operations (APP 2004).

APP’s recent production data indicates that it has succeeded in achieving its target of 4.1 GMT per ton of pulp. For 2014, APP has reported its Indonesia mills consumed 14,776,456 GMT of raw materials to produce 3,606,000 tons of pulp (APP 2015a). These figures are equivalent to 4.1 GMT – or 4.7 m³ over bark – per ton of pulp.

Although APP projected ambitious targets for achieving higher MAI's for both species (especially for *Acacia mangium*), there are strong reasons to question whether such improvements have been achieved on any significant scale across the group's plantation base. As will be discussed in Chapter Four, productivity levels at many HTI plantations in Sumata and Kalimantan have been held in check over the past decade by multiple risk factors, including the impacts of fires and pest and diseases. Indeed, in many areas Sinar Mas/APP plantation companies have reportedly been replacing *Acacia mangium* with *Eucalyptus pellita* due to sharply declining yields in areas affected by root rot and/or stem wilt/canker (Harwood and Nambiar 2014a).

In the absence of up-to-date growth and yield data in the public domain, the authors of the present report find little basis to estimate, with any degree of precision, the average productivity levels that Sinar Mas/APP plantation companies are achieving on an industrial scale across all of the group's plantations. The authors note, however, that the abovementioned Ata Marie growth and yield study, using company-supplied data for 21 of the 38 plantation concessions supplying wood to APP's mills, determined average growth and yield to be 25 GMT/ha/yr at the time of harvest (Ata Marie 2013). The authors of the present report consider this figure – equivalent to an average MAI of 28.5 m³/ha/year (over bark) – to be a high-growth scenario on an industrial scale, across the group's entire planted area.⁶ For the purposes of this analysis, the authors consider an average MAI of 23 m³/ha/year (over bark) to be a medium-growth scenario, and an average MAI of 18 m³/ha/year (over bark) to be a low-growth scenario.⁷

In Tables 3.2–3.4, these growth scenarios are used to estimate how much planted area Sinar Mas/APP would need and what levels of productivity would have to be achieved to meet the OKI mill's future wood requirement at a pulp capacity levels of 2.0 million, 2.8 million, and 3.2 million tons/yr. The calculations are based on an assumed harvesting rotation of five years and losses of 15% from the point of harvest to the mill site.⁸

Under these conditions, Table 3.2 shows that Sinar Mas/APP's forestry suppliers will need to harvest between 77,606 ha (high-growth scenario) and 122,876 ha (low-growth scenario) each year if the OKI mill is to produce 2.0 million tons of pulp annually. Over a five-year rotation, these scenarios imply a net planted area of between 388,029 ha and 614,379 ha; and a gross plantation area of between 646,715 ha and 1,023,965 ha. By way of comparison, APP reported on its Forest Conservation Policy Monitoring Dashboard in 2015 that Sinar Mas/APP's HTI plantation concessions in South Sumatra had a developed production area (or net planted area) of 328,956 ha and a gross area of 789,043 ha. It must be noted, however, that these figures were reported before the 2015 fires and do not reflect the extent to which planted areas of *Acacia* and *Eucalyptus* within Sinar Mas/APP concessions were destroyed.

Table 3.3 shows the net and gross plantation areas that would be needed to support a BHK pulp mill with a production capacity of 2.8 million tons/yr under similar hypothetical plantation productivity scenarios.

6 In its January 15, 2013 statement, Ata Marie describes growth rates of 25 GMT/ha/yr as follows: "This level of plantation is relatively modest compared to growth rates in Brazil, but is comparable to the best plantation companies operating in South East Asia."

7 These growth scenarios are based on indicative averages of mean annual increment (MAI) achieved on an industrial scale across mineral soils and peatland sites, as well as across pulpwood species, mainly *Acacia mangium* and *Acacia crassicaarpa*, though also including *Eucalyptus pellita*. MAI's achieved on specific sites can be expected to vary widely from below 15 m³/ha/yr to above 35 m³/ha/yr, depending on site conditions, management practices, the quality of the genetic material utilized, and other factors. As MAI measures the average annual productivity of a stand (or industrial estate) over the life of the stand (or industrial estate), it is influenced by stocking densities and mortality levels, not simply the growth rates of the trees that survive to harvest. In the absence of detailed and verifiable growth and yield data, the authors of the present report make no claims about the specific MAI's achieved on an industrial scale by Sinar Mas/APP's supplier concessions.

8 Given the limited verifiable data available in the public domain concerning the rate of wood losses in Sinar Mas/APP's operations, the present study considers 15% to be a very conservative estimate. Actual losses could be substantially higher than this. In APP's 2004 Sustainability Action Plan, for instance, the company reported wood losses of 20% in harvesting, process, and transport of pulpwood to the mill (APP 2004).

Under such conditions, the mill's forestry suppliers would need to harvest between 108,648 ha (high-growth scenario) and 172,026 ha (low-growth scenario) on an annual basis for the mill to operate at full capacity. Over a five-year rotation, these scenarios imply a net planted area of between 543,240 ha and 860,131 ha; and a gross plantation area of between 905,401 ha and 1,443,551 ha.

Similarly, Table 3.4 shows the net and gross plantation areas that would be needed to support a BHK pulp mill with a production capacity of 3.2 million tons/yr under similar hypothetical plantation productivity scenarios. At this higher capacity level, the mill's forestry suppliers would need to harvest between 124,169 ha (high-growth scenario) and 196,601 ha (low-growth scenario) on an annual basis for the mill to operate at full capacity. Over a five-year rotation, these scenarios imply a net planted area of between 620,846 ha and 983,007 ha; and a gross plantation area of between 1,034,744 ha and 1,638,344 ha.

Table 3.2: Plantation requirements for a BHK pulp mill operating at 2.0 million tons/yr

	Unit	Low-growth scenario	Medium-growth scenario	High-growth scenario
Mean Annual Increment (MAI)	m ³ /ha/yr	18	23	28.5
Rotation	years	5	5	5
Gross yield at harvest	m ³ /ha	90	115	142.5
Assumed losses (15%)	m ³ /ha	13.5	17.25	21.375
Net yield after losses	m ³ /ha	76.5	97.75	121.125
Total volume of wood required	m ³	9,400,000	9,400,000	9,400,000
Net planted area for annual harvest	ha	122,876	96,164	77,606
Net planted area for 5 year rotation	ha	614,379	480,818	388,029
Gross plantation area (assuming 60% planted)	ha	1,023,965	801,364	646,715

Table 3.3: Plantation requirements for a BHK pulp mill operating at 2.8 million tons/yr

	Unit	Low-growth scenario	Medium-growth scenario	High-growth scenario
Mean Annual Increment (MAI)	m ³ /ha/yr	18	23	28.5
Rotation	years	5	5	5
Gross yield at harvest	m ³ /ha	90	115	142.5
Assumed losses (15%)	m ³ /ha	13.5	17.25	21.375
Net yield after losses	m ³ /ha	76.5	97.75	121.125
Total volume of wood required	m ³	13,160,000	13,160,000	13,160,000
Net planted area for annual harvest	ha	172,026	134,629	108,648
Net planted area for 5 year rotation	ha	860,131	673,146	543,240
Gross plantation area (assuming 60% planted)	ha	1,433,551	1,121,910	905,401

Table 3.4: Plantation requirements for a BHK pulp mill operating at 3.2 million tons/yr

	Unit	Low-growth scenario	Medium-growth scenario	High-growth scenario
Mean Annual Increment (MAI)	m ³ /ha/yr	18	23	28.5
Rotation	years	5	5	5
Gross yield at harvest	m ³ /ha	90	115	142.5
Assumed losses (15%)	m ³ /ha	13.5	17.25	21.375
Net yield after losses	m ³ /ha	76.5	97.75	121.125
Total volume of wood required	m ³	15,040,000	15,040,000	15,040,000
Net planted area for annual harvest	ha	196,601	153,862	124,169
Net planted area for 5 year rotation	ha	983,007	769,309	620,846
Gross plantation area (assuming 60% planted)	ha	1,638,344	1,282,182	1,034,744

In Box 3.2, these same growth scenarios are used to estimate how much wood Sinar Mas/APP plantations in Indonesia are likely to produce and whether those wood volumes will meet the fiber requirements for all three of the group’s Sumatra pulp mills – Indah Kiat, Lontar Papyrus, and OKI – at the various projected capacity levels for the South Sumatra mill (see Box 3.2).

Section 3.3: Limited productivity of Sinar Mas/APP’s existing South Sumatra plantations

Three of Sinar Mas Forestry’s seven affiliated concession companies in South Sumatra province are in the eastern part of the province in Ogan Kemerling Ilir District, where the new mill is located: PT Bumi Andalas Permai, PT SBA Wood Industries, and PT Bumi Mekar Hijau (see Map 3.1). The other four concession companies are located in the northern part of the province in Musi Banyuasin District: PT Rimba Hutani Mas, PT Bumi Persada Permai, PT Tri Pupajaya, and PT Sumber Hijau Permai (see Map 3.1).

Box 3.2: Projecting the effects of the OKI mill on APP’s overall wood balance in Indonesia

It can be anticipated that APP may suggest that any shortfalls in wood supply for the OKI mill from plantations in South Sumatra can be filled by the group’s supplier concessions in other provinces. So it is therefore useful to look at the group’s overall wood demand from the Indah Kiat and Lontar Papyrus mills, as well as the OKI mill, in relation to Sinar Mas/APP’s developed plantation area throughout Indonesia.

Indah Kiat’s current pulp production capacity is reported to be 2.8 million tons/yr and that of Lontar Papyrus is 1.0 million tons/yr. The OKI mill’s pulp production capacity is considered under three scenarios: 2.0 million, 2.8 million, and 3.2 million tons/yr. Under these three scenarios, APP’s overall wood demand would total, respectively, 27.2 million m³/yr; 31.0 million m³/yr; and 32.9 million m³/yr (see Tables 3.5–3.7).

Table 3.5: APP's overall demand for pulpwood in Indonesia if OKI pulp capacity is 2.0 million tons/yr

	Unit	Indah Kiat	Lontar Papyrus	OKI	Total
Pulp capacity	ton/yr	2,800,000	1,000,000	2,000,000	5,800,000
Wood to pulp conversion	m ³ /ton	4.7	4.7	4.7	4.7
Wood demand at full capacity	m ³ /yr	13,160,000	4,700,000	9,400,000	27,260,000

Table 3.6: APP's overall demand for pulpwood in Indonesia if OKI pulp capacity is 2.8 million tons/yr

	Unit	Indah Kiat	Lontar Papyrus	OKI	Total
Pulp capacity	ton/yr	2,800,000	1,000,000	2,800,000	6,600,000
Wood to pulp conversion	m ³ /ton	4.7	4.7	4.7	4.7
Wood demand at full capacity	m ³ /yr	13,160,000	4,700,000	13,160,000	31,020,000

Table 3.7: APP's overall demand for pulpwood in Indonesia if OKI pulp capacity is 3.2 million tons/yr

	Unit	Indah Kiat	Lontar Papyrus	OKI	Total
Pulp capacity	ton/yr	2,800,000	1,000,000	3,200,000	7,000,000
Wood to pulp conversion	m ³ /ton	4.7	4.7	4.7	4.7
Wood demand at full capacity	m ³ /yr	13,160,000	4,700,000	15,040,000	32,900,000

APP has indicated that its suppliers have a developed pulpwood plantation area in Indonesia of approximately 1.0 million ha (APP 2014c).⁹ If the plantations are cultivated on a five-year rotation, it can be estimated that on average 200,000 ha are harvested annually. Table 3.8 indicates the estimated volume of wood that can be produced from this area on an annual basis under low, medium, and high growth scenarios. In a low-growth scenario, this plantation area would produce 15.3 million m³/yr; in a medium-growth scenario 19.5 million m³/yr; and in a high-growth scenario 24.2 million m³/yr (see Table 3.8).

⁹ The authors assume that APP suppliers have not developed new plantation area since the FCP commitments were made in February 2013. "APP FCP Progress Update – September 2015" notes, "When we [APP] announced our FCP in February 2013, all new plantation developments of our suppliers were halted pending the recommendations from a series of ecological, social and commercial assessments." According to this "Progress Update," the recommendations would be combined into Integrated Sustainable Forest Management Plans (ISFMP). As of April 10, 2016, it is the author's understanding that the ISFMP processes have not yet been completed.

Table 3.8: Estimated net yield from APP’s developed plantation area under low, medium, and high growth scenarios

	Unit	Low-growth scenario	Medium-growth scenario	High-growth scenario
Developed plantation area	ha	1,000,000	1,000,000	1,000,000
Rotation length	years	5	5	5
Annual harvest area	ha	200,000	200,000	200,000
Mean annual increment	m ³ /ha/yr	18	23	28.5
Gross yield per hectare	m ³ /ha	90	115	142.5
Total gross yield	m ³	18,000,000	23,000,000	28,500,000
Losses	%	15%	15%	15%
Net yield	m ³	15,300,000	19,550,000	24,225,000

These calculations suggest that APP’s pulp mills in Indonesia are likely to face a shortage of plantation-grown pulpwood from Sinar Mas/APP supplier concessions once the OKI mill begins production, considering recently reported developed plantation areas (see Table 3.9). The size of the group’s internal wood fiber shortfall will be influenced both by the scale of pulp capacity that is installed at the OKI mill (thereby determining the volume of fiber it consumes) and the average growth and yields achieved by Sinar Mas/APP HTI plantation companies.

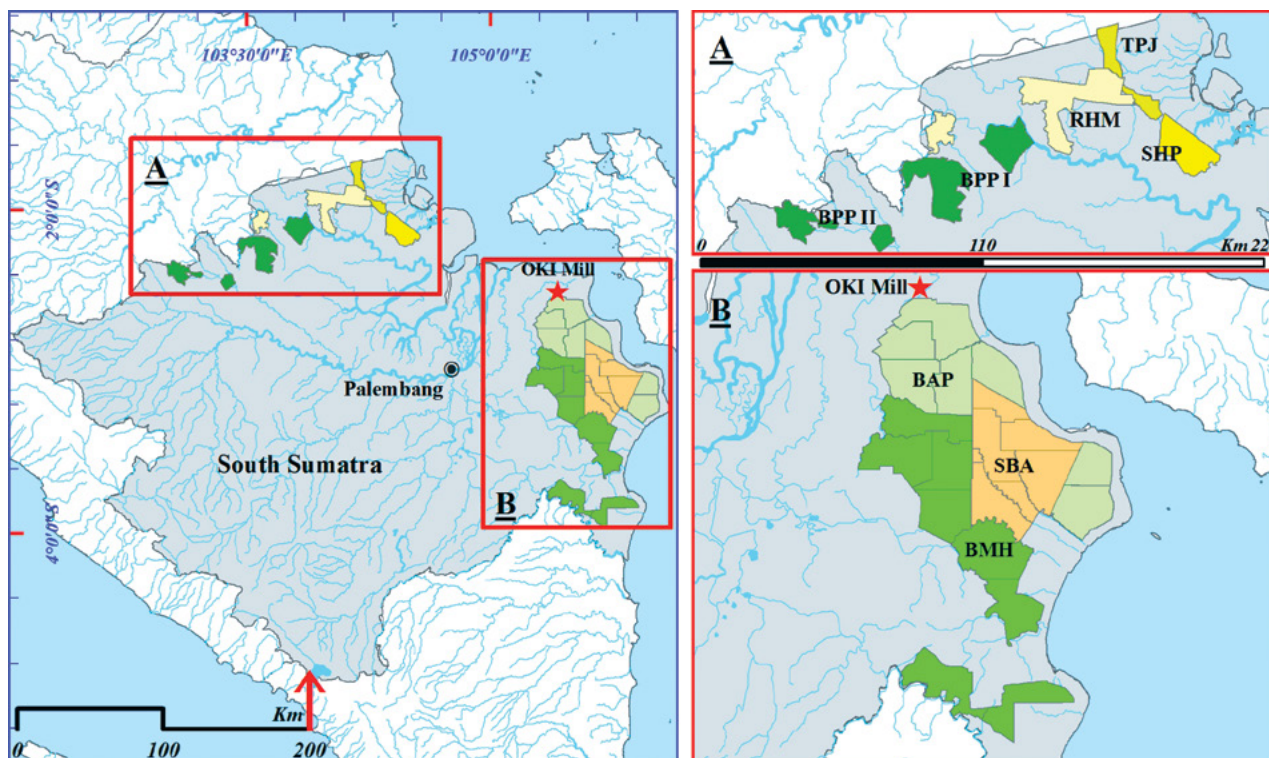
Even under a high-growth scenario (MAI = 28.5 m³/ha/yr) and an installed pulp capacity of 2.0 million tons/yr at OKI, it is estimated the group will face an annual wood fiber shortfall of 3.0 million m³/yr. If OKI is ultimately built with a capacity of 2.8 million tons/yr, this shortfall is projected to expand to 6.7 million m³/yr. Similarly, if OKI is built at 2.0 million tons/yr and Sinar Mas/APP’s plantations achieve medium- or low-growth scenarios, the group’s wood fiber shortfall is projected to expand to 7.7 million m³/yr or 11.9 million m³/yr, respectively.

Table 3.9: APP group-wide wood shortage for Indonesia pulp mills from Sinar Mas/APP plantation suppliers under various HTI growth scenarios and pulp production capacities for the OKI mill

HTI plantation growth scenario	Group capacity at different OKI mill capacity scenarios		
	5.8 m tons/yr	6.6 m tons/yr	7.0 m tons/yr
Low-growth scenario	11,960,000	15,720,000	17,600,000
Medium-growth scenario	7,710,000	11,470,000	13,350,000
High-growth scenario	3,035,000	6,795,000	8,675,000

These projections suggest that Sinar Mas/APP will need to plant substantial new areas and/or increase incremental growth rates in order to meet its mills’ combined wood demand from the group’s internal plantations.

Map 3.1: Sinar Mas/APP supplier concessions in South Sumatra



BAP PT Bumi Andalas Permai (192,7000 ha)
BMH PT Bumi Mekar Hijau (250,370 ha)
BPP I PT Bumi Persada Permai I (60,433 ha)
BPP II PT Bumi Persada Permai II (24,050 ha)

RHM PT Rimba Hutani Mas (67,100 ha)
SHP PT Sumber Hijau Permai (30,040 ha)
TPJ PT Tri Pupajaya (21,995 ha)
SBA PT SBA Wood Industries (110,373 ha)

Source: HTI concession boundaries are based on RKT annual work plans submitted by the companies to the Ministry of Environment and Forestry (2011–2014). HTI concession area figures are from APP’s Forest Conservation Policy Monitoring Dashboard (2015).

The HTI concession licenses held by four of Sinar Mas/APP’s forestry suppliers in South Sumatra, totaling 645,858 ha, took effect in September and October 2004 (see Table 3.10). Three of these concessions – held by PT Bumi Mekar Hijau, PT Bumi Andalas Permai, and PT SBA Wood Industries – have been granted for periods of 100 years. The fourth concession, held by PT Bumi Persada Permai I, has been granted for a 50-year period. Four other concessions were granted between 2006 and 2009 with a total area of 143,185 ha and license periods ranging between 43 and 100 years.

Table 3.10: Sinar Mas/APP supplier concessions in South Sumatra

Company	Total Concession Area (ha)	Concession Started (Date)	Concession Period (Years)
PT Bumi Mekar Hijau	250,370	7 Sep 2004 and 18 Oct 2004	100
PT Bumi Andalas Permai	192,700	7 Sep 2004	100
PT Bumi Persada Permai (I)	60,433	7 Sep 2004	50
PT SBA Wood Industries	142,355	10 Sep 2004	100
PT Sumber Hijau Permai	30,040	13 Feb 2006	43
PT Rimba Hutani Mas	67,100	22 Mar 2007	100
PT Bumi Persada Permai (II)	24,050	5 Mar 2009	60
PT Tri Pupajaya	21,995	2 Oct 2009	60

Source: Eyes on the Forest interactive concession map accessible at <http://maps.eyesontheforest.or.id>.

Together, these seven HTI plantation companies manage a total concession area of 789,043 ha.¹⁰ Within these concessions, APP has identified a potential production area of 535,165 ha, representing 68% of the gross area under license (see Table 3.11). Of this potential production area, APP has indicated that 328,956 ha, or 42% of the gross concession area, is “developed production area.” The remaining 206,209 ha has been set aside as “moratorium” area while APP conducts High Conservation Value (HCV) and High Carbon Stock (HCS) assessments to determine whether some of it can be developed under its current FCP commitments.¹¹ In this way, it is considered to be “possible production area.”

Table 3.11: Sinar Mas/APP classification of production area within supplier concessions in South Sumatra

Gross concession area	789,043 ha
Production area	535,165 ha
Moratorium for HCV and HCS assessments	206,209 ha
Developed production area	328,956 ha

Source: APP’s Forest Conservation Policy Monitoring Dashboard (accessed October 15, 2015)

According to the HTI companies’ official annual work plans (RKT) filed with the government on an annual basis, the aggregate volume of plantation-grown pulpwood produced by these concessions totaled 1,333,163 m³ in 2011¹²; 1,732,711 m³ in 2012; 3,263,095 m³ in 2013; and 3,295,279 m³ in 2014 (see Figure 3.1) (PT Bumi Andalas Permai 2013, 2014, 2015a, 2015b; PT Bumi Mekar Hijau 2012, 2013, 2014, 2015; PT Bumi Persada Permai I 2012, 2013, 2014, 2015; Bumi Persada Permai II 2012, 2013, 2015; PT Rimba Hutani Mas 2012, 2013, 2014, 2015; PT SBA Wood Industries 2013, 2014, 2015a, 2015b; PT Sumber Hijau Permai 2013, 2014, 2015; PT Tri Pupajaya 2012, 2013, 2015).

Significant volumes of MTH have been harvested from these concessions in addition to the reported volumes of plantation-grown pulpwood, according to the companies’ RKT annual work plans. The RKT reports show that 1,720,326 m³ of MTH was harvested in 2010; 1,074,170 m³ of MTH was harvested in 2011; 643,479 m³ of MTH was harvested in 2012 (PT Bumi Persada Permai I 2012, 2013; PT Bumi Persada Permai II 2011, 2012, 2013; PT Rimba Hutani Mas 2011, 2012, 2013; PT Tri Pupajaya 2011, 2012, 2013). Deforestation analysis suggests that Sinar Mas/APP supplier companies also harvested substantial volumes of MTH prior to 2010 (Global Forest Watch Interactive Map; Eyes on the Forest Interactive Map).

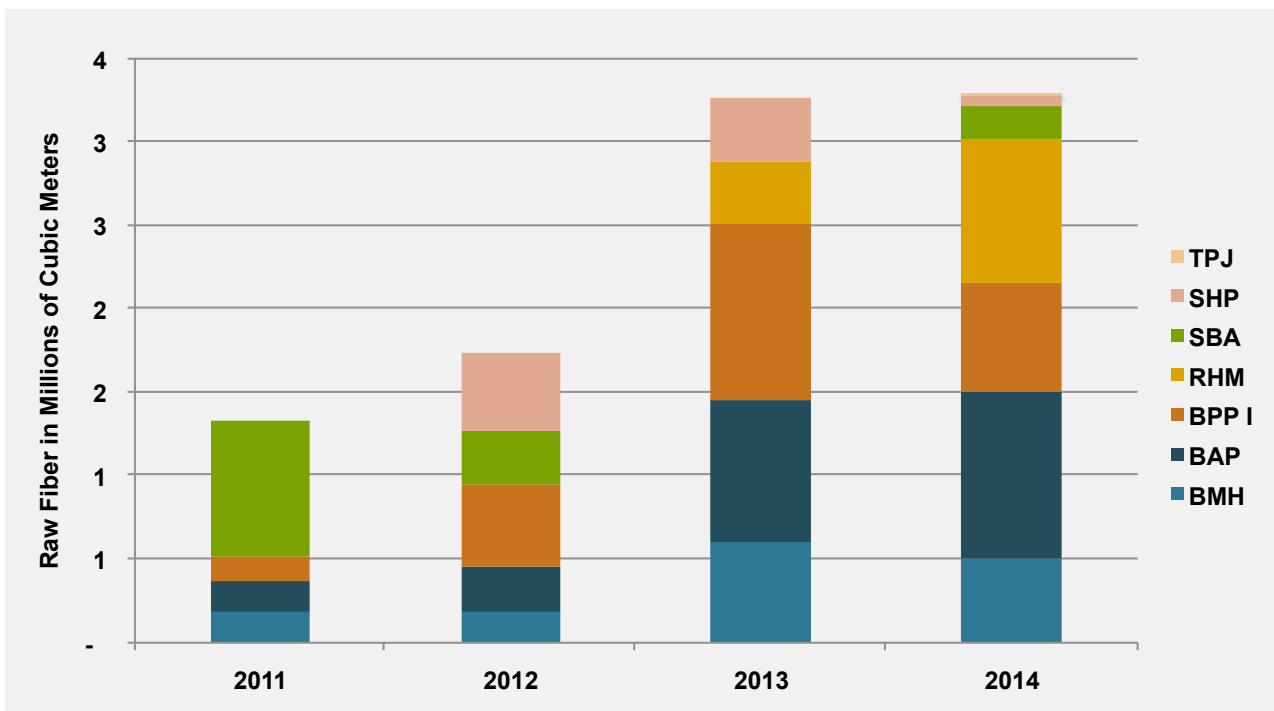
Reports indicate that APP has been sourcing plantation pulpwood from its affiliated concessions in South Sumatra to supply its two existing pulp mills: Lontar Papyrus in Jambi and Indah Kiat in Riau (Greenomics 2014). For example, in 2014 Lontar Papyrus reported that it consumed 157,726 m³ from Bumi Andalas Permai, 104,921 m³ from Bumi Mekar Hijau, and 71,346 m³ from SBA Wood Industries (PT Lontar Papyrus

10 The total concession area, “production” and “developed production” areas are data from Asia Pulp & Paper’s Forest Conservation Policy Monitoring Dashboard (accessed on October 15, 2015 at <http://www.fcpmonitoring.com/Pages/Default.aspx?M=1&S=0>). Since that time, this information has been removed from the site. Readers of the report who wish to view screenshots of the data as presented on the website may contact the authors of this report.

11 APP defines forest as natural forest designated as HCV or HCS (see Section 3.6). APP uses six indicators to identify HCV areas, defined by biodiversity value, ecological value, environmental services value, “critical for meeting basic needs of local people,” and “critical for maintaining cultural identify of local communities” (APP Sustainability Report 2014). The assessments, according to APP, are supposed to include technical evaluation and stakeholder consultation. APP defines HCS areas as “those where the land has a high concentration of plant organic matter above ground” (APP Sustainability Report 2014). Notably, this does not take into account below ground carbon, such as that stored in peatlands. APP uses an HCS approach originally designed by TFT and Golden Agri Resources, an APP affiliated oil palm company, in collaboration with Greenpeace. Using “a combination of satellite analysis, observation on the ground, and aerial surveys,” the HCS approach attempts to “distinguish natural forest, which has a high carbon stock, from degraded land and former forest, where only small trees, scrub or grassland remain” (APP 2015).

12 Excludes 2011 data for pulpwood production from PT Sumber Hijau Permai.

Figure 3.1: Reported production of plantation-grown pulpwood at Sinar Mas/APP supplier concessions in South Sumatra, 2011–2014 (millions of cubic meters)



Source: PT Bumi Andalas Permai (2013, 2014, 2015a, 2015b); PT Bumi Mekar Hijau (2012, 2013, 2014, 2015); PT Bumi Persada Permai I (2012, 2013, 2014, 2015); Bumi Persada Permai II (2012, 2013, 2015); PT Rimba Hutani Mas (2012, 2013, 2014, 2015); PT SBA Wood Industries (2013, 2014, 2015a, 2015b); PT Sumber Hijau Permai (2013, 2014, 2015); PT Tri Pupajaya (2012, 2013, 2015).

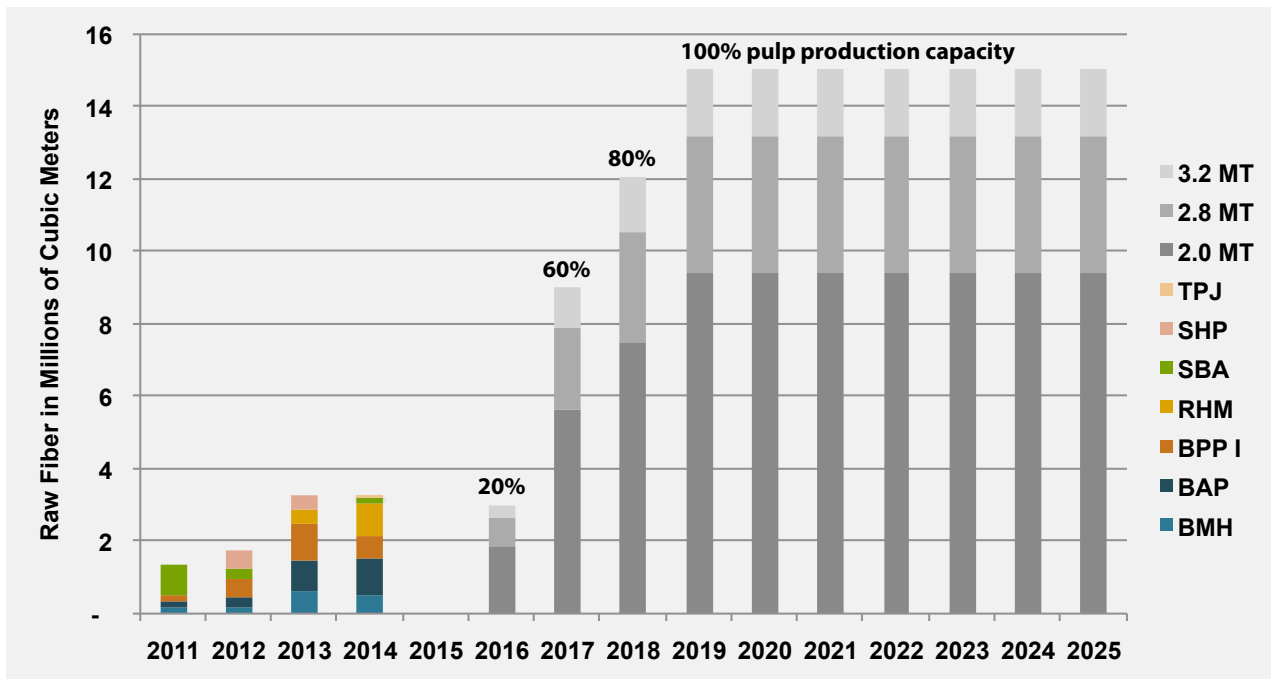
2014). In 2013, Lontar Papyrus reported that it consumed 133,753 m³ from Bumi Andalas Permai, 165,537 m³ from Bumi Mekar Hijau, 4,441 m³ from SBA Wood Industries, and 55,464 m³ from Bumi Persada Permai (PT Lontar Papyrus 2013).

Sinar Mas/APP’s affiliated concessions in South Sumatra are expected to be the main source of wood fiber supply for the new OKI mill (APP 2013c). In principle, by having plantations located so close to the mill site, OKI can be expected to benefit from low transport costs, an important component of overall delivered wood costs. This is particularly important given APP’s commitment to use only plantation-grown pulpwood, which generally has significantly higher production costs than MTH harvested from conversion of natural forests (Barr 2001).

The wood fiber requirement for the OKI mill has been modeled with the assumption that it begins production at 20% of designed pulp capacity in 2016; increases production to 60% of capacity in 2017; further increases to 80% of capacity in 2018; and begins operating at full capacity in 2019 (see Figure 3.2). Significantly, the mill’s fiber requirement in 2019, at 100% capacity of 2.0 million tons/yr, will be nearly triple the total volume of plantation pulpwood harvested from the South Sumatra concessions in 2014 (see Figure 3.2). At the very least, this raises fundamental questions as to whether Sinar Mas/APP’s existing plantations within the province will be sufficient to meet the OKI mill’s fiber demand once it is fully operational.

APP may argue that the South Sumatra concessions had deliberately not harvested much plantation fiber up to 2014 in order to keep plantations for future use, so harvested wood volumes should not be used to project future wood supply. This report’s analysis of OKI’s projected wood demand and plantation requirements indicates that APP/Sinar Mas’ current developed plantation areas in the province are unlikely to meet this demand on a sustained basis regardless of past plantation production. The analysis of the South Sumatra concessions’ harvested wood shows that these concessions have not produced the volume of wood on an annual basis that OKI will need to operate at anticipated capacity production levels.

Figure 3.2: Comparison of plantation-grown pulpwood production by Sinar Mas/APP HTI concessions in South Sumatra (2011–2014) and projected annual wood fiber demand by the OKI mill under pulp production capacity scenarios of 2.0 million, 2.8 million, and 3.2 million tons/yr (2016–2025)



Source: RKT annual work plans submitted by each company to the Ministry of Environment and Forestry, 2011–2014.

At APP’s third anniversary event for the FCP commitments, the authors of this report asked what the company will do if Sinar Mas/APP’s concessions in South Sumatra are not able to produce sufficient plantation-grown pulpwood. APP’s Director of Sustainability and Stakeholder Engagement responded that in the event the OKI mill could not secure enough fiber from the group’s plantations in the province, the company would ship in pulp logs and/or wood chips. Section 3.5 below examines the likely cost implications of shipping in wood from outside South Sumatra, including potential sources outside of Indonesia.

Section 3.4: Limited capacity to expand production area within existing South Sumatra concessions

Sinar Mas/APP has limited capacity to expand the group’s developed plantation production area within the group’s existing HTI concessions in South Sumatra. Though its current concession area in the province is 789,043 ha, the official “set-asides” mean that the potential production area is only 535,165 ha.¹³ Of this area, APP has indicated that 328,956 ha have already been developed for plantations (FCP Monitoring Dashboard 2015).

As part of the FCP process, APP has placed a voluntary “moratorium” on using the remaining 206,209 ha until forestry consulting companies it has contracted complete HCV and HCS assessments. These assessments (along with the peat expert studies, social conflict resolution and restoration planning) will supposedly feed into the company’s process for developing an Integrated Sustainable Forest Management Plan (ISFMP) (APP 2015). Stakeholders have recommended that the ISFMP process should take into account social, peat, and restoration considerations, as well as the HCS and HCV assessment results, in determining which areas the companies eventually use to develop plantations.

¹³ These “set-asides” includes areas for conservation, community use, and indigenous species (FCP Dashboard).

At most, Sinar Mas/APP will be able to expand its developed production area within the group's existing HTI concessions in South Sumatra by 206,209 ha. However, the ISFMP process could result in far less than that being available for the development of new plantations.

In November 2015, the OKI mill's site director, Gadang Hartawan, claimed that the mill's fiber needs will be supplied by 470,000 ha of HTI plantations in OKI and Musi Banyuasin (Jati 2015). This may imply that Sinar Mas/APP expects that more than two-

thirds of the land affected by the moratorium (68%) will ultimately be cleared to expand the plantation area. Alternately, it could indicate that Sinar Mas/APP plans to increase its concession areas in South Sumatra.



Large diameter logs harvested from peatlands in Sinar Mas/APP's PT Rimba Hutani Mas concession in South Sumatra, December 2009. Credit: Marcel Silvius, Wetlands International

The acquisition of established HTI plantations elsewhere in South Sumatra would likely be difficult. PT Musi Hutan Persada manages the other large HTI concession area in South Sumatra, with a total area of 296,400 ha on the western side of the province. These concessions supply PT Tanjung Enim Lestari (PT TEL), a pulp mill located 130 kilometers (km) west of Palembang, and the authors of the present report have seen no indication that either PT TEL or the owners of its forestry supplier firms have any intention to transfer the concession rights to Sinar Mas/APP or to divert any portion of its pulpwood supply to the OKI mill once it begins production.

A more likely scenario is that Sinar Mas/APP will seek to obtain new HTI concessions licenses within South Sumatra or the neighboring province of Bangka Belitung, the center of Indonesia's tin mining industry. A 2012 decree from the Ministry of Forestry indicated that some 413,572 ha in South Sumatra and 246,631 ha in Bangka Belitung had been assigned 'indicative designation' (*'alokasi indikatif pencadangan'*) for allocation as HTI plantation concessions and/or HTR (*Hutan Tanaman Rakyat*) community forestry schemes.¹⁴ It is not clear to the authors of the present report whether licenses for any portion of these areas have yet been issued to Sinar Mas/APP affiliates or other parties since the decree was issued in June 2012. Nor is it clear whether the Ministry of Environment and Forestry still plans to allocate these areas for plantation development, given the catastrophic fires that occurred in South Sumatra and other provinces in 2015. It is noted that Sinar Mas currently has one HTI plantation concession on Bangka: PT Bangun Rimba Sejahtera, with a licensed area of 66,460 ha.

APP has also raised the possibility of sourcing wood from partnerships with community forestry schemes. Such schemes are not new for Indonesia's pulp industry in general, or for Sinar Mas/APP in particular. Since the 1990s, APP has indicated that it has obtained a portion of its wood fiber supply from community forestry plantations. But the volumes of wood supplied by community outgrowers in the past have generally been quite limited, and this raises questions as to whether APP's efforts in South Sumatra can realistically be expected to yield significant wood supply for the OKI mill.

14 Keputusan Menteri Kehutanan Republik Indonesia Nomor: SK.3803/Menhut-VI/BRPUK/2012 tentang Penetapan Peta Indikatif Pencadangan Kawasan Hutan Produksi Untuk Usaha Pemanfaatan Hasil Hutan Kayu, tanggal 29 Juni 2012.

The pulp industry in Indonesia is composed of only a few producers, with APP and APRIL accounting for approximately 90% of the industry's total output. So communities growing pulpwood have had a very limited number of companies willing to buy their wood, particularly within an economically feasible distance from the harvest site. In the case of communities in South Sumatra, for example, there is only one other pulp producer, PT TEL, in the province. As a result, communities in the past had very limited pricing power and were largely price takers, meaning that they sold the wood for whatever the company was willing to pay since the market for small-diameter pulp logs was highly uncompetitive (Sudarmalik 2014; Martin 2008). Wood prices offered to communities, at least historically in Indonesia, have been very low, and those low prices provided communities with little incentive to continue or increase production relative to other land uses such as palm oil or rubber cultivation (Rochmayanto and Limbong 2013; Schneck 2009). For this reason, the Hutan Tanaman Rakyat (Community Plantation) program launched in Indonesia in 2009 has achieved only very limited success (Obidzinski and Dermawan 2010).

The Government of Indonesia has been actively promoting its community forestry program, with the aim of strengthening community-based timber industries. In recent press statements, however, a senior official from Indonesia's Ministry of the Environment and Forestry made it clear that Indonesia's pulp companies should not seek to use this program to secure new lands for pulpwood production. In a strongly worded statement, Secretary General Bambang Hendroyono said:

The pulp and paper industry shouldn't even consider trying to take advantage of the community plantation forest program to expand its acacia plantations [. . .] The pulp and paper industry must not try to go in and take control of community plantation forest areas. This is non-negotiable. Ministerial regulations prohibiting this will be formulated. (Foresthints.news 2016)

Section 3.5: Added costs to ship in wood from outside Sumatra

APP officials have said that if it turns out the OKI mill cannot obtain sufficient wood fiber from the group's South Sumatra plantations, the company would ship in plantation-grown wood from outside the province.¹⁵ However, the company has publicly released few details on two critical variables: 1) what stocks of plantation wood Sinar Mas/APP has available outside South Sumatra; and 2) the cost at which externally-sourced wood could be delivered to the mill. Industry sources interviewed for this study have suggested that APP's two most likely sources for plantation wood outside South Sumatra would be the group's HTI concessions in Kalimantan and/or independent wood chips suppliers in Vietnam, Australia, or other countries in the region.¹⁶ Each of these, however, could potentially involve much higher delivered wood costs than OKI would likely pay for wood fiber sourced from Sinar Mas/APP concessions in South Sumatra.

Sinar Mas/APP is known to have at least four HTI concessions covering a total area of 389,770 ha in West Kalimantan; and at least six HTI concessions covering 334,465 ha in East Kalimantan (APP 2013). Detailed figures on the planted areas and productivity levels on these sites are not currently available. At various points over the past decade, however, APP has been reported to transport pulp logs from the West Kalimantan concessions by barge to Riau to meet the wood supply needs of the Indah Kiat mill. In East Kalimantan, Sinar Mas/APP-affiliated plantations at PT Surya Hutani Jaya and PT Sumalindo Lestari Jaya I are known to supply pulp logs to the group's PT Sarana Bina Semesta Alam (SBSA) Chip Mill, located in

15 This point was stated by Aida Greenbury, Director of Sustainability and Stakeholder Engagement, in response to questions posed by the authors at APP's second and third anniversary events for the FCP, held in Jakarta on February 4, 2015 and February 4, 2016. APP's "Sustainability Roadmap Vision 2020," published in November 2013, explicitly states that in the event of wood shortages, it would import wood chips from outside Indonesia: "Any unforeseen or unplanned shortfall in plantation fibre – as a result of unavoidable plantation wood losses (e.g. through disease or wood handling) – will, if necessary, be met through the purchase and import of certified plantation chips from overseas suppliers."

16 It is also possible that the OKI mill could source a portion of its wood fiber from Sinar Mas/APP HTI plantations in Riau or Jambi. However, the authors of this study have seen no indication that either the Indah Kiat or Lontar Papyrus mills expect to have a surplus of locally-sourced plantation-grown wood fiber in the foreseeable future.

Kutai District, just upstream from Samarinda. The SBSA chip mill is believed to ship most or all of its wood chips to APP's pulp mill in Hainan Province, China.

Sinar Mas/APP supplier companies do not publicly report the costs at which they produce plantation pulpwood and deliver it to the group's mills. Nor do APP and its subsidiaries report the prices that the mills pay for the pulpwood purchased from the group's suppliers. As such, it is beyond the scope of this report to provide a comparative analysis of the costs involved in supplying the OKI mill from local plantations in South Sumatra versus those in Kalimantan or elsewhere. However, a former wood supply manager interviewed for this study indicated that the handling and transport associated with shipping pulp logs from West Kalimantan to supply the Sumatra mills typically cost approximately Rp 140,000 per GMT – or just over US\$ 10 per GMT – more than wood fiber sourced locally in Riau or Jambi.¹⁷ He indicated that the cost of shipping pulp logs from East Kalimantan to the Sumatra mills would be considerably more due to the much longer distance involved. Assuming a similar rate were to apply for shipments to South Sumatra, these estimates suggest that for every 1.0 million tons of pulp the OKI mill might potentially produce with wood from Kalimantan suppliers, it can be projected the company could pay a premium of roughly US\$ 41 million in additional transport costs alone.¹⁸

Other potential sources of plantation-grown fiber are wood chip suppliers in Australia and Vietnam. Exports of Eucalyptus chips from Australia have grown dramatically in recent years to reach a record-high of 5.2 million tons in 2015, and nearly 90% of these are shipped to China and Japan (*Wood Resource Quarterly* 2016). Similarly, Vietnam is currently the world's largest exporter of Eucalyptus chips, shipping 7.9 million tons in 2015 to overseas buyers, also mainly in China and Japan (*Wood Resource Quarterly* 2016). Between Q4-2013 and Q4-2015, nominal CIF (cost, insurance, and freight) prices for Australian wood chip shipments landed in China ranged between US\$ 188 and US\$ 206 per oven-dried metric ton (ODMT), while those from Vietnam ranged between US\$ 152 and US\$ 167 per ODMT (*Wood Resource Quarterly* 2014, 2015, 2016). At a conversion of 2.0 GMT per ODMT, these figures are equivalent in terms of raw fiber content to a delivered wood price of US\$ 94–103 per GMT for Australian wood chips and US\$ 76–83.5 per GMT for Vietnamese wood chips.

These figures are presented here as indicative numbers only, as they are based on delivery of wood chips to the China market. To estimate the relative costs of wood chips delivered to South Sumatra, the CIF prices for Australian suppliers would need to be adjusted downward to reflect the shorter shipping distance; and conversely, those for Vietnamese suppliers would need to be adjusted upward to reflect the longer shipping distance. If it is assumed that the delivered cost of locally sourced plantation pulpwood in Sumatra is in the range of US\$ 35–45 per GMT, these figures suggest that the cost of imported wood chips for OKI or other Indonesian pulp producers would be roughly double the cost of wood sourced locally. This reflects not just the distances involved, but also the fact that the mill would be paying international market prices for its wood. Moreover, in doing so the pulp mill would use hard currency rather than Indonesian Rupiah to purchase its wood, thereby foregoing a major economic advantage it would otherwise enjoy (Barr 2001).

If it were necessary to ship in wood from outside South Sumatra, it is conceivable that APP might choose to do so as a temporary stop-gap measure to maintain its FCP commitments of “zero deforestation” and “100% sustainable plantation wood for pulp.” However, if the company were to ship in large amounts of wood fiber for any extended period of time, the substantial added costs involved could potentially have a significant negative effect on the OKI mill's overall cost competitiveness and profitability.

¹⁷ Interview in Jakarta on January 21, 2016.

¹⁸ This figure is based on the calculation that 4.1 GMT are required to produce 1.0 ton of pulp.

Section 3.6: Loopholes in APP's Forest Conservation Policy

A point that has been largely overlooked since APP launched its current Forest Conservation Policy is that the company's commitments to "zero deforestation," "100% sustainable plantation wood for pulp," and the August 2013 cut-off of "natural forest wood" are structured in ways that leave the door open to continued deforestation by third parties within the group's HTI concessions and use of significant volumes of MTH by the group's pulp mills.

First, "zero deforestation" is defined in the FCP to apply only to the wood in the raw material supply chain for the group's pulp mills. It does not mean no land clearing or deforestation will occur within the boundaries of Sinar Mas/APP's supplier concessions. Indeed, the Rainforest Alliance assessment released in February 2015 documented that natural forest clearance continued at each of the group's concession areas visited during that assessment, albeit apparently by actors other than the concession license-holder:

In the course of the fieldwork in 21 concessions, the Rainforest Alliance observed recent natural forest clearance in each concession visited. The most common was small-scale encroachment from shifting agriculture. . . . Illegal loggers also contributed to the degradation of natural forest by harvesting the large commercially important trees from natural forest areas. Similar observations of widespread natural forest clearance and illegal activities in the forest are reported by the HCV and HCS assessment teams and by The Forest Trust (TFT) in its monitoring reports for APP. . . . Rainforest Alliance found that in numerous supplier concessions visited the security gates in forest areas are open or broken and the security posts are unstaffed and in disrepair. Numerous open access roads and canals in these concessions, viewed by the Rainforest Alliance, allow unrestricted access to and from the forest to people engaged in forest clearance activities or other activities such as illegal logging. (Rainforest Alliance 2015b)

It is noted that "Rainforest Alliance found no evidence that the [Sinar Mas/APP] supplier companies are directly engaged in the on-going clearance" (Rainforest Alliance 2015b).¹⁹ But field investigations by independent NGOs found two Sinar Mas/APP suppliers continuing to clear natural forest without HCV or HCS assessments in the early phase of APP's moratorium on natural forest clearance (Eyes on the Forest 2013; RPHK 2013).

Second, APP defines "natural forest" as forests identified to be HCV or HCS areas. That implies that wood from natural vegetation assessed as non-HCS or non-HCV by APP consultants do not fall under APP's definition of "natural forest wood."²⁰ APP's success in implementing its FCP and "zero deforestation" commitments, in large part, hinges on the quality of HCV and HCS assessments to determine which standing stocks of MTH within Sinar Mas/APP's concessions can be used by the group's pulp mills. However, the delineation of HCV and HCS areas is done by APP consultants, and the full HCV and HCS assessments have not been made publicly available (as of April 10, 2016). Also, the HCV assessments, to the best of the authors' knowledge, have not been conducted under the HCV Resource Network's

19 The Rainforest Alliance report describes the monitoring of APP's moratorium areas as follows: "The supplier companies that are being monitored are those that supplied MTH fiber to APP immediately prior to February 1, 2013. The boundaries of the final logging coupe in each of these supplier concessions is checked every four months to confirm that the harvesting has not resumed in natural forest in these locations. TFT is monitoring areas of natural forest covered by the moratorium, which includes areas previously earmarked for conversion to plantation. TFT is not responsible for monitoring areas of natural forest outside the moratorium areas. In some of the areas that are being monitored, TFT found clearance of natural forest and logging of MTH was taking place. They concluded that the moratorium was not being breached because no evidence was found that the non-compliance was due to any direct action of the APP supplier company. Nevertheless, TFT's monitoring reports repeatedly state that the APP supplier companies need to take more measures to prevent the land clearing and illegal logging by others" (Rainforest Alliance 2015b).

20 This is evident in its statement referring to the cut-off of "Natural Forest Wood" entering its mills in "APP Forest Conservation Policy: One Year Summary": "Since that day [August 31, 2014] we have only accepted wood from non-HCV/HCS areas, from our plantations, or chips from suppliers for which we have had clear verification of compliance with the FCP" (APP February 2014).

Assessor Licensing Scheme, which includes peer review and Quality Panel Evaluation.²¹ Nor have the HCS assessments been submitted to the HCS Approach Quality Review Process.²²

In addition to the question of the quality of the assessments, the Rainforest Alliance audit (2015b) found a worrying loophole in the HCV and HCS assessment process for determining “natural forest”:

APP considers areas of early successional stages of natural forest on previously cleared but unplanted land to be “developed areas” which remain available for plantation. APP excluded these “developed areas” from the scope of the HCS assessments and from the commitment to “only develop areas that are not forested.” (Rainforest Alliance 2015b)

Meanwhile, as noted above, Rainforest Alliance and TFT have reported that many HCS and HCV areas have been subjected to ongoing logging by unspecified parties, raising questions as to whether these forests will become sufficiently degraded such that APP ultimately will be able to clear the remaining standing stock and use it for pulp production, without calling it “natural forest wood” as defined by the FCP.

Third, from the outset of the FCP process, APP has indicated that its commitment to “100% sustainable plantation wood for pulp” is “subject to maximum tolerance of 5% for waste and residue” (APP 2014a). It is not clear to the authors of the present report what “waste” and “residue” mean in this context. It would appear, however, that the group’s pulp mills can continue to utilize MTH for up to 5% of their wood fiber supply without violating the FCP commitments, as APP has defined them.

Here, it is important to remember that APP’s existing Sumatra pulp mills – Indah Kiat and Lontar Papyrus – have the capacity to consume 17.8 million m³/yr of wood fiber at current pulp production capacity levels and the group’s effective demand for wood fiber will increase to 31.0 million m³/yr if the OKI mill is constructed with a pulp capacity of 2.8 million tons/yr. At this level, APP’s “maximum tolerance of 5%” suggests the group’s pulp mills could consume 1.5 million m³ of MTH annually without violating the FCP commitments as currently worded. NGOs have voiced concern that this loophole could allow MTH from HCV/HCS areas to enter the supply chain because it would be difficult to detect whether MTH was exclusively sourced from non-HCV/HCS forests (WWF-Indonesia 2013; Burung Indonesia et al. 2013; EPN 2013).

21 For more information, see HCV Resource Network Assessor Licensing Scheme: The HCV assessment process. <https://www.hcvnetwork.org/als/hcv-assessment-process>.

22 For more information, see High Carbon Stock Approach Quality Review Process <http://highcarbonstock.org/hcs-approach-quality-review-process/>. It is noted that the HCS Approach Steering Group “does not require third-party certification in order to verify that HCS assessments were carried out according to the methodology explained in the HCS Approach Toolkit. Instead, companies must use trained practitioners to conduct their HCS assessments and submit each assessment to a small Peer Review panel. The Peer Review panel’s feedback will then be published alongside a summary of the assessment, and stakeholders can then enter into a dialogue with the company about the results.”



Chapter Four: Material risks to future wood supply from HTI plantations

Sinar Mas/APP plantation companies in South Sumatra and other provinces face numerous risks that could affect their productivity and profitability. These include risks associated with: catastrophic fires; peatland subsidence, flooding, and acidic soils; pests and diseases; and land tenure disputes and conflicts with local communities. It is not clear whether government agencies or financial institutions engaged with the OKI mill project have adequately assessed these risks.

These risks are persistent and long-term in nature. Each of them raises questions about Sinar Mas/APP's ability to establish enough plantations and produce enough wood to supply its existing mills and the new OKI mill on a sustained basis. Fire risk stays persistent as long as the peat is drained; the impacts of peat subsidence grow worse over time; the threat of pests and diseases appears to be increasing; and the legal basis and political voice for communities asserting land claims is growing stronger.

Summary of key points

- South Sumatra – where the OKI mill is being constructed – was the province hardest hit by Indonesia's catastrophic fires of 2015, with over 600,000 ha burned and US\$ 3.9 billion in damages.
- Within Sinar Mas/APP's concessions in South Sumatra, it is estimated that 293,000 ha burned in 2015, including 86,000 ha of planted Acacia (26% of the group's planted area in the province).
- With 77% of Sinar Mas/APP concessions in South Sumatra situated on drained peatlands, catastrophic fires will remain a persistent threat, especially as the El Niño cycle is projected to intensify with climate change.
- Fires and haze also pose legal, regulatory, and reputational risks: the Indonesian government suspended several Sinar Mas/APP supplier concessions as a result of the 2015 fires. It is now suing one of the group's plantation companies for damages caused by fires in 2014.
- The development of Acacia plantations on drained peatlands leads to subsidence and flooding. Over time, such conditions can reduce yields and make peatland sites unviable for wood fiber production.
- The substrate beneath many peatlands on the coastal belt of Sumatra is composed of potential acid sulphate soils. Once the peat is exhausted and the potential acid sulphate soils drained, the potential acid sulphate soils will oxidize and acidify to become active acid sulphate soils on which pulpwood species are unlikely to grow productively once the peat is exhausted.
- Acacia plantations are susceptible to fungi and diseases on both mineral soils and peatlands, including *Ganoderma* root rot and a stem wilt/canker called *Ceratocystis*. As a result, *Acacia mangium* on mineral soils has suffered significantly declining yields, and *Acacia crassicarpa* on peat soils may experience the same as the number of rotations increases.
- Macaques and other mammals have significantly damaged Acacia plantations by stripping the bark, which provides opportunities for *Ceratocystis* and other diseases to infect the trees.
- With plantation concessions covering 2.6 million ha across five provinces, Sinar Mas/APP suppliers are facing land tenure disputes and social conflicts with several hundred communities.
- Land conflicts can undermine productivity and profitability at plantation sites by causing disruption of operations, damage or destruction of planted areas, loss of concession area, and in some cases, violence.

- APP has agreed to recognize customary land claims, to adopt principles of ‘free, prior, and informed consent’ (FPIC), and to resolve conflicts with local communities, but implementation of these commitments has been slow and uneven.
- Following a landmark ruling by Indonesia’s Constitutional Court in May 2013 recognizing the rights of customary (*adat*) communities, Sinar Mas/APP plantation companies are likely to face growing risks of communities using legal challenges to reclaim lands in concession areas.

Section 4.1: Risk of catastrophic fires

The catastrophic fires that burned across Sumatra, Kalimantan, and Papua during the second half of 2015 highlight serious immediate and long-term risks to APP’s plantation base for the OKI mill, as well as for the group’s existing Sumatra pulp mills. On a national scale, the fires burned 2.6 million ha between June and October 2015, mainly in Sumatra and Kalimantan (World Bank 2015).¹ The fires generated a thick haze, which blanketed large parts of Southeast Asia, causing regional economic and health impacts for millions of people in Singapore, Malaysia, and Indonesia.

The World Bank estimates the domestic costs associated with losses and damages from the fires and haze will exceed US\$ 16.1 billion (Rp. 221 trillion) (World Bank 2015). Preliminary estimates from the Indonesian government suggest that the total cost of the fires could reach US\$ 34.5 billion (Rp. 475 trillion) when mitigation efforts are included (Chan 2015a). Once all regional and global impacts are understood, the ultimate costs of the fires will probably be significantly higher. Moreover, these steep economic losses paled in comparison to the impacts on human health, which included the death of four babies in Palembang (Chan 2015b). Greenhouse gas (GHG) emissions from the 2015 fires have been estimated to be 1,750 million metric tons of carbon dioxide equivalent (mtCO₂e), surpassing the fossil fuel CO₂ emissions for Indonesia, Germany, and Japan in 2013 (Global Fire Emissions Database 2015).²

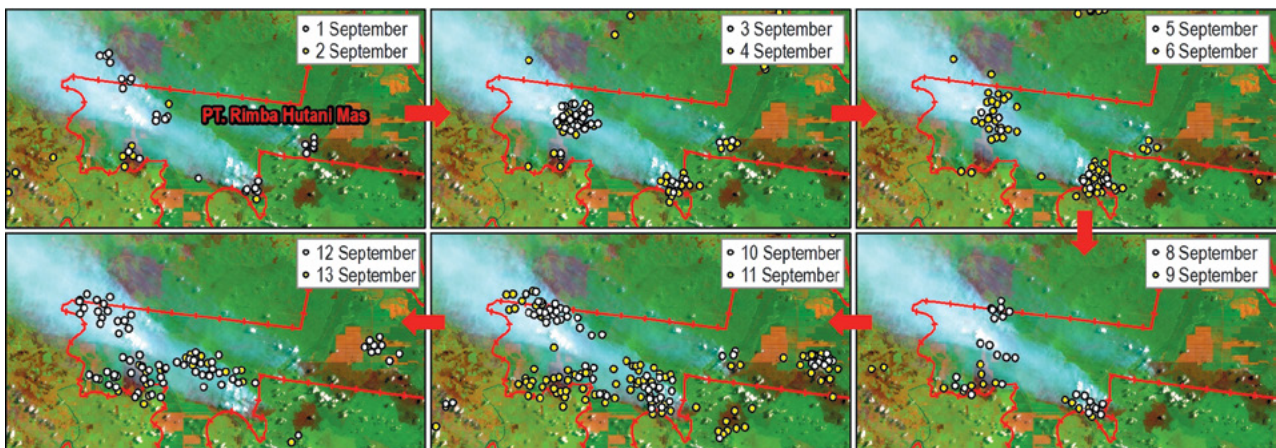
Within Indonesia, no province has been more profoundly affected by the 2015 fires than South Sumatra, where APP is building the OKI mill. Government figures indicate that 603,000 ha in South Sumatra burned during June–October 2015, accounting for 23 percent of the country’s entire burnt area (World Bank 2015). According to World Bank estimates, economic losses and damages from the fires in South Sumatra amounted to US\$ 3.9 billion (Rp. 53.8 trillion) during June–October 2015, including US\$ 967 million (Rp. 13.3 trillion) in losses and damages to forestry assets (World Bank 2015).

Many of the fires in 2015 occurred within Sinar Mas/APP concessions in South Sumatra. Eyes on the Forest’s analysis of NASA fire hotspot data found that 37% of all high-confidence hotspots on the entire island of Sumatra between January 1 and October 11, 2015 (3,435 of 9,251) were detected within the boundaries of four South Sumatra concessions affiliated with Sinar Mas/APP: PT Bumi Andalas Permai, PT Bumi Mekar Hijau, PT Rimba Hutani Mas, and PT Sebangun Bumi Andalas Wood Industries (Eyes on the Forest 2015). The same four companies accounted for 50% of all high confidence hotspots detected on Sumatra’s peatlands during that time period (Eyes on the Forest 2015).

1 World Bank estimates are based on data provided by the Government of Indonesia’s Agency for the Assessment and Application of Technology (Badan Pengkajian dan Penerapan Teknologi, or BPPT) and confirmed by the Ministry of Environment and Forestry (KLHK).

2 For more than 20 days during September–November 2015, the emissions from Indonesia’s fires surpassed the daily emissions from the entire U.S. economy (World Resources Institute 2015).

Figure 4.1: Satellite images of fire hot spots in Sinar Mas/APP's supplier concession PT Rimba Hutani Mass in South Sumatra on successive days in September 2015



Source: *Eyes on the Forest 2015*.

Impacts of the 2015 fires on Sinar Mas/APP's plantation base and wood supply

The 2015 fires in Sumatra had devastating impacts on Sinar Mas Forestry concessions, particularly the South Sumatra concessions being developed to supply the OKI mill. In November 2015, APP's Director of Sustainability and Stakeholder Engagement, Aida Greenbury, said she "expects its [OKI mill's] pulp production to be hurt by a shortage of pulpwood supply" as a result of the fires (Otto 2015). APP's Deputy Director of Sustainability, Aniela Maria, confirmed the fires' impact on APP plantations, and said:

We have not yet completed verifications and do not want to speculate. The verifications of areas affected will be done together with the Government of Indonesia. As for business impact, availability of pulpwood plantation will directly impact our pulp production. How much of this will be impacted will need to be reviewed once verifications are completed. (Fogarty 2015a)

To the best of the author's knowledge, as of April 10, 2016 – some four months after these statements were made – APP has not publicly released a detailed assessment of the extent to which the fires damaged its plantation holdings or what implications they are likely to have for wood supply and fiber cost to the OKI mill once it begins operating.³

A coalition of civil society organizations in South Sumatra has estimated that 293,065 ha – or 37% of Sinar Mas/APP's entire concession area in South Sumatra – was burned in the 2015 fires (Hutan Kita Institute et al. 2015). The coalition estimates that 86,004 ha of planted Acacia burned inside Sinar Mas/APP's developed pulpwood plantation production area (Hutan Kita Institute et al. 2016).⁴ These findings suggest that the 2015 fires destroyed some 26% of APP's South Sumatra established plantation base.⁵

³ In response to a question raised at APP's third anniversary celebration for the FCP (Jakarta, February 4, 2016), Aida Greenbury indicated that the Government of Indonesia was leading the investigation into the cause, extent, and impacts of the fires in South Sumatra, and as such, the company could not provide a detailed public assessment about the fires' impacts until the government released its findings.

⁴ The coalition's analysis of fire impacts used NASA active fire data and USGS Landsat 8 data from 2013 through the end of 2015 to track land cover changes on APP/Sinar Mas concessions in South Sumatra. Ground checks to verify the satellite data were conducted in November and December 2015 (Hutan Kita Institute et al. 2016).

⁵ An industry source with knowledge of Sinar Mas/APP's plantation operations indicated that the 2015 fires also burned significant areas within the group's supplier concessions in some regions outside South Sumatra, notably in Jambi and West Kalimantan. The authors have not yet been able to confirm the extent of the areas that may have been affected. (Confidential communication from plantation expert, January 21, 2016).

Table 4.1: Total planted Acacia burned in Sinar Mas/APP concessions in South Sumatra during 2015 fires

Company	Burned Acacia (ha)	Percent of total (%)
PT Bumi Andalas Permai	42,292	49.2
PT SBA Wood Industries	22,134	25.7
PT Rimba Hutani Mas	10,227	11.9
PT Bumi Mekar Hijau	8,010	9.3
PT Tripupa Jaya	1,868	2.2
PT Bumi Persada Permai I	1,472	1.7
PT Sumber Hijau Permai	1	0.0
PT Bumi Persada Permai II	0	0.0
Total (ha)	86,004	100.0

Source: Hutan Kita Institute et al. 2016

These plantation losses raise questions as to whether APP will have enough wood fiber to supply not only its two existing mills in Riau and Jambi, but also the new South Sumatra mill, once it begins production in late-2016. As noted above, Sinar Mas/APP's South Sumatra plantations have never produced even 50% of the pulpwood needed to meet the annual fiber requirement for a 2.0 million ton/yr pulp mill. To the extent the abovementioned estimates of the catastrophic impacts of the 2015 fires are accurate, they suggest that the group's South Sumatra HTI concessions are now considerably further from this target than even one year ago.

Persistent fire risk going forward

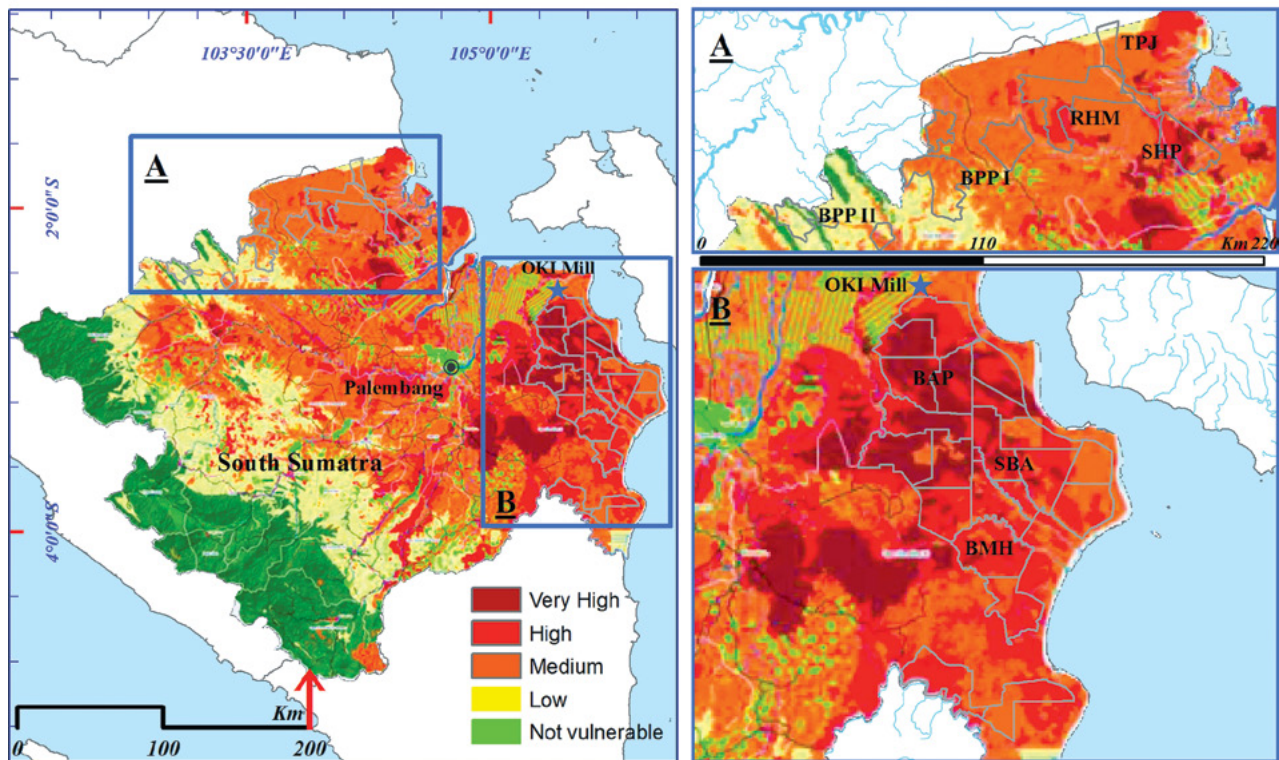
The 2015 fires that burned through Sinar Mas/APP's plantations were neither unexpected nor a one-time event. The dry El Niño conditions that made the 2015 fires catastrophic have occurred periodically in recent decades, and experts anticipate such extreme conditions will recur more often in the future (Cai et al. 2014). Sinar Mas/APP supplier concessions have suffered recurrent fires, on a less catastrophic scale, even in non El Niño years.⁶

Although an extended drought and El Niño conditions exacerbated the impacts of the 2015 fires, forest and peatland fires generally occur on an annual basis in South Sumatra and other provinces. Over the past decade, a sizeable percentage of these have occurred within the boundaries of Sinar Mas/APP's plantations. Hotspot analysis prepared for this report found that between January 2005 and December 2015, 42% of high confidence hotspots in South Sumatra were inside Sinar Mas/APP concessions.⁷ In its fire risk map, South Sumatra's provincial forestry department also identifies much of the area within and around Sinar Mas/APP's concessions as having "high" to "very high" fire risk (see Map 4.1).

6 See Eyes on the Forest interactive map (<http://maps.eyesontheforest.or.id>) where historical fire hotspots can be seen in relation to all Sinar Mas/APP pulpwood concessions in Sumatra.

7 The analysis compared the total number of high confidence hotspots in South Sumatra with those inside Sinar Mas/APP concessions from the respective dates they started (see Table 3.10). For example, a hotspot occurring in 2006 on the area where the PT Rimba Hutani concession is today would be counted as outside the concession area since the concession started in March 2007. Hotspot data is from MODIS data set of NASA FIRMS (*Fire Information for Resource Management System*), and the Morton and Defries (2008) classification for high confidence hot spot is used (confidence level equal to or greater than 30/100, and brightness factor greater than 330 Kelvin).

Map 4.1: Boundaries of Sinar Mas/APP concessions overlaid onto fire risk map of South Sumatra Provincial Forestry Department



BAP PT Bumi Andalas Permai (192,7000) ha
BMH PT Bumi Mekar Hijau (250,370) ha
BPP I PT Bumi Persada Permai I (60,433) ha
BPP II PT Bumi Persada Permai II (24,050) ha

RHM PT Rimba Hutani Mas (67,100) ha
SHP PT Sumber Hijau Permai (30,040) ha
TPJ PT Tri Pupajaya (21,995) ha
SBA PT SBA Wood Industries (110,373) ha

Source: Forest and land fire vulnerability map for South Sumatra Province, Forestry Department of South Sumatra Province (2005). Concession boundaries from Annual Work Plans (RKT).

A primary reason Sinar Mas/APP’s plantations in South Sumatra are susceptible to such high fire risk is that a majority of the group’s concession areas in the province are located on peat (see Section 4.2 below). Natural peatlands, being waterlogged swamps, have a very low fire risk. But when they are drained to establish agro-industrial plantations – i.e. for pulpwood or oil palm – the fire risk increases by several orders of magnitude (Someshwar et al. n.d.). Peat stores massive amounts of waterlogged biomass, and once this biomass is exposed to air and allowed to dry, it becomes highly flammable and once ignited, difficult to extinguish (Takeuchi et al. 2010). As peat fires burn below ground in the soil, such fires are difficult to extinguish. Combustion in peat fires is relatively incomplete as a consequence of limited oxygen availability, causing high amounts of particulates to be emitted and resulting in dense haze.

Between January and mid-October 2015, 74% of all high confidence hotspots in Sumatra were detected on peat (Eyes on the Forest 2015). Similarly, 91.5% of the 790,000 ha that burned in Central Kalimantan in the devastating fires of 1997-98 was located on peat (Page et al. 2002). Moreover, 99% of fires that occurred on the peatland-dominated Kampar Peninsula in Riau Province between 2000 and September 2015, occurred within plantation concessions or in areas affected by the drainage from these plantations, including concessions managed by affiliates of Sinar Mas/APP (Hooijer et al. 2015).

The risk of catastrophic fires in South Sumatra and other parts of Indonesia is significantly amplified under extreme weather conditions related to El Niño – Southern Oscillation (ENSO) events. In El Niño years, reduced precipitation and higher temperatures than normal often lead to prolonged droughts (Vecchi and Soden 2007). Under such conditions, heavily logged forests and drained peatlands – both of which

have large volumes of dry, combustible biomass – are especially vulnerable to fires; and such fires can be extremely difficult to extinguish in the absence of monsoon rains.

Meteorological studies have projected that due to greenhouse gas warming, El Niño conditions are likely to increase in frequency and intensity over the coming decades (Cai et al. 2014), resulting in reduced rainfall over tropical peatlands (Li et al. 2007) and a positive feedback loop between decreased soil moisture and less precipitation in Indonesia’s main burning regions (Notaro 2008).⁸ This suggests that fires will remain a persistent threat for Sinar Mas/APP’s plantations in South Sumatra and other provinces, and that the risk of catastrophic impacts is likely to increase as climate change intensifies the El Niño cycle. Since 1996, APP has sought to manage the risks associated with fires by maintaining a no-burn policy for all of its concessions and focusing on fire-fighting. As the 2015 fires demonstrated, however, fire suppression efforts have been far from effective. Short of rewetting the peatlands – which would make it impossible for them to be used for high-intensity industrial pulpwood production – there are no guarantees the group’s prevention and mitigation measures will be effective.⁹

When fires have occurred, the company has appeared to blame smallholders and other parties for starting the fires, which then spread into the Sinar Mas/APP concessions (Fogarty 2015b). In a November 2015 article in *The Straits Times*, Aida Greenbury, APP’s Managing Director of Sustainability and Stakeholder Engagement, stated:

Fire is a hugely complex issue, involving the rights of local communities, illegal activity by small enterprises often with political links and fundamental complexities over land use rights, maps, ownership and protection. . . . If the rest of the landscape do whatever they want, build whatever drainage canals and burn lands wherever they want, we will be affected. And that’s why we have so many hot spots in our operations. (Fogarty 2015b)

The Rainforest Alliance further highlighted both the complexity of these issues and the risks they pose in its 2015 “Evaluation of Asia Pulp & Paper’s Progress to Meet its Forest Conservation Policy (2013) and Additional Public Statements”:

In the course of the fieldwork in 21 concessions, the Rainforest Alliance observed recent natural forest clearance in each concession visited. The most common was small-scale encroachment from shifting agriculture involving the carving out a plot for garden and home that ranged from 5–20 hectares per plot. The slash-and-burn clearance techniques applied in these instances were associated with fires that sometimes spread out of control, especially on peatland, and affected a wider area of natural forest. (Rainforest Alliance 2015b)

With the data currently available in the public domain, it is quite difficult to determine with certainty who is ultimately responsible for starting the fires that had such devastating impacts on Sinar Mas/APP’s supplier concessions in 2015. It is clear, however, that HTI license-holders have a legal obligation to protect their concession assets. This can reasonably be expected to include implementation of effective measures to prevent fires within the concession boundaries and to suppress fires when they occur. A more fundamental question that must be asked is, who bears responsibility for creating such incendiary conditions within the landscapes where catastrophic fires have occurred?

8 Cai et al. (2014), published in *Nature Climate Change*, predicts that the likelihood of extreme or “super” El Niños will double from occurring, on average, every 20 years to occurring in the future, on average, every 10 years. For pulpwood plantations located in high fire-risk areas, this suggest extreme fire events could occur, on average, every two rotations.

9 APP reported blocking “over 3,500 perimeter canals to increase water levels in APP suppliers’ concessions located on peatland . . .” as a step towards creating “buffer zones” (APP 2016a; APP 2016b).

Legal, regulatory, and reputational risks

As the 2015 fires have shown, the risks that peatland fires pose for Sinar Mas/APP are not limited to the material losses incurred when established plantation areas are burned. Rather, Sinar Mas/APP and its affiliates in South Sumatra were also exposed to legal, regulatory, and reputational risks when it became clear that fires within their concession boundaries were a significant source of the transboundary haze that affected Singapore and other parts of Southeast Asia during late 2015. In September and October 2015, Singapore's National Environment Authority issued "Preventive Measures Notices" to the group's four main plantation companies in South Sumatra – PT Bumi Andalas Permai, PT Bumi Mekar Hijau, PT Rimba Hutani Mas, and PT Sebangun Bumi Andalas Wood Industries – along with APP, their parent company, for possible violation of the country's Transboundary Haze Pollution Act (Kek 2015). Supermarket chains in Singapore pulled APP products from their shelves in a boycott against the company to protest its role in the haze-producing fires (Chen 2015).

In September 2015, the Indonesian government arrested an executive of PT Bumi Mekar Hijau in connection with the fires, and the Ministry of Environment and Forestry sued Bumi Mekar Hijau in South Sumatra court for a record sum of over US\$ 500 million in damages and recovery fees related to the burning of 20,000 ha within its concession in 2014 (Soeriaatmadja 2015, Jong 2015). In its initial verdict, the provincial court ruled in favor of PT Bumi Mekar Hijau. The Ministry of Environment and Forestry is appealing the decision. Ministry spokesman Eka Widodo Sugiri said the Ministry found "strong indications" that Bumi Mekar Hijau was guilty of setting fires within the boundaries of its plantation concessions in 2014 and 2015 (Maulia 2016). The Ministry and the National Police have indicated they are investigating cases related to the 2015 fires, many of which occurred in APP affiliated concessions (Arnaz 2015). Given the much larger scale of the 2015 fires, it would be reasonable to anticipate the Ministry could seek even larger damages than the US\$ 500 million it has sought for the 2014 fires.

In December 2015, the Government also suspended the business licenses of 16 plantation companies for illegal burning within their licensed areas, including pulpwood producers with concessions in Sumatra and Kalimantan (Soeriaatmadja 2015). *The Straits Times* reported that suspended firms included Sinar Mas affiliates PT Bumi Mekar Hijau and PT Sebangun Bumi Andalas Wood Industries in South Sumatra and PT Mega Alam Sentosa in West Kalimantan (Soeriaatmadja 2015).

In late 2015, the Minister of Environment and Forestry issued a ministerial instruction that indicates burned areas are not to be replanted (S.661/Menlhk-Setjen/Rokum/2015). If fully implemented, this could mean a 26% reduction of the developed production area on Sinar Mas/APP affiliated concessions in South Sumatra as a result of the 2015 fires alone (based on the analysis by Hutan Kita Institute et al. 2016). Furthermore, a consensus is emerging among many stakeholders in Indonesia that lasting solutions to the annual fire and haze problem will need to focus on stopping peatland draining and phasing out drainage-based land-use of peatlands, in addition to rewetting drained peatlands and pursuing alternative economic uses such as paludiculture (Mongabay 2015; Wetlands International 2015). In early 2016, the President of Indonesia created a new Peatland Restoration Agency (Badan Restorasi Gambut, or BRG) (Kapoor 2016).

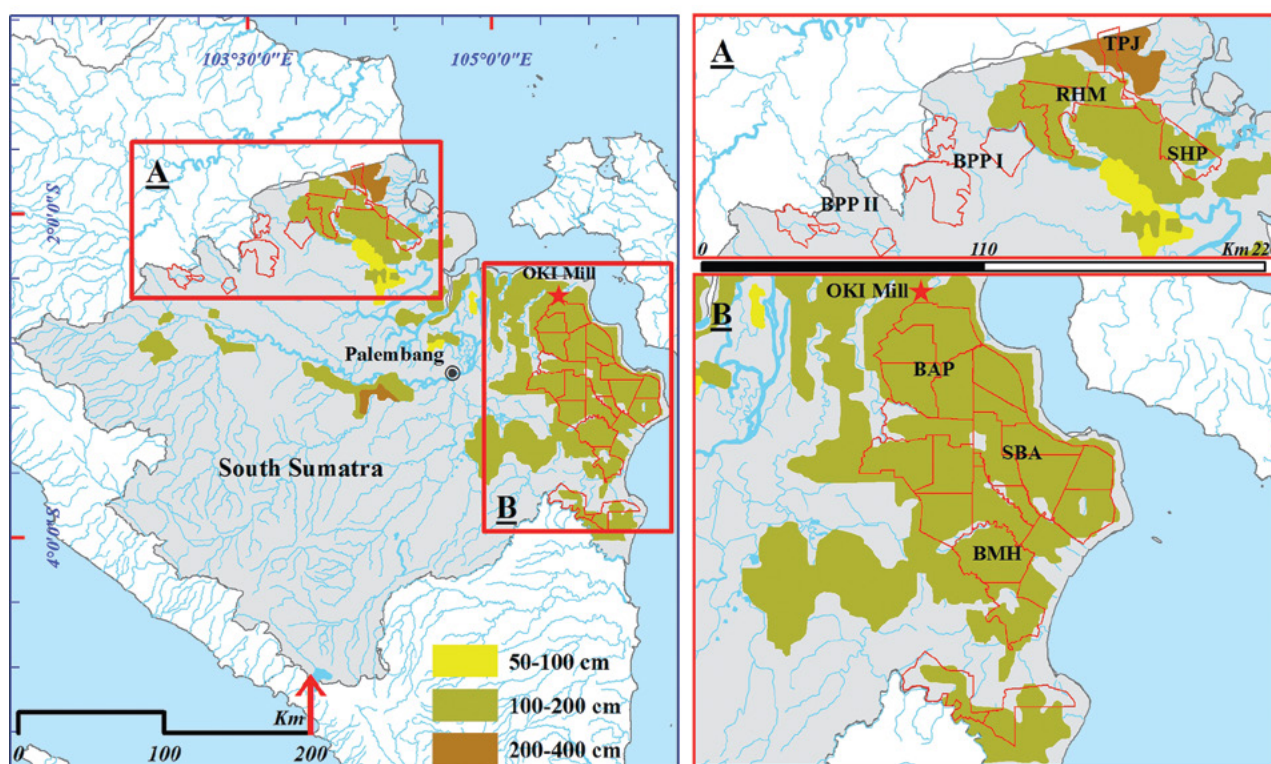
Peatland restoration efforts led by the BRG will initially focus on four districts, including OKI and Musi Banyuasin in South Sumatra where Sinar Mas/APP's affiliated concessions are located (Jong 2016). For Sinar Mas/APP, such policy changes carry a significant degree of risk for future wood supply, as the group's plantation base – especially for the OKI mill – is largely situated on peat. If the government were to require rewetting of all peatlands in their concessions, this could potentially reduce the group's total plantation area (currently 2.6 million ha across five provinces) by over 50%.¹⁰ By the same token, if Sinar Mas/APP were allowed to continue pulpwood production on peatlands, the risk of them being destroyed by fire will remain high for the foreseeable future.

¹⁰ According to Eyes on the Forest report (October 14, 2015), some 67% of Sinar Mas/APP's supplier concessions are on peatlands.

Section 4.2: Risk of peatland subsidence, flooding, and acidic soils

High fire risk is not the only concern related to pulpwood plantations on drained peatlands. Peatland subsidence and flooding are also major risks to Sinar Mas/APP plantations in South Sumatra and their potential to remain productive over the medium to long term, since more than three-quarters of the group's concessions in the province are located on peatlands. Spatial analysis based on Wetlands International's Peat Atlas indicates that peatlands account for 77% of the total area of 789,043 hectares within HTI concessions now being developed to supply fiber to the OKI mill (based on analysis of Wahyunto et al. 2003) (see Map 4.2).¹¹ APP's existing pulp mills in Riau and Jambi are also highly dependent on wood sourced from concessions on peatlands in Sumatra and Kalimantan, and the group has been developing plantations on peat since the late-1990s. An estimated 67% of Sinar Mas/APP concessions in Indonesia are on peatlands (Eyes on the Forest 2015).

Map 4.2: Location, area, and depth of peatlands in relation to Sinar Mas/APP concessions in South Sumatra



Abbreviation on Map	Sinar Mas/APP Concession Company	Depth of Peat	Area of Peat (ha)	Percentage of Peat in Concession
BAP	PT Bumi Andalas Permai	100–200 cm	191,237	99%
BMH	PT Bumi Mekar Hijau	100–200 cm	208,271	83%
SBA	PT SBA Wood Industries	100–200 cm	126,415	89%
RHM	PT Rimba Hutani Mas	100–200 cm	47,421	71%
BPP I	PT Bumi Persada Permai (I & II)	100–200 cm	298	0%
SHP	PT Sumber Hijau Permai	100–200 cm	21,262	71%

¹¹ An analysis of existing peat maps of Indonesia recommends using the Wetlands International map (Wahyunto et al. 2003), though it was found through field checks to consistently underestimate the depth of peat (QANS 2013). The other available peat map, released by the Ministry of Agriculture in 2011, was, according to this analysis, largely derived from the Wetlands International map though lowered the peat classes and thereby underestimated the depth of the peat to an even greater extent.

Abbreviation on Map	Sinar Mas/APP Concession Company	Depth of Peat	Area of Peat (ha)	Percentage of Peat in Concession
TPJ	PT Tri Pupajaya	100–200 cm	5,752	61%
		200–400 cm	7,756	
Total			608,412	77%

Source: Based on data from Wetlands International Peat Atlas (Wahyunto 2003 et al.).

In contrast to mineral soils, peatlands are “wetland ecosystems formed by the accumulation of organic matter from partially decomposed vegetation over thousands of years in waterlogged conditions” (Hooijer et al. 2015a). To develop pulpwood plantations on these sites requires that the peatlands be drained by constructing a network of canals. Once the peat surface is drained, these canals are then used to manage the water table, remove water following inundation or floods, and transport heavy equipment and pulpwood by barge. The main pulpwood species planted on peatland sites is *Acacia crassicarpa*. It is better suited for drained peat soils than *Acacia mangium*, the main species grown on mineral soils.

Scientific studies conducted in Indonesia and other parts of Southeast Asia have shown that developing commercial plantations on peatlands leads to degraded and flooded landscapes with diminished economic use (Comte et al. 2012, Hooijer et al. 2015a, Hooijer et al. 2015b). When peatlands are drained to establish plantations, they immediately begin to compact and consolidate (which reduces permeability and infiltration) and continue to subside through oxidation, resulting in increased flood and fire risk (Hooijer et al. 2012, Stephens et al. 1984). Subsidence causes the elevation of the soil to decrease. This process happens fast at first, and then at a slower, steady rate until the drainage limit is reached or when the peatland is rewetted.

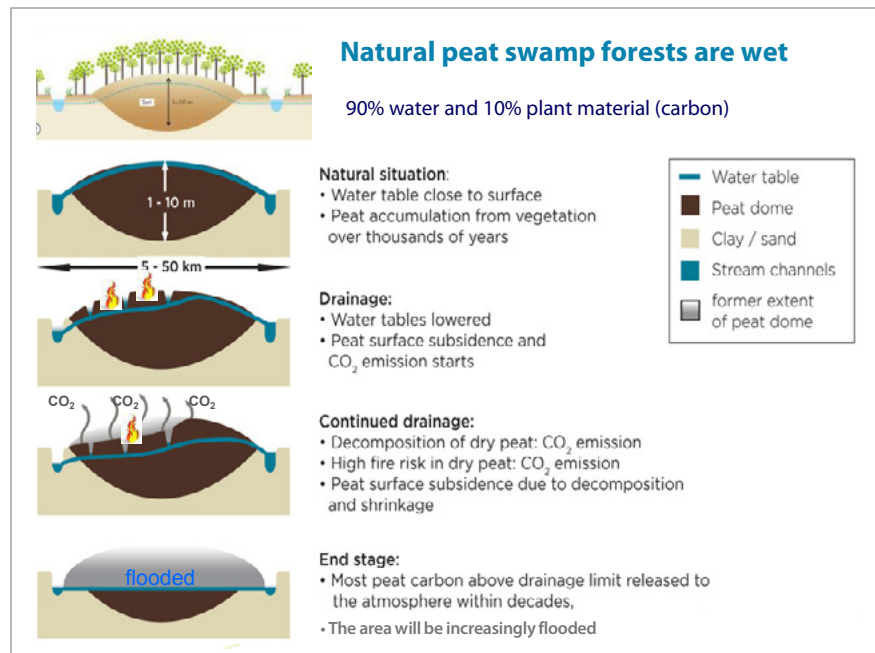
A large-scale study to monitor subsidence of *Acacia* plantations on peatlands in Riau and Jambi provinces documented an average subsidence of 142 cm during the first five years after drainage, of which 75 cm occurred in the initial year, primarily due to peat consolidation and compaction (Hooijer et al. 2012). After five years, the subsidence continued at a uniform rate of 5 cm/year on sites where the water table depth was an average of 0.7 meters below the surface, described as close to a “best case” water table depth for managing both productivity and subsidence in *Acacia* plantations on peat. For maximum productivity of *Acacia crassicarpa*, however, the water table would need to be deeper. But this in turn would increase the rate of subsidence (the lower the water table, the faster the subsidence). As a result, plantation managers are constantly balancing productivity of the plantation and subsidence, compromising one to improve the other.

The process through which subsidence ultimately leads to *Acacia* plantations on peat becoming unproductive can take decades. Under some conditions, however, subsidence is already resulting in declining yields and/or substantially higher costs (Hooijer et al. 2015a). A critical factor shaping these impacts is the distance between the surface of the peat and the level at which it becomes impossible to use gravity-based drainage to drain sufficiently (i.e. the drainage limit). The drainage limit for much of Indonesia’s peatlands is at or just above the base of the peat, so the distance to the drainage limit is slightly less than the depth of the peat. Based on Hooijer et al. (2012) it can be estimated that *Acacia* sites with peat 2.0 meters deep (considered a moderate depth) could lose their peat entirely (and presumably reach the drainage limit) within 16 years, or shortly after three 5-year rotations. Similarly, *Acacia* sites on peat of 3.0 meters depth could lose their peat entirely within 36 years, or just a bit more than seven 5-year rotations.

Much of the peatland areas that APP and its plantation partners are now developing in South Sumatra to support the OKI mill are of shallow (0.5–1.0 meters) to moderate depth (1.0–2.0 meters) (see Map 4.2). Although the government has issued 100 year concession licenses for many of these HTI plantations, there is a strong probability that this land could become much less productive long before the concession period ends. Given that several of these concessions initiated planting as early as 2004, subsidence in many areas has been already been happening for over 10 years.

Significantly, hydrological studies have shown that water management techniques have only limited scope to slow the detrimental impacts of subsidence and flooding associated with declining plantation productivity. In their study of *Acacia crassicaarpa* plantations in Riau and Jambi, Hooijer et al. (2012) found that “best management practices” resulted in an average subsidence rate of 3.5 cm/year, only moderately less than the average subsidence rate of 5 cm/year documented under “business as usual” conditions. Challenging widely-held beliefs that water management could greatly slow the subsidence process, Hooijer and his colleagues concluded that:

Figure 4.2: Process of peatland subsidence leading to flooding, fire, and carbon emissions



Source: Wetlands International.

A relationship with groundwater table depth shows that subsidence and carbon loss are still considerable even at the highest water levels theoretically possible in plantations. This implies that improved plantation water management will reduce these impacts by 20% at most, relative to current conditions, and that high rates of carbon loss and land subsidence are inevitable consequences of conversion of forested tropical peatlands to other land uses. (Hooijer et al. 2012)

For HTI companies developing plantations on peat, the decision to adopt “best management practices” may ultimately depend on whether the projected 20% reduction in subsidence impacts justifies the major investment needed to maintain water management structures at optimal levels. Even if they decide to make the investment, ultimately the plantation’s productivity will still collapse at some point.

Over time, flooding often amplifies the effects of subsidence on peatland plantations. According to Hooijer et al. (2015a), “As the peatland surface subsides, it will eventually reach a point where flooding will occur.” Experts assess flood risk by determining the area of peatland that falls below two elevation thresholds: the High Water Level (HWL) and the Free Drainability Limit (FDL). HWL is the level at which flooding by river or sea water becomes frequent and for prolonged periods of time, while FDL is the point at which gravity-based drainage becomes problematic. FDL is always above HWL and the difference generally increases as one moves away from rivers to the interior of peatlands. A low HWL is associated with a high likelihood of flooding and a low FDL with undrainability. In either case, *Acacia crassicaarpa* is unable to grow productively on a sustained basis.

Using LiDAR data, the consultancy Deltares assessed flood risk on the Kampar Peninsula in Riau province, where Sinar Mas/APP and affiliates have 50,661 ha of concessions on drained peat and their chief competitor APRIL has 131,965 ha (Hooijer et al. 2015a). The analysis revealed that even when “best management practices” are applied, around 25 years from now (2039) almost 25% of the *Acacia* plantations will be below the HWL and 67% will be below the FDL (Hooijer et al. 2015a). In 50 years, over a third of the plantations will be below the HWL, and in 100 years over 60% will fall below HWL. If one assumes

“business as usual” water management and the associated subsidence rates, the percentage of plantation areas below the flooding thresholds becomes even greater.

APP has hired the same consultants that did the Kampar Peninsula flood risk assessment to do research it can use to design its peatlands management policy (APP 2015a). Deltares is now heading APP’s Peat Expert Management team and is in the process of examining LiDAR data covering 4.5 million ha of peatlands, including much of APP’s concessions in Sumatra. However, to the best of the authors’ knowledge, as of April 10, 2016, APP had not released flood risk assessments for its concessions, including South Sumatra.

While sector analysts are encouraged by APP’s increasing attention to these issues, some have voiced doubts that the company will be able to transition to a more sustainable path since so much of its plantation land is on peat. In an October 2015 article in Singapore’s *Straits Times*, Marcel Silvius, a peat expert at Wetlands International, commented:

I think it is the first time a company is taking a step like that to look seriously at the sustainability issue. But I think the conclusions are going to be kind of shocking for them because most of their areas will prove to be totally unsustainable in the long term. (Fogarty 2015c)

Acid Sulphate Soils

To the best of the authors’ knowledge, Sinar Mas/APP has not publicly acknowledged the full extent of the risks associated with potential acid sulphate soils underlying peatlands, despite the fact that they present the possibility for environmental catastrophe. Potential acid sulphate soils exist under many coastal peat areas in eastern Sumatra (Attanandana and Vacharotayan 1986). In South Sumatra, where the thickness of peat within Sinar Mas/APP’s concessions is relatively shallow, there is a strong possibility that subsidence and eventual loss of the peat layer will expose potential acid sulphate soils, turning them into active acid sulphate soils. In this case, the land will likely become too acidic for productive plantations and may cause contamination of both the concession and adjacent areas and the ground and surface waters into which the plantations drain. There is high likelihood that cultivation of pulpwood species will thus become unviable in these areas, even if the base of the peat layers is above drainability limits or if drainage would continue with pump-operated systems.

Potential acid sulphate soils are soils and sediments containing iron sulphides, most commonly pyrite (Attanandana and Vacharotayan 1986). They are poorly drained, i.e. waterlogged, soils with high pyrite content and are generally not harmful (Lim et al. 2012). However, when the pyrite is exposed to the air by drainage or disturbance, sulphuric acid is formed turning them into actual acid sulphate soils (Attanandana and Vacharotayan 1986). This oxidization process causes the soil to become highly acidic (pH below 4) impacting on land productivity, and often leads to the release of toxic quantities of iron, aluminum, and heavy metals (Lim et al. 2012). The soluble forms of aluminum, in particular, can enter groundwater and surface water, causing negative impacts for aquatic life and plants (Lim et al. 2012).

The majority of acid sulphate soils are found in coastal areas, including an estimated 2 million ha in the coastal areas of eastern Sumatra and Kalimantan (Attanandana and Vacharotayan 1986). The *Roundtable for Sustainable Palm Oil (RSPO) Manual on Best Management Practices for Existing Oil Palm Cultivation on Peat* cautions palm oil plantation managers against exposing the potential acid sulphate soils:

For existing plantations on peat, which are underlain with potential acid sulphate soils, it is very important that only shallow drainage ditches are developed and they do not penetrate the acid sulphate layer. Over time the peat layer will be gradually lost due to oxidation and compaction and therefore by the end of the first or second generation the acid sulphate layer may be close to the surface. In such cases it is strongly recommended not to continue with the plantation – or to drain the area further – as in addition to the reduction in oil palm yield on the area affected, the acid and toxic runoff from the acid sulphate areas may contaminate other areas. (Lim et al. 2012)

The RSPO requires any new palm oil plantations on peat to check whether potential acid sulphate soils underlie the peat and to map these soils as part of its insistence on long-term viability of plantations (Lim et al. 2012). Neither APP nor any other pulp company operating in Indonesia, to the knowledge of the authors of this report, has agreed to such a practice. APP is now conducting a peatlands mapping exercise across its concessions to measure the thickness of peat domes. This exercise, to the best of the authors' knowledge, does not include mapping the mineral soils, including any potential acid sulphate soils, which underlay the peat within its concessions.

Given these risks, why have Indonesia's pulp producers developed so many of their plantations on peatlands? The clearest reason is that available land to plant Acacia and Eucalyptus on mineral soils has become increasingly scarce in Sumatra (Uryu 2010; Uryu 2008). In most areas, local communities or other land users already manage the mineral soils, which makes those areas far more prone to land tenure conflicts than peatland sites. Peatlands usually have fewer people living on or utilizing them, thus companies have less competition. Moreover, many APP and APRIL peatland sites in Sumatra and Kalimantan have had large stocks of natural forest timber, which has allowed the companies (or their affiliates) to capture economic rents even before establishing Acacia plantations.

In sum, Acacia plantations have been developed on peatlands not because they are well suited for producing pulpwood, but at least in part, because of the limited availability of other lands. This suggests that if producers' plantation productivity declines significantly on peatlands, they will face considerable difficulty finding alternate sites on which to develop plantations that are not on peat.

The strong scientific evidence pointing to the long-term problems with sustaining fiber supply on peatland plantations due to subsidence and flooding appears inconsistent with APP's outwardly confident posture towards peatland plantations. While the company is undoubtedly aware of these risks, APP's sustainability reports do not disclose how much either the OKI mill or the company's existing pulp mills rely on fiber sourced from concessions on peatlands.¹² As recently as August 2015, APP's Director of Sustainability and Stakeholder Engagement claimed in a public statement that "there is almost no existence of peat" in APP affiliated concessions in the "OKI landscape."¹³

For investors and lenders involved in the OKI mill project, it will be important to require transparency on the company's exposure to peatland risks. To assess these risks, they will need to consider how subsidence and flooding on peatland plantations could affect OKI's wood supply and the implications for the mill's wood costs if Acacia yields on peatlands were to significantly decline over the medium- to long-term.

Box 4.1: Alternative pulpwood species for undrained peatlands

APP has indicated that finding alternative species suitable for undrained peatlands is a priority in its Peatland Best Practice Management Programme (see for example "Supporting Fact Sheet, 13 August 2015 – Progress towards delivering Asia Pulp & Paper Group's peatland commitments"). This was a recommendation provided by Deltares, and APP has indicated that it has established joint studies with Deltares and Euroconsult Mott McDonald focusing on alternative cropping systems on peatlands. APP notes, "This part of the PBMP [Peatland Best Practice Management Programme] will require a longer time period to implement in order to ensure the right species are selected and trialed prior to implementing on a wider scale" (APP 2015b).

12 For example, see APP Sustainability Report 2013 (APP 2014a).

13 Statement made by Aida Greenbury in question and answer session of APP meeting on August 13, 2015 regarding its Forest Conservation Policy and peatlands management plans. Ms. Greenbury went on to say, "there's some peat dome in the middle, but it's also protected. The rest of the area is burned down marine clay when our suppliers took it over in 2003." APP has posted a video of this event on Youtube (<https://www.youtube.com/watch?v=u9G64K2LyV8>). Ms. Greenbury's comment occurs at 2:33:00.

A joint project by the Indonesian government and European organizations identified over 400 species that grow on peatlands and have economic potential, including almost 30 species suitable for pulpwood production (Giesen 2013). A research paper prepared for this project elaborates on a species of eucalyptus called gelam (*Melaleuca cajuputi*) that is one of the most promising of these peatlands species suitable for production of pulp (Giesen 2015). Gelam can thrive in undisturbed and disturbed peatlands, readily regenerates and grows rapidly, and is tolerant of fire and flood (Giesen 2015). The chemical properties of gelam are suitable for pulp production and gelam chips for pulp have been produced in Vietnam (Nguyen 2008). One study in Vietnam assumed yields for gelam of 120 m³/ha on a seven year rotation based on a survey of *Melaleuca* forests in the Long Xuyen Quadrangular, which indicates annual growth rates, on average, of around 17 m³/ha/year (Nguyen 2008).

Organizations interested in protecting peatlands such as Wetlands International see potential in the sustainable use of rewetted peatlands (called ‘Paludiculture’) using flood tolerant species like gelam in areas that are not important for biodiversity and around buffer zones of peat swamp forests. At the same time, Wetlands International acknowledges that these species cannot produce wood fiber at production rates and costs comparable to large-scale industrial plantations of *Acacia* and *Eucalyptus* on drained peatlands.¹⁴ The trees would have to be selectively logged rather than clear-felled in order to sustain a canopy cover and prevent direct sunlight penetrating and drying out the soil. Application of fertilizer enhances the decomposition of peat and is therefore undesirable in a paludiculture system. Finally, transportation is difficult when drainage canals are blocked to restore the peatlands, which makes plantation management relatively more expensive.

Section 4.3: Risk of pests and diseases

Pests and diseases that attack commercial plantations of non-native *Acacias* and *Eucalypts* across Indonesia represent another significant risk to Sinar Mas/APP’s long-term fiber supply both to OKI and the group’s other Sumatra pulp mills. Various fungal root-rot diseases and a stem wilt/canker called *Ceratocystis*, as well as pests including beetles and monkeys, have substantially damaged pulpwood plantations and lowered yields (Harwood and Nambiar 2014; Rimbawanto et al. 2014). Sinar Mas/APP plantation managers are aware of these issues and are trying to solve them, but have limited ability to deploy large-scale control measures (Harwood and Nambiar 2014; Eyles et al. 2008). Experts project the effects of some diseases and pests could increase in severity across successive rotations (Wingfield et al. 2011).

Acacia mangium and *Acacia crassicaarpa* are the two main species grown for pulpwood in Sumatra and Kalimantan. Both are native to northern Australia, Papua New Guinea, and West Papua (Harwood and Nambiar 2014; Wingfield et al. 2011). *Acacia mangium*, which is usually grown on mineral soils, was introduced to Indonesia in 1979, first in Sumatra and then in Kalimantan, and the country’s pulp producers began to plant large areas of *Acacia mangium* for pulpwood plantations in 1990. *Acacia crassicaarpa*, which is better suited to wetlands, became an increasingly important species as the development of pulpwood plantations expanded rapidly onto drained peatlands after 2000.

Both *Acacia mangium* and *Acacia crassicaarpa* are susceptible to a variety of fungal root-rot diseases, which “colonize the roots of the trees and decay the wood and the bark” (Rimbawanto 2014; Mohammed et al. 2006; Old et al. 2000). Symptoms of root-rot disease include yellowing, wilting, and reduced size of foliage, thinning of the crown, poor growth rates, high susceptibility to wind throw, dieback, and tree death in groups (Eyles et al. 2008; Old et al. 2000). In forest stands, trees affected by root rot tend to be clustered in

14 Discussion with Wetlands International peat expert Marcel Silvius on January 15, 2016.

“circular disease centers [which] increase in diameter as root contact occurs between neighboring diseased and healthy trees” (Mohammed et al. 2006).

For *Acacia mangium*, root-rot disease caused by various species of *Ganoderma* fungus has had the greatest impact on productivity (Irianto et al. 2006). A study of second-rotation *Acacia mangium* plantations sites in South Sumatra, Riau, and Kalimantan found the incidence of root rot ranged from 3% to 28% (Irianto et al. 2006). Scientific studies indicate that root rot becomes progressively more severe and widespread as the number of rotations increases. One multi-year study (in which scientists from companies associated with APP and its competitor APRIL both participated) found that “the incidence of root-rot increases exponentially over rotations”: First rotation incidence was 5%, second rotation 15%, and third rotation 35% (Mohammed et al. 2012). Another study estimates up to 28% mortality of *Acacia mangium* on second rotation stands, and concluded that a third rotation on heavily-infected sites would be practically impossible (Hardiyanto 2014).

In many regions, *Acacia mangium* has also been adversely affected by *Ceratocystis*, a genus of plant pathogens that cause canker stain and wilt diseases of trees, often resulting in their death (Roux and Wingfield 2009). The *Ceratocystis* stem wilt/canker has had extensive impacts on non-native *Acacia* and *Eucalyptus* species in Africa and South America, and in recent years, has infected increasingly large areas of *Acacia* plantations in Indonesia, including those in South Sumatra (Wingfield et al. 2011). In Indonesia, according to Harwood and Nambiar (2014b), “outbreaks of *Ceratocystis* stem wilt/canker have been more damaging than root rot, although *Ceratocystis* was recognized as a major problem later.” The *Ceratocystis* fungal spores typically enter the affected tree through wounds. The widespread use of pruning in *Acacia* plantations to promote optimum tree growth often makes them susceptible to infection (Tarigan et al. 2011). Wood-boring beetles are also known to transmit the fungus.

The extent of damage that pests and diseases have done to commercial plantations in Indonesia is difficult to quantify in any definitive sense as private plantation companies have provided only very restricted access to independent researchers. However, findings from a limited number of studies suggest that such impacts have been profound. At plantation research sites in Sumatra, Harwood and Nambiar (2014) found that root rot, followed by the rapid spread of *Ceratocystis* stem/wilt canker, reduced *Acacia mangium* incremental growth rates from 22 and 35 m³/ha/yr during the first rotation to 15 m³/ha/year or less. These findings, in turn, led Harwood and Nambiar (2014b) to conclude:

Despite the significant progress achieved over the last decade in plantation management, the future of *A. mangium* plantations in Sumatra is uncertain. Two major diseases, root rot (*Ganoderma* sp.) and stem wilt/canker (*Ceratocystis* sp.), are now causing such levels of mortality that a significant portion of these plantations are no longer viable.

With limited control options available, the “widespread and increasing stand mortality” of *Acacia mangium* due to diseases has led companies planting on mineral soils to switch to *Eucalyptus pellita* (Nambiar and Harwood 2014). In general, *Eucalyptus pellita* yields less volume than healthy *Acacia mangium* during their initial rotations. Harwood and Nambiar (2014a) found that first rotation of *Eucalyptus pellita* that replaced *Acacia mangium* produced growth rates 16–18 m³/ha/yr. The production cost for *Eucalyptus pellita* is also higher since it is not a nitrogen-fixing species and the trees, therefore, require more fertilizer. Moreover, *Eucalyptus pellita* is also susceptible to the same root rot that decimated *Acacia mangium* plantations, but the extent of losses suffered so far is not yet clear.

Acacia crassicarpa is similarly susceptible to root rot and *Ceratocystis* stem wilt/canker, but so far the species has not experienced the same level of losses that have reportedly occurred on *Acacia mangium* plantations in Sumatra. This may be because *Acacia mangium* was introduced to Sumatra earlier and has been planted for more rotations. Plantation experts interviewed for this study expressed an opinion that as the number of *Acacia crassicarpa* rotations increases, there is a reasonable chance that it, too, could experience losses on a similar scale to *Acacia mangium*.

In 2004, researchers identified a new fungal pathogen, *Passalora perplexa*, which causes leaf blight on *Acacia crassicarpa*. According to Beilharz et al. (2004), “In plantations, the disease associated with this fungus can be very severe and it is likely to provide significant challenges for forestry companies that plant *A. crassicarpa*.” Crassicarpa leaf blight caused by *Passalora perplexa* has been documented both in Australia, where *Acacia crassicarpa* is native, and in pulpwood plantations in South Sumatra (Wingfield et al. 2011). Beilharz et al. (2004) describe *Passalora perplexa* as “potentially devastating” for commercial plantations in which *Acacia crassicarpa* is grown, and note that “virtually nothing is known regarding the biology of *P. perplexa*, and this alone represents an important constraint to efforts to control the leaf blight disease it causes.”

Local fauna pose another risk to the *Acacia* species planted for pulpwood. Long-tailed and pig-tailed macaques, orangutans, prevost’s squirrels, and other mammals strip and gnaw on the *Acacia* bark so they can feed on the sweet inner layers of cambium (Hardiyanto 2014, McBeth 2014). Even when this does not kill the trees outright, it provides opportunities for diseases such as *Ceratocystis* to infect them. Long-tailed macaques have been reported to cause significant damage in the *Acacia* plantations of PT Musi Hutan Persada in South Sumatra (Kurniawan 2009). The threat from mammals to *Acacia* plantations is another reason some plantation companies switched planting *Eucalyptus pellita* instead of *Acacia mangium*, since the mammals are less attracted to the *Eucalyptus*’ corky bark.

Noting that “in terms of pests and diseases, planting Australian acacias in new environments represents a fascinating experiment in biology and biogeography,” Wingfield et al. (2011) argue that the long-term risks these pose for pulpwood plantations in Indonesia can best be understood by examining the experience of other non-native plantation species grown commercially outside of their natural habitats. In particular, they describe dynamic effects of pests and diseases on various species of *Eucalyptus* and *Pinus* trees planted outside their native environments, as well as *Acacia mearnsii*, an Australian native which has been managed in plantations in South Africa for over 140 years.

In many cases, Wingfield et al. (2011) point out, intensively managed plantations of these species achieved impressive levels of productivity during the initial rotations after they were introduced to new regions. They attribute much of this success to what they describe as “enemy escape” – that is, the separation of these species from the pests and pathogens that function as the trees’ natural enemies in their native environments. In each case, however, pests and diseases emerged that slowed or reversed the productivity gains achieved by these non-native tree species, and the damaging effects of these have often increased and become more intractable over time.

Wingfield et al. (2011) maintain that the experience of intensively-managed plantations of *Acacia mangium* and *Acacia crassicarpa* plantations in Sumatra have followed a similar pattern. After achieving satisfactory levels of productivity during initial rotations, growth and yields for both species have been slowed significantly by *Ganoderma* root rot and *Ceratocystis* in recent years. According to Wingfield et al. (2011), the pests and pathogens that have affected Australian *Acacias* in non-native environments have originated from multiple sources. In some cases, they are “new encounter” pests and pathogens which do not occur in the trees’ native environments and for which they have little or no natural resistance. Wingfield et al. (2011) note that *Ceratocystis acaciavora* is an example of a “new encounter” pathogen, as the fungus is native to Indonesia and apparently underwent a host shift to infect *Acacia mangium*.

In other cases, pests and pathogens from the trees’ native environments can be transmitted to the new regions where the trees are planted, and once there, their damaging effect on the trees can be amplified. Wingfield et al. (2011) describe this effect as follows:

Once a non-native species has become established in a new and genetically uniform environment such as that found in intensively managed plantations, the pest or pathogen appears to have an increased opportunity to spread to new environments. Thus, populations of the pest or pathogen

rise to levels seldom found in natural forests, and they gain added opportunity to spread. This is generally referred to as a 'beachhead' effect where increasingly robust bases of 'power' enable a pest or pathogen to move yet again.

Over the long term, Wingfield et al. (2011) maintain, "the global spread of seriously damaging forest pests and pathogens appears to increase in momentum with time." Noting that "plantation forestry using nonnative Australian *Acacia* species . . . is a relatively new practice," they argue that "the halcyon days of inexpensive forestry benefiting from the separation of trees from their natural enemies are clearly going to change as new pests and pathogens appear." For *Acacia* plantations in Sumatra and other parts of Indonesia, Wingfield et al.'s (2011) conclusions suggest considerable levels of ongoing risk for the foreseeable future: "This experiment is young; the long-term outcomes are largely unpredictable and are likely to hold surprises, some of which will not be favourable for the natural environment or for commercial forestry."

Section 4.4: Risk of land tenure disputes and social conflict

APP and its suppliers are contending with several hundred conflicts with local communities and other land-users on their 2.6 million ha of plantation concessions (Rainforest Alliance 2015b). According to a 2015 assessment by Rainforest Alliance, there are conflicts in each of the group's 38 concessions, which involve "thousands of people who live in the communities in and around the concessions and who have a history of tensions, conflicts and unfulfilled promises with APP and its supplier companies" (Rainforest Alliance 2015b). In many cases, these communities have customary land rights dating back many decades or more, and claim lands on which the companies have planted and/or intend to plant pulpwood species. Land conflicts are especially prevalent on sites on mineral soils, which generally support more intensive agricultural activities than peatland sites.

South Sumatra, where APP chose to build the OKI mill, apparently ranks among the provinces with the most agrarian conflict (Komnas HAM 2015). Local organizations estimate that at least 60,000 ha of APP-affiliated concession areas – or over 7.5 % of the group's land bank in that province – has been subject to competing tenure claims by rural communities.¹⁵ As of April 10, 2016, most of these claims remain unresolved.

APP is not alone in facing conflicts arising from land claims issues. Tenure conflicts are widespread in Indonesia's forestry, oil palm, and other land-based sectors. Within the forestry sector, land conflicts are especially prevalent in and around the 11 million hectares of HTI concessions (about 9% of the forest estate) the government has allocated to industrial plantation companies, with licenses extending for periods from 43 to 100 years. In many cases, these concessions overlap with areas owned, occupied, and/or managed by local communities, many of which have been managed under customary (*adat*) tenure institutions. Indonesia's Constitution recognizes both national law and customary tenure rights in the administration of forest land and resources. Recent decisions by the Constitutional Court firmly acknowledge the land rights of indigenous communities to their customary forests (AMAN 2013; Butler 2013). Yet the delineation between areas that are subject to state control versus community ownership remain unclear, and overlapping claims are expected to take decades to resolve.

A 2014 report by the Ministry of Environment and Forestry documented at least 81 conflicts between HTI license-holders and local communities that government agencies are monitoring and/or mediating (KLHK 2015). These are the tip of the iceberg. According to a 2009 survey of 17 provinces out of 34 provinces in Indonesia, 38,565 villages are located within or adjacent to the boundaries of the state-administered Forest Estate (*Kawasan Hutan*) (KPK 2015).¹⁶ With some 11 million ha of these forests now under license as HTI concessions, land disputes with these communities will number in the thousands.

¹⁵ Estimated by Hutan Kita Institute, February 2016.

¹⁶ It is noted that none of the provinces in Kalimantan, where a significant number of community land claims exist, were included in this study.

For lenders and investors in mega-scale pulp mills such as OKI, the prevalence of unresolved land claims is a major risk factor, the dynamics of which need to be well understood and assessed. Land conflicts can disrupt pulpwood plantation operations in a variety of ways, undermining both their productivity and profitability. In regions where local community farms, forests and settlements have been displaced from lands allocated to HTI license-holders, there have been numerous cases in which established plantation areas have been damaged or destroyed by arson or where local residents have failed to report fires near plantations (Murdiyarso and Adiningsih 2003; Dennis et al. 2005). In some cases, tenure disputes have led community members to occupy plantation areas, block access roads and/or seize equipment belonging to forestry concession-holders. In extreme cases, such conflicts can also lead to violence. In March 2015, for instance, it was reported that company security guards beat to death Indra Pelani, a 22-year old farmer and activist involved in a land dispute with APP-affiliate PT Wirakarya Sakti (WKS) in Tebo District of Jambi Province (Moodie 2015).¹⁷

Third party assessments of APP's plantation resources have highlighted the extent to which land conflicts pose risks to wood fiber supply for the group's pulp mills. A 2001 report by AMEC Simons described land tenure and ownership disputes as "a significant risk to the group's sustainable wood supply plans" (Webb 2001). In Jambi Province, AMEC Simons documented land claims by local communities that affected over 57,000 ha of land within the HTI concession held by PT Wira Karya Sakti (WKS), the main supplier of wood fiber to the Lontar Papyrus pulp mill (Webb 2001). The AMEC Simons report concluded that "the existing level of claim disputes can have a large impact" and that "if the number of successful claims escalates, it will have a further severe impact on sustainable wood supply plans." Shortly after the release of the AMEC Simons report, APP reportedly removed most of the areas under dispute from its estimates of the plantable land available to WKS, which represented a reduction equivalent to nearly 20% of the company's licensed area. Nevertheless, WKS continues to face challenges in resolving land disputes with local communities: Since the FCP process began in 2013, the company has only partially resolved one land dispute, reaching an agreement with the Senyerang community over half of their customary lands.

More recently, in its 2015 evaluation of APP's progress in meeting its FCP commitments, Rainforest Alliance stated:

Community encroachment was observed in many of [21] concessions visited. Some of the more organized communities visited during the evaluation had cleared up to 600 hectares. Much of this clearance was along riparian zones and rivers where water was plentiful. . . . Though definitive root causes could not be determined, such clearings appear to be largely attributable to overlapping tenures and competing land uses. (Rainforest Alliance, 2015b)

A 2013 report by The Munden Project identifies "overlapping land claims that diminish the value and viability of industrial concessions" as a problem faced by investors and financing institutions globally (de Leon et al. 2013). The report defines "land tenure risk" as "the danger of a dispute between the concession holder and others who believe they have a legitimate claim to use the land for their own purposes, usually for reasons of traditional usage" (de Leon 2013). While industry participants are clearly aware of the disruptive effects that overlapping land claims can have on their operations, lenders and outside investors may not have adequate information or effective tools to assess such risks. As a result, land tenure risks may not be valued accurately in the financing of investment projects that depend on industrial concessions, and such risks can be difficult to insure against (de Leon et al. 2013).

17 Other cases of conflicts between local communities and APP affiliates and supplier companies have been reported in the past. Harwell (2003) documented a series of violent attacks on villagers in Riau Province between 1997 and 2002, carried out by the Mobile Brigade (Brimob) of the National Police Force and private security contractors working for the Sinar Mas Group and its affiliates. In December 2008, Indonesian civil society organizations reported the use of violence by security forces working with Sinar Mas/APP affiliate PT Arara Abadi in order to evict local people from land the company sought to obtain for plantation development (Watch Indonesia! and WALHI 2008).

In fact, there are ways for investors to quantify and manage the risks associated with land tenure disputes and associated social conflicts. These include mapping of lands owned and/or managed by local communities and ensuring that the sponsor of an investment project has operational policies to manage such risks. In the case of OKI mill and the HTI concessions meant to supply its fiber, APP has made well-publicized efforts under its 2013 Forest Conservation Policy to recognize customary land rights, respect peoples' right to give or withhold their Free, Prior and Informed Consent to operations planned on their lands, and resolve land conflicts in its supply chain.

Implementation of these commitments reportedly has been slow and uneven. An assessment released by Rainforest Alliance in February 2015 summarized the company's progress as follows:

APP has made moderate progress in completing a full inventory of the many conflicts that exist with communities, and developing action plans and priorities. One pilot social conflict resolution process has been completed, and a small proportion (approximately 10%) of the several hundred other conflicts that APP has mapped have had MOUs or action plans developed. The majority of these conflicts remain. Field evidence, including interviews with numerous of the local communities and individuals involved, indicates that limited progress has been made to implement the agreements or action plans or the principles of FPIC with indigenous peoples and local communities in forestry operations. (Rainforest Alliance 2015b)

Some civil society organizations have questioned APP's commitment to addressing the core problems in a comprehensive way. A January 2015 report published by the Forest Peoples Program, Rainforest Action Network, and a coalition of NGOs based in South Sumatra, including Wahana Bumi Hijau raises numerous concerns regarding APP's implementation of FPIC principles:

APP has not fully respected the right of communities affected by the proposed OKI Pulp and Paper mill to give or withhold their consent (FPIC). APP has already started construction of the mill, yet the company has not followed key elements of its own SOP/protocol relating to FPIC. For example, participation in the FPIC process was limited. Information provided was often inadequate and not given in writing. Written consent from a majority of community members or groups potentially affected by the project was not obtained. Permits for the Mill and construction of the Mill commenced before consent was given by one or more of the potentially affected communities with a right to FPIC. In short, the Free, Prior and Informed Consent of at least one community directly affected by the proposed new mill has yet to be obtained and several aspects of the FPIC process in other affected communities has been flawed. (Forest Peoples Program et al. 2015)

Similarly, the joint NGO report raises concerns about APP's efforts to resolve conflicts with local communities:

Even in areas where conflicts had been brought to the company's attention, APP is failing to consult communities and their NGO advisors or to get agreement with key stakeholders on what processes are needed to resolve conflicts, preferring instead to develop conflict resolution action plans in isolation. Further, APP is using the fact that it is developing an action plan for a community as a reason not to be transparent about the conflict or post community complaints on the company dashboard thereby triggering open grievance procedures. (Forest Peoples Program et al. 2015)

A field review of APP's pilot conflict resolution in the village of Senyerang in Jambi, showed that APP and the local government had obliged the community to accept nugatory compensation for only half of the lands it had lost to the company, restricted the village to developing rubber on less than 20% of its area, while leaving the company in control of over 80% of the community's land (Anderson et al. 2014).¹⁸

18 Since the initial agreement between the company and the community was reached, it has been reported that WKS and the community have entered into a new agreement in which the company is able to use an additional 600 ha of the partnership areas which had previously been allocated for rubber development.

One of the cases in APP's conflict resolution initiative has involved a community in Riding, South Sumatra, which claims 10,000 hectares currently inside the Bumi Mekar Hijau concession. These negotiations lasted for two years. The final agreement (yet-to-be-signed, as of April 2016) includes a benefit-sharing arrangement to provide the community with Rp. 12,000 (less than US\$ 1) per ton of Acacia produced.¹⁹ Despite repeated requests by the Riding community, the company reportedly did not provide them with sufficient economic data to assess the fairness of the benefit-sharing arrangement offered to them.²⁰ It is not yet clear whether this deal will endure, and as of April 2016, it has yet to be formalized into a binding agreement. What is clear is that if APP's future negotiations with communities continue at a similar pace, it could take many years to resolve the outstanding land claims by the 20 or so communities situated in and around the company's South Sumatra concession areas.

APP and its suppliers may also face new risks of communities using formal legal channels to reclaim lands in concession areas. A landmark ruling by the nation's Constitutional Court in May 2013 affirmed the rights of *adat* communities to exercise control over land and forest resources that fall within their customary domains (Putusan No.35/PUU-x/2012, AMAN 2013, Butler 2013). Within this context, the legal framework in which communities can make enforceable claims to customary lands is evolving rapidly. Communities in many parts of Indonesia have completed mapping of customary territories and are now pushing for legal recognition in local implementing regulations. In 2015, the Agrarian Ministry passed a new Ministerial Regulation (Permen Agraria 9/2015) that allows any community which can show it has occupied land in a forest area or plantation for more than 20 years to have their lands excised from the area of the permit and recognized as communal land (*hak komunal*).

To the extent such recognition is granted, it would increase the likelihood that plantation companies holding HTI concession licenses could be required to relinquish at least a portion of their operational areas to community ownership and use. For Sinar Mas/APP and its suppliers, this could mean diminished concession area and/or increased leverage on the part of communities to negotiate for better land rental and/or benefit-sharing agreements. Any such developments could ultimately put upward pressure on wood costs for the OKI mill.

19 Personal communications with Riding community members involved in the negotiation process (November 18, 2015).

20 Personal communications with Riding community members involved in the negotiation process (November 18, 2014).



Chapter Five: Assessing the public benefits and costs of the OKI pulp mill

When APP announced in July 2013 that it was developing the OKI mill, the company issued a press release outlining the project's benefits for Indonesia. The OKI mill, it claimed, would generate US\$ 2.6 billion in investment; create 10,000 new jobs; improve infrastructure to access the remote area; and increase South Sumatra's exports by 36% and overall GDP by 9% (APP 2013). The press release quotes then Trade Minister Gita Wirjawan as saying, "Pulp and paper is part of the foundation of the Indonesian economy and we believe that the sector can grow in a way that will benefit the people of Indonesia, while also protecting our forests" (APP 2013a).

In listing the economic benefits of the OKI mill, APP has clearly sought to present the project in terms that would warrant support from both the government and the people of Indonesia. Such support would, of course, be crucial not only in securing the necessary licenses and permits needed to build the mill. It would also be necessary to justify the considerable public resources that the government has allocated to OKI's mega-scale pulp and paper project. As noted in previous chapters, public support for OKI has notably included the provision of a 10-year corporate tax holiday and licenses for HTI plantation concessions covering nearly 800,000 ha.

Within this context, it is important for Indonesian stakeholders to assess the stated economic benefits of the OKI project against the public resources that have been made available. This chapter shows, as one example, how the extensive land area that has been licensed to support the mill has supported the creation of only a limited number of jobs by Sinar Mas/APP supplier concessions. It also shows how despite the capital investment involved, the OKI project is likely to generate minimal tax and royalty revenues for the Government of Indonesia.

The chapter also considers the documented externalized costs of the OKI mill project. Chief among these are the health and economic impacts of recent fires within Sinar Mas/APP concessions in South Sumatra. They also include the significant levels of carbon emissions generated by Sinar Mas/APP's development of pulpwood plantations on drained peatlands, and the long-term degradation of these lands as a productive resource. The costs are described to be externalized because the mill's owner and its shareholders do not carry them on their balance sheets. Instead, the costs are incurred by local communities, the Indonesian government, and the environment – and in the case of carbon emissions, by the rest of the world.

Section 5.1: Limited employment from an extensive land base

When APP first announced the OKI mill project, as indicated above, it claimed the mill would create 10,000 jobs. Now this estimate has increased to 18,500 jobs, according to the latest information from APP that the authors of this report have seen.¹ This includes 3,500 direct jobs and an additional 15,000 indirect jobs (Primadhyta 2015).

On the surface, these job creation figures are noteworthy, particularly for a rural region of Indonesia where employment prospects are limited. And these jobs, to the extent that they are provided to people local to this area, will likely improve the household earnings and living conditions for those who obtain them. The number of jobs created by the OKI mill project, however, should be considered relative to the use of public resources required to provide them.

Chief among these public resources is land. The mill, river and sea ports occupy 2,800 ha of land bought by the company (Fogarty 2015d). But the concession areas that will produce wood for the mill are classified as part of Indonesia's national forest estate (*Kawasan Hutan*), which is controlled by the government and, according to Article 33 of Indonesia's Constitution, is supposed to be managed for the benefit of the Indonesian people. Sinar Mas/APP's concession area in South Sumatra is vast, comprising almost 9% of the

¹ The authors of this report are unaware of APP publicly releasing information about how either the direct or indirect job creation figures were calculated or why they were changed from the initial estimate.

Summary of key points

- Sinar Mas/APP supplier concessions in South Sumatra provide few jobs relative to the large land areas they occupy. With an area of 789,023 ha, the seven concessions reported hiring 4,311 workers in 2013 and 1,276 workers in 2014, or, on average, 1 worker for every 183 ha in 2013 and 1 worker for every 618 ha in 2014.
- Under the 10-year tax holiday, the government will collect no corporate tax revenue from OKI during the first eight years of the mill's operation and 50% of the normal tax rate for the following two years.
- The government's land rental fees for plantation concessions are also extremely low.
- During 2010–2012, Sinar Mas/APP harvested 3.4 million m³ of MTH from its concessions while paying forest royalties set well below the stumpage value of the timber.
- Total economic impacts from fires and haze for South Sumatra in 2015 amounted to almost US\$ 3.9 billion (Rp. 53.8 trillion), according to World Bank estimates.
- During 2015, an estimated 293,000 ha burned inside Sinar Mas/APP concessions in South Sumatra, accounting for as much as 48% of the total burned area in the province and 11.3% of the total estimated GHG emissions from fires in Indonesia.
- Sinar Mas/APP has an estimated 253,296 ha of net planted area on peat, which is projected to emit 25.33 million tons of CO₂ per year.
- After multiple rotations of intensively managed pulpwood plantations, the peat on Sinar Mas/APP concessions will largely, if not totally, be exhausted, with large areas vulnerable to flooding and leaching from acid sulphate soils.
- Careful analysis of wood supply plans before investment permits are issued is a critically important step to ensure that any new pulp mill projects support more sustainable outcomes.

province's entire land area.² From a public policy perspective, Indonesians may question whether the jobs created by the OKI mill project justify such a large use of public resources.

The Sinar Mas/APP affiliated concession companies themselves appear to provide few jobs relative to the large land areas they occupy. In its annual work plans submitted to the government, Bumi Mekar Hijau, the largest of the group's South Sumatra concessions, has reported employing 1852 workers in 2013 and 317 workers in 2014 (PT Bumi Mekar Hijau 2014; PT Bumi Mekar Hijau 2015). Considering that the concessions size is 250,370 ha, the labor to land ratio is 1 worker for every 135 ha in 2013 and 1 worker for every 790 ha in 2014. Similarly, Bumi Andalas Permai has reported employing 1298 workers in 2013 and 345 workers in 2014 for its 192,700 ha concession, or 1 worker for every 148 ha in 2013 and 1 worker for every 558 ha (PT Bumi Andalas Permai 2015). These employment figures include "hired labor and contractors," as noted in the annual work plans, so not all of these workers are necessarily full-time employees (PT Bumi Andalas Permai 2014; PT Bumi Andalas Permai 2015). In total, the seven concession companies in South Sumatra with an area of 789,023 ha, reported hiring 4,311 workers in 2013 and 1,276 workers in 2014, or, on average, 1 worker for every 183 ha in 2013 and 1 worker for every 618 ha in 2014 (Annual work plans for seven concession companies—see References).

² As discussed in Section 4.4, local communities claim sizeable areas within the HTI concessions provided by the government for use by Sinar Mas/APP.

Section 5.2: Minimal tax and royalty revenues for the government

Another major benefit the OKI mill could have for Indonesia is providing government revenues. The Government of Indonesia is currently pursuing an ambitious fiscal spending agenda, but is struggling to generate sufficient tax revenue with which to fund its programs (Amindoni 2016). It is notable, however, that the government will collect only minimal corporate tax revenue from OKI during the first decade of the mill's operation. In August 2015, the government approved a 10-year tax holiday for the OKI mill, under which the company will not be required to pay corporate tax for its initial eight years of operation and will pay 50% of the normal tax rate for the following two years (Issetiabudi 2015; *Jakarta Post* 2015).

Governments frequently use tax holidays to provide an incentive for projects with large capital investments. However, it appears the Government of Indonesia approved the tax holiday for OKI once the project was already well underway. As noted above, APP secured an initial loan of US\$ 1.8 billion from the CDB in October 2013 and a second loan of US\$ 700 million in March 2015 (PPI 2015). The company began placing major orders with machinery and equipment suppliers in early-2014, and construction was already well advanced by mid-2015 (Andritz 2014; Jacobs 2014; Metso 2014). Given that APP secured financing for the investment, ordered key machinery, and began construction of the mill before the tax holiday was granted, it would appear the tax incentive was not a necessary incentive for the project to be carried out, even as it will deprive the government of much-needed revenue. Strikingly, there was no public discussion or media reports, to the knowledge of the report's authors, about the economic value of the tax holiday that the government has provided for the OKI project, despite the fact that tax revenue shortfalls are an issue of primary public concern.

The Government of Indonesia also does not generate significant revenues from the land rent paid by Sinar Mas/APP supplier concessions relative to the vast areas they control. In South Sumatra, the group's suppliers have licenses for HTI concessions covering 789,043 ha, for periods ranging between 43 and 100 years (see Table 5.1).

Table 5.1: Sinar Mas/APP suppliers' HTI concessions in South Sumatra

Company	Total Concession Area (ha)	Concession Started (Date)	Concession Period (Years)
PT Bumi Mekar Hijau	250,370	7 Sep 2004 and 18 Oct 2004	100
PT Bumi Andalas Permai	192,700	7 Sep 2004	100
PT Bumi Persada Permai (I)	60,433	7 Sep 2004	50
PT SBA Wood Industries	142,355	10 Sep 2004	100
PT Sumber Hijau Permai	30,040	13 Feb 2006	43
PT Rimba Hutani Mas	67,100	22 Mar 2007	100
PT Bumi Persada Permai (II)	24,050	5 Mar 2009	60
PT Tri Pupajaya	21,995	2 Oct 2009	60

Source: *Eyes on the Forest Interactive Map* (<http://maps.eyesontheforest.or.id/>)

HTI license-holders are required to pay two area-based fees to the government on an annual basis for the lands within these concessions to develop commercial plantations. One is the HTI concession license fee for forest plantations (*Iuran Izin Usaha Pemanfaatan Hasil Hutan Kayu pada Hutan Tanaman*, or IIUPHHK-HT), and the other is the land and building tax (*Pajak Bumi Bangunan*, or PBB) (PP.12/2014; UU.12/1994). The current annual licensing fee for HTI concessions in Indonesia is Rp. 250 per ha/yr (or US\$ 0.02 per ha/yr at current

Box 5.1 Indah Kiat Pulp and Paper's history of corporate tax payments

Indonesia's fiscal policymakers may believe that after the tax holiday is finished, the OKI mill will generate substantial tax revenues for the government and, by extension, the people of Indonesia. Unfortunately, APP's track record in paying corporate income tax suggests these future revenues may never materialize on a large scale. Indah Kiat, the group's flagship mill in Riau, was very profitable in the 1990s. For the years 1994–98, it reported US\$ 906 million in pre-tax profits over sales of US\$ 4.3 billion. As per the conventional policy of deferring taxes on fixed asset investment, the company was assessed only US\$ 2 million in taxes, rather than the US\$ 271.7 million (reflecting the contemporary statutory rate of 30%) which would have been due had no such policy been in place.

Tax deferrals are just that: deferrals and not holidays. Hence taxes deferred for equipment bought in the 1990s, would start to reverse thereafter as can be seen by looking at the financial statements of capital-intensive companies, such as Indocement, which invested heavily in the 1980s and 1990s. In the case of Indah Kiat, US\$ 246.8 million of deferred taxes fell due during 2004–14; however, these did not get paid (PT Indah Kiat 2005–14). Firstly, fresh investments generated new deferred tax credits, resulting in a net reversal of only US\$ 210 million. Secondly, the company's reported profitability slumped. Between 2004 and 2014, Indah Kiat reported only US\$ 368 million in pre-tax profit over US\$ 22.7 billion in sales, and was assessed only US\$ 53.2 million in current taxes. For the 11-year period, total taxes paid as per the cashflow statement were only US\$ 43 million, as in most years taxes due could be offset against tax loss carry forwards. In comparison, the company paid US\$ 248.3 million in management fees to APP over the same period. As at the end of 2014, Indah Kiat recognized US\$ 125 million in deferred tax liabilities on its books (PT Indah Kiat 2014).

Table 5.2: Indah Kiat, Tax paid 2004–2014 (USD millions)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2004–14
Pulp production (k tons)	1,918.0	1,866.0	1,907.0	1,843.0	2,100.0	1,984.0	2,260.0	2,206.0	2,412.0	2,541.0	2,775.0	23,812.0
Sales	1,421.9	1,414.1	1,584.3	1,879.3	2,277.0	1,773.4	2,509.6	2,559.9	2,518.1	2,651.5	2,181.3	22,770.4
Current tax assessed					0.1	(17.2)	(36.1)					(53.2)
Tax paid (refunded) as per the cash flow statement	(27.4)	(7.6)	8.9	(20.3)	25.6	(24.9)	6.4	25.9	18.0	35.8	1.6	42.0
Net deferred tax position (negative amount denotes tax liability)	73.5	65.4	(93.9)	(112.7)	(108.4)	(126.8)	(150.8)	(157.7)	(140.2)	(125.6)	(125.8)	

Source: PT Indah Kiat annual reports 2005–12

Indah Kiat's tax payment history raises questions as to whether the Government of Indonesia is likely to collect significant corporate tax payments from OKI once its initial 10-year tax holiday expires. Indeed, APP has already signaled that it has plans for at least two more phases of capital investment at OKI after the current initial construction is complete, suggesting that the company could benefit from new investment incentives and tax deferrals for a number of years to come.

exchange rates) (PP.12/2014; Permenhut PP.76/Menhut-II/2014). Most of the APP supplier concession land in South Sumatra has been allocated for 100 years, suggesting that if the rate for the licensing fee remains at the current level, the government can expect to collect a total of only US\$ 2.00 per ha for the entire 100 years.

The value of the PBB land and building tax for HTI plantations depends on the valuation of the land and its geographical location (Perdirjen Pajak No. Per-42/PJ/2015; PP.25/2002). A pro-forma calculation estimates that this tax is approximately Rp. 24,000 per ha/yr (or less than US\$ 2.00 per ha/yr). At these rates, it can be estimated that Sinar Mas/APP supplier concessions in South Sumatra pay an estimated \$15,781 in licensing fees and \$1,574,498 in land tax on an annual basis for an area more than 10 times the size of Singapore.³

The Government of Indonesia also did not collect significant amounts of non-tax revenue relative to the value of the resource from MTH harvested inside Sinar Mas/APP concessions in South Sumatra. Prior to APP's sustainability commitments in 2013, it harvested significant volumes of MTH from these concessions. Annual work plans indicate that Sinar Mas/APP suppliers harvested 3,410,170 m³ of MTH from clearing 33,135 ha during 2010–2012 (see Table 5.3). Deforestation analysis indicates it is also likely that the concessions companies harvested substantial volumes of MTH prior to 2010 (Global Forest Watch Interactive Map; Eyes on the Forest Interactive Map).

Table 5.3: Area cleared and MTH production by Sinar Mas/APP HTI companies in South Sumatra, as reported in RKT annual work plans, 2010–2012

Concession	Year	Area Cleared (ha)	Total MTH (m ³)	Small-Diameter (m ³)	Large-Diameter (m ³)
PT Rimba Hutani Mas	2010	10,431	1,339,158	971,353	367,805
PT Tri Pupajaya	2010	1,948	273,440	150,877	122,563
PT Bumi Persada Permai II	2010	2,039	101,442	92,938	8,504
PT Rimba Hutani Mas	2011	5,554	522,915	211,291	311,624
PT Tri Pupajaya	2011	3,012	368,320	188,563	179,756
PT Bumi Persada Permai II	2011	1,407	91,309	36,637	54,672
PT Bumi Persada Permai I	2011	1,572	91,627	63,932.2	27,695
PT Tri Pupajaya	2012	5,840	529,379	260,114	269,264
PT Bumi Persada Permai II	2012	1,170	83,788	48,324	35,464
PT Bumi Persada Permai I	2012	162.6	8,792	4,305.8	4,487
Total		33,135	3,410,170	2,028,335	1,381,834

Source: RKT annual work plans submitted by the companies listed.

In a 2015 report, Indonesia's Corruption Eradication Commission (*Komisi Pemberantasan Korupsi*, or KPK) documented that the government's timber royalty levels had changed little since the 1990s while market prices increased dramatically: "With DR and PSDH rates set well below the stumpage value of the timber, land-clearing companies can generate very high levels of profit, especially when they clear areas with a standing stock of 100 m³/ha or more" (KPK 2015). The average reported production in the Sinar Mas/APP South Sumatra concessions 2010–2012 was 103 m³/ha (see Table 5.3). Assuming that Sinar Mas/APP concessions in South Sumatra paid the royalty fees on all the MTH harvested, the government

³ This calculation of the PBB land and building tax is based on 535,165 ha of productive land and 253,878 ha of unproductive land in the concessions (based on figures in APP's Forest Conservation Policy Dashboard). The calculation assumed there were 1,000 ha of building area and that the land had a taxable sales value (Nilai Jual Obyek Pajak) of Rp. 1,200 per square meter. The district head in each locality determines the taxable sales value.

should have collected an estimated US\$ 24 million.⁴ Meanwhile, the domestic commercial value of just the 1,381,834 m³ of large-diameter timber reported to have been harvested during this period can be estimated to have totaled nearly US\$ 230 million.⁵

Section 5.3: Externalized health and economic impacts from the 2015 fires

The 2015 fires in Indonesia illustrated the tremendous impact that forest and peatland fires and haze have on human health. An estimated 43 million people in Sumatra and Kalimantan inhaled toxic fumes for months, according to BMKG, Indonesia's Meteorology, Climatology and Geophysics Agency (Lamb 2015). Such long-term exposure has considerable short and long-term impacts on human health. In Indonesia, almost half a million people suffered from respiratory infections (Lamb 2015; Salim 2015).

The combustion of biomass produces smoke containing hundreds of chemicals, many of which are harmful to human health (Naeher et al. 2007). The most significant way to measure the risk of smoke is in levels of fine particulate matter, mainly composed of organic carbon and black carbon components, less than 2.5 micrometers in diameter (Naeher et al. 2007). Indonesia, along with Singapore, uses the Pollutant Standards Index (PSI), which measures particulate matter in the air in addition to harmful gases such as sulphur dioxide, carbon monoxide, nitrogen dioxide, and ozone.

PSI readings over 100 are considered unhealthy and over 300 is considered hazardous (National Environment Agency, Singapore 2014). In many of the worst-hit fire locations in Kalimantan and Sumatra, PSI readings were more than 2,000 PSI (Lamb 2015). In Palembang, South Sumatra, close to the Sinar Mas/APP supplier concessions, the PM levels remained at the hazardous level (above 300) between September 25 and October 20 (26 days), and remained at unhealthy levels (above 150) for another 10 days (through October 30) (Global Forest Watch Fires analysis based on data collected from BMKG).

The health impacts of haze from forest fires range from acute eye and skin irritation to serious respiratory and cardiovascular problems that can result in death (Goodman and Mulik 2015). Miriam Marlier, a post-doctoral research scientist at Columbia University who studied the health effects from fire emissions in Southeast Asia from 1997 to 2006, said:

Long-term studies have established that there is a relationship between annual exposure to fine particulate matter and cardiovascular and respiratory diseases and lung cancer in adults. There is also research showing that early-life exposure in the womb and after birth can contribute to infant mortality as well as negative health outcomes later in life. (Patterson 2015)

Marlier's findings played out in 2015. In Palembang, the capital of South Sumatra province located near the four Sinar Mas/APP supplier concessions with an inordinate number of hotspots, four babies died of respiratory problems caused by the haze (Chan 2015b). Across Indonesia, 19 deaths were caused by the haze, according to Indonesia's Minister of Social Affairs (*Guardian* 2015).

The World Bank estimated that health-related costs of the haze amounted to Rp. 2.079 trillion or around US\$ 150 million (*Indonesia Economic Quarterly Report* December 2015). This estimate does not include long-term impacts on health of sustained exposure to the haze, which research indicates are significant. One region-wide study estimated that 110,000 deaths per year in Southeast Asia were attributable to landscape fire smoke as a result of chronic and sporadic exposure to particulate matter, and this average increased to 296,000 deaths during El Niño years (Johnston et al. 2012).

4 Based on average royalty rates of \$15/m³ for large-diameter timber and \$2/ton for small-diameter timber reported in KPK (2015).

5 Based on Market Information Service of International Tropical Timber Organization, average price for "core logs" reported in 2010 (\$197/m³) and 2011 (\$217/m³). Average price for 2011 was used for 2012 as well since no price data was available for that year.

Total economic impacts from the fires and haze for South Sumatra province amounted to almost US\$ 3.9 billion (Rp. 53.8 trillion), or 16% of the province's GDP, according to World Bank estimates (World Bank 2015). The World Bank estimated 608,237 ha of burned area using data from BPPT (World Bank 2015). The South Sumatra NGO analysis presented earlier in this report (Section 4.1) indicated that 293,065 ha burned inside Sinar Mas/APP concessions in the province (Hutan Kita Institute 2015), thereby accounting for as much as 48% of the total burned area in South Sumatra. Although the specific costs of the fires that occurred within Sinar Mas/APP's concessions have not yet been publicly released, they were clearly very substantial. When such costs are made available, it may be useful to compare them to the US\$ 1.5 billion in export revenues that APP claims the OKI mill will generate on an annual basis.

Section 5.4: Externalized costs of carbon emissions

The CO₂ and overall greenhouse gas (GHG) emissions from the Sinar Mas/APP supplier concessions in South Sumatra have two major sources: peat oxidation caused by drainage and fires. Peatlands are a significant carbon sink containing one third of the world's soil carbon (Miettinen et al. 2012). Development of peatlands involving drainage of the peat soil causes the peat carbon to oxidize and become a major source of carbon emissions (Murdiyarso et al. 2010). Insular Southeast Asia contains over one-half (56%) of the world's tropical peatlands, and companies have converted 4.6 million ha of these peatlands into industrial plantations, mostly for palm oil and pulpwood production (Miettinen et al. 2016).

With the process of draining peatlands, biological oxidation ("decomposition of peat in the aerated zone above the water table owing to biological breakdown of organic matter") occurs causing loss of carbon stock and resulting in peatland subsidence (Hooijer et al. 2012). Peat soils and the carbon stocks they contain have formed over thousands of years as organic material accumulates in anaerobic and often acidic conditions (Page et al. 2010). In the first 25 years after peat is drained, average CO₂ emissions are 100 tons/ha/yr (Hooijer et al. 2012). Maintaining higher water levels (closer to the surface) reduces the rate of subsidence, but even "best practice" water management only reduces subsidence and related CO₂ emissions by at most 20% (Hooijer et al. 2012).

The reported plantation area in Sinar Mas/APP's concessions was 328,956 ha.⁶ As indicated earlier in this report, 77% of Sinar Mas/APP suppliers' total concession area in the province is on peatlands (see Section 4.2). Assuming that this same proportion of peatlands applies to the plantation area, it can be estimated that 253,296 ha of net planted area is on peat. Given Hooijer et al.'s (2012) estimate of average CO₂ emissions of 100 tons/ha/yr cited above, Sinar Mas/APP supplier concessions on peat can thus be estimated to emit, on average, 25.33 million tons of CO₂ emissions per year for the first 25 years that the areas are drained.⁷

The CO₂ emissions from peat oxidation, though significant, are small compared to emissions released during fires. The GHG emissions from the 2015 fires in Indonesia exceeded those of Japan's annual emissions and for a number of days were more than the daily emissions of the entire U.S. economy (van der Werf 2015). The Global Fire Emissions Database (GFED) estimated that Indonesia's 2015 fires emitted

6 This area refers to "developed plantation area" as was reported on APP's FCP Monitoring Dashboard (see Section 3.3). Note that this figure was reported before the 2015 fires, which burned an estimated 86,000 ha of planted area (see Section 4.1).

7 This is a conservative estimate given the drainage and accompanying subsidence impacts on the hydrology of adjacent – hydrologically connected – peatland areas beyond the plantations, and in many cases, even beyond the concession boundaries (Hooijer et al. 2012). So using only the planted area underestimates the overall subsidence and CO₂ emissions impacts from draining the licensed peat areas for pulpwood production. The estimate also assumes that the developed plantation area will remain the same as what APP reported at the beginning of the FCP process. It is likely that the company will develop more plantation area in these concessions after the HCV, HCS, and other processes are complete.

This estimate takes into account only the CO₂ emissions from post-clearing oxidation, and omits CO₂ emissions from land clearing activities that may have resulted in the loss of aboveground biomass.

about 1.75 billion metric tons of CO₂ equivalent. Considering that about 2.6 million ha burned in the 2015 fires (World Bank 2015), the estimated emissions are about 673 metric tons of CO₂ equivalent per hectare. As indicated earlier in this report, a coalition of NGOs from South Sumatra has estimated that 293,000 ha burned inside APP suppliers' concessions areas in South Sumatra in 2015 (Hutan Kita et al. 2016). It can then be estimated that the fires inside those concession areas contributed about 197 million metric tons of CO₂ equivalent to Indonesia's total emissions.⁸ This is 11.3% of the total estimated emissions from the fires.

CO₂ emissions from supplier concessions in South Sumatra present a challenge for Indonesia's attempt to curb emissions and meet international climate change commitments. Indonesia's business as usual (BAU) scenario for GHG emissions in 2020 is 1,805 MtCO₂e. In its INDC submitted for the Paris COP, Indonesia made an unconditional commitment, i.e. without support from international donors, to achieve annual emissions levels of 1,336 MtCO₂e. The difference between BAU and the 2020 commitment is 469 MtCO₂e. The annual emissions from peat oxidation in the Sinar Mas/APP concessions in South Sumatra of 25.33 MtCO₂ is more than 5% of the difference between BAU emissions and Indonesia's 2020 annual emissions target.

Indonesia may also consider the lost revenue from CO₂ emissions given that as carbon markets continue to develop, the possibility increases for countries to receive financial incentives for reducing emissions. If, for example, the country is able to secure carbon payments at the price of \$5 per ton (World Bank 2015), then the 25.33 millions tons of annual CO₂ emissions from the Sinar Mas/APP plantations in South Sumatra would be losing around \$126 million per year in potential future revenue.

Section 5.5: Externalized costs of land degradation

The discussion of material risks to the productivity of plantations on drained peatlands in Section 4.2 considered the impacts of subsidence, flooding and acid sulfate soils. When any or a combination of these impacts makes cultivation of pulpwood species no longer viable, Sinar Mas/APP will presumably return their current concessions to the government and find new land on which to develop plantations in other parts of Sumatra or elsewhere in Indonesia. However, it is not unreasonable to expect that the much of the lands which the Sinar Mas/APP concessions in South Sumatra now occupy could be left in a degraded condition with little or no economic use.

In areas where drainage-based cultivation is practiced, it can be anticipated that after multiple rotations of intensively managed pulpwood plantations, the peat will largely, if not totally, be exhausted, and the elevation of the land will likely be at or below the drainage limit (Hooijer et al. 2015a). Agriculture such as paddy cultivation on such land would be very difficult to pursue. Also, the likelihood that potential acid sulfate soils lie below much of the peatlands in OKI district means that this land could become very acidic (pH less than 4), while sulphuric acid and heavy metals leach into the waterways (Lim et al. 2012). Under such conditions, it is likely that neither surrounding communities nor other commercial interests would be able to use the land productively, and any significant contamination of waterways would represent an environmental hazard that would need to be mitigated.

Section 5.6: Mega-scale pulp mills as a development model for Indonesia

On March 1, 2016, Indonesia's Minister of Industry Saleh Husin visited the site of OKI mill and said that Indonesia hopes to jump from being the ninth to the sixth largest pulp producer in the world: "I hope we can achieve the target sometime next year with OKI's operations this year" (Amin 2016). Minister Saleh was expressing the Government of Indonesia's long-held policy to support the development of mega-scale pulp

⁸ It should be noted that major fires occurred in the peatlands adjacent to Sinar Mas/APP concessions and infrastructure (roads) linked to the plantations. In some cases, these fires may have been facilitated by the off-site drainage impacts from the concession areas and roads. This raises important questions about the degree to which the HTI license-holders may have contributed to the creation of high fire-risk conditions even outside their concession boundaries.

mills as an engine of economic growth in Indonesia. To this end, the government has allocated 11 million ha of land for HTI plantation development, much of it intended to grow pulpwood. In addition, it has extended tax incentives to the industry such as the 10-year tax holiday provided to OKI.

Through the 1990s and 2000s, the government's support also included giving Indonesian pulp producers access to MTH through its "bridging supply" policy (Barr 2001). In principle, the policy allowed producers to use MTH harvested through the clearing of natural forests within their HTI concessions until their plantations matured and became fully productive. With royalty levels set well below the stumpage value of the wood, producers were able to capture economic rents from natural forest timber and pulpwood, giving them a powerful incentive to use MTH in their mills for as long as they could (KPK 2015). Indeed, it was this availability of cheap wood from natural forests that allowed Indonesia's pulp producers to enjoy some of the lowest cash costs among BHK pulp producers globally (Barr 2001). But it also may have incentivized the country's mega-scale pulp mills to become major drivers of deforestation.

In recent years, both APP and APRIL have committed to using only plantation wood in their pulp mill supply chains. Yet these commitments coincide with the producers' making large capital investments in pulp capacity expansions: APP with the OKI mill and APRIL with adding a new dissolving pulp and rayon line to its existing facility in Riau. It is not yet clear whether the producers' commitments signal a genuinely sustainable paradigm in Indonesia's pulp industry, which can be implemented successfully even as this new capacity comes onstream. If producers are unable to meet their sustainability commitments once the new capacity is installed, then the industry's current expansion process may very well have laid the groundwork for the next wave of deforestation in Indonesia.

The catastrophic fires and haze of 2015 showed that the development of a plantation-based wood supply for the nation's pulp industry has also come at a high cost to Indonesia and its people. The government has estimated the economic costs of the fire and haze, as documented in Section 4.1, to have totaled US\$ 34 billion. This pales in comparison to the human health costs, which included 19 deaths, and an estimated 500,000 cases of respiratory infections in Sumatra and Kalimantan (Lamb 2015). A high proportion of the hotspots in Sumatra occurred inside pulpwood concessions, particularly those that will supply the OKI mill with wood fiber (Eyes on the Forest 2015).

With a capital investment approaching US\$ 3.0 billion, APP's construction of the OKI mega-scale pulp and paper mill in the peatlands of South Sumatra also effectively locks in high annual carbon emission levels, potentially for decades to come. And especially in El Niño years, CO₂ emissions from these sites can be expected to reach globally significant levels, as they did in 2015.

Should the development of Indonesia's pulp and paper industry, or any industry for that matter, come at such a high cost to local communities, human health and the environment? The Government of Indonesia may consider alternative ways to develop the pulp and paper industry that maximize benefits to the country while minimizing the costs and risks. One critically important step in this process will be to ensure that any new pulp mills that are proposed – or capacity expansion projects at existing mills – are not approved without careful scrutiny of a detailed wood supply plan. For Indonesia's pulp industry to be truly sustainable, such plans should ensure that producers have a secure and legal fiber supply and plantation land base that does not involve displacement of local communities from customary lands; deforestation and destruction of critical habitat; or drainage of high-carbon peatlands.



Recommendations

Recommendations for APP and the Sinar Mas Group

Be transparent:

1) Immediately release credible and verifiable long-term wood supply plans for OKI and other APP pulp mills to ensure stakeholders that APP has enough plantation fiber to supply its mills and a responsible back-up plan to compensate for any potential short-fall.

In order for APP to establish that it has sufficient plantation resources to maintain its sustainability commitments and expand its Indonesia pulp capacity by over 50%, APP should provide a detailed wood supply plan for the Sumatra mills that covers at least three rotations (approximately 15 years) from the start of OKI's operations. The underlying data and assumptions of this plan should be publicly released to allow for independent review of the model APP has used to project future wood fiber production and consumption. These disclosures should include details of areas planted/replanted; species by age class; incremental growth rates; rotation length; yields per hectare for each Sinar Mas/APP supplier concession; pulp conversion ratios; and percent losses from harvesting and loading. As APP is three years into the FCP process, APP should be able to make such disclosures immediately and unconditionally.

2) Disclose key information on material risk factors potentially affecting productivity and sustainability of HTI plantation resources.

Although the company claims “unprecedented transparency,” the authors have found no evidence that APP has disclosed basic information about risks to plantation productivity that would allow stakeholders to independently assess their anticipated impacts on the group's operations. How much of the Sinar Mas/APP supplier concessions are on peatlands and how much of that is drained/planted with pulpwood species? How much of the concessions are on deep peat (>3m)? Within what timeframe is the drainage base expected to be reached in peatland plantations? How much area inside the group's concessions burned in the 2015 fires? How much of that area was planted with Acacia or Eucalyptus or was moratorium area undergoing HCV and HCS assessments? How much land inside the group's concessions do local communities claim? And how are diseases and pests impacting tree stand mortality? APP should provide immediate disclosures to respond to these questions, and should establish an accountable mechanism to respond to stakeholder requests for additional information on key risk factors.

Be responsible:

3) Adopt an accountable plan to completely phase out pulpwood production on drained peatlands, publish a detailed map of peatlands on Sinar Mas/APP concessions, and phase-in paludiculture crops.

Plantations on drained peatlands are not sustainable, either in terms of commercial productivity or their impacts on the environment. APP should immediately formulate and publicly release a plan for the phasing-out of all drainage-based pulpwood plantations on peatlands and for the rewetting of these areas well before the drainage limit is reached. This will reduce the risks of catastrophic fires, curb CO₂ emissions, and prevent flooding and land degradation. This plan should include the phasing-in of flood-tolerant crops adapted to wet peatland conditions. While APP has publicized its peatland mapping effort using LiDAR in conjunction with Deltares, APP's plans to release the data from this mapping exercise remain unclear. APP should commit to publicly releasing the complete LiDAR data from this peatlands mapping exercise so all stakeholders can independently assess the extent, thickness, and impacts of Sinar Mas/APP concessions on peatlands. The company should also commit to testing the mineral soils below the peatlands for potential acid sulphate soils and publicly release the full results from these tests.

4) Adopt a moratorium on further land acquisitions until pre-existing customary rights of indigenous peoples and local communities are respected and conflicts are resolved.

Under the FCP process, APP has identified and mapped several hundred conflicts with local communities, however the process of resolving these has been slow. APP should commit to recognizing the pre-existing customary rights of indigenous peoples and local communities in lands and forests before acquiring any further lands as concessions for plantation expansion in customary rights areas. The company should also commit to collaborating with stakeholders to explore alternative tenure systems for fibre expansion which secure, instead of diminish, community rights subject to free, prior and informed consent. APP must also set and achieve accountable targets for resolving conflicts in existing concessions before any further expansion of its supply base. The company and its suppliers should commit to working with government agencies and CSOs to prevent violence against local communities and land-rights defenders.

Recommendations for the Government of Indonesia

Ensure sustainability:

1) Require APP to clarify the designed pulp production capacity of the OKI mill and to verify the long-term wood supply plans for each of the group's mills before OKI's operating permit is issued.

The government should require APP to make accountable public disclosures concerning the pulp capacity that has been installed at OKI and any plans the company may have to expand this capacity and/or to add new production lines in the future. This should be accompanied by a public release of the complete investment permit and environmental assessments (AMDAL) for the OKI mill. The government should also verify the validity of the wood supply plans (*Rencana Pemenuhan Bahan Baku Industri*, or RPBBI) for the OKI, Indah Kiat, and Lontar Papyrus pulp mills. Given the scale of these mills' combined demand for land and wood fiber, the government should require APP to submit an accountable plan for meeting the group's overall wood supply for at least 15 years (three rotations of plantation harvest) from the start of OKI's production. It should especially ensure that the assumptions used are based on verifiable growth and yield data to demonstrate that Sinar Mas/APP will be able to supply the three mills with sufficient volumes of plantation-grown wood fiber over the short-, medium-, and long-term. The company's plan should also include an alternative wood supply plan explaining where Sinar Mas/APP would source additional raw materials if the group's plantations fail to produce the projected volumes of wood fiber.

2) Prohibit the use of 'mixed tropical hardwoods' from clearing of natural forests by pulp producers.

Indonesia's two largest pulp producers – Sinar Mas/APP and the APRIL group – have adopted voluntary commitments to make very substantial reductions in the use of MTH by their mills. Yet as this report has highlighted, there is a risk that pulp producers could decide to resume using large volumes of MTH if their HTI plantations are not able to produce the amount of wood fiber that their mills require to operate at full capacity. This risk is heightened as producers build large new pulp mills and/or expand production capacity at existing mills. The Ministry of Environment and Forestry should adopt regulations to prohibit the use of MTH by Indonesia's pulp producers. Doing so would provide a strong incentive for producers to maintain and extend their commitments to achieving "zero deforestation" in their supply chains and the use of "100% sustainable plantation wood for pulp." It would also help to ensure that Indonesia's pulp companies fully assess the financial risks associated with expanding their production capacity unless they have a secure, sustainable, and legal wood fiber supply.

3) Impose a permanent ban on the development of new plantations on drained peatlands, including phasing-out of existing sites, and hold HTI license-holders legally accountable for creating high risk conditions for peatland fires and other environmental hazards.

The catastrophic fires of 2015 provided dramatic evidence of the environmental risks, public health impacts, and economic costs associated with developing plantations on drained peatlands. The government must strengthen its current policy to stop clearing and draining of peatlands by issuing a government regulation that supports this position. Only a ministerial instruction supports the current policy, which gives little weight to the government's position and makes it difficult to hold companies legally responsible for defying the policy. The government should permanently ban any new HTI development on peatlands that requires canalization and draining the peat. It should also require license-holders of existing HTI plantations on peatlands to submit accountable plans for phasing-out operations on these sites, blocking drainage canals, and rewetting the drained areas.

In late-2015 and early-2016, the government took unprecedented actions to hold corporate actors in the forestry and oil palm sectors accountable for fires that occurred within the boundaries of their concession areas. This included freezing the licenses of many HTI concessions including some Sinar Mas/APP suppliers, and, in the case of PT Bumi Mekar Hijau, suing the company for damages. The government should continue to utilize legal and regulatory tools to establish a clear precedent demonstrating that companies that have drained peatlands to establish plantations will be held accountable for creating conditions of high risk for peatland fires and other types of environmental hazard, including exposure and leaching of acid sulphate soils.

Ensure equitable development:

4) Convene an independent review of government policies to promote development of mega-scale pulp mills and HTI plantations in Indonesia.

As the experience of the OKI project in South Sumatra demonstrates, the development of mega-scale pulp mills in Indonesia has involved the allocation of substantial public resources, while creating significant potential risks and long-term impacts. The government should commission a task force of independent experts to review the public costs and benefits of such projects and to assess whether mega-scale pulp mills are a sustainable and equitable model for economic development. In particular, this review should assess whether the government can meet its commitments for 'pro-poor' economic development, national carbon emission reductions, and prevention of annual fires and haze if it continues to promote large capital investments in pulp mill projects. The results should be fully released for public review.

In 2011–12 the Ministry of Environment and Forestry designated 11.8 million ha of unlicensed production forest as being eligible for allocation as HTI plantation concessions. Before issuing new HTI licenses, the Ministry should convene an independent review of the costs and benefits associated with allocating such large areas from the forest estate (*Kawasan Hutan*) to private companies for periods of up to 100 years. In particular, this review should consider: 1) the extent to which HTI development on drained peatlands has contributed to catastrophic fires and haze and Indonesia's high levels of carbon emissions; 2) the effects of peat soil subsidence and associated flooding on plantation productivity on peatland sites; 3) the role that HTI concessions have played in catalyzing social conflicts; and 4) the degree to which the HTI program has facilitated the transfer of economic rents to private forestry companies by allowing them to clear remaining stocks of natural forest timber while paying low royalties.

5) Support recognition of the customary rights of indigenous peoples and local communities living in and around HTI concession areas, and resolution of conflicts.

The government should establish a framework for strengthening customary rights by ratifying the Indigenous People's Rights Acknowledgment and Protection Bill (PPMHA). This would provide legal recognition of customary (*adat*) communities and create an official mechanism for resolving land tenure

disputes. The Ministry of Environment and Forestry should not issue new HTI concession licenses in areas covered by customary rights and should review community land claims within existing HTI plantation concessions. The Ministry's conflict resolution unit should work closely with the National Commission on Human Rights (Komnas HAM) and the Ministry of Agrarian Affairs and Spatial Planning to support community-based mapping of customary resources and the resolution of community land claims and conflicts with HTI license-holders. The government should require HTI companies and other forestry license-holders to uphold the principle of free, prior, and informed consent in their dealings with local communities. The government should also provide legal protections for land-rights defenders and use judicial and law enforcement mechanisms to prevent violence against local communities.

Recommendations for financial institutions, investors, and buyers

Understand the risks:

1) Increase scrutiny of APP's corporate sustainability commitments, especially as the OKI mill expands the group's social and environmental footprints.

APP announced its Forest Conservation Policy in February 2013, as plans were being made for the construction of the OKI pulp mill in South Sumatra. As OKI begins pulp production in late 2016, it can be anticipated that it will create operational pressures for Sinar Mas/APP suppliers to generate substantially larger volumes of wood than they have done in the past. Minimally, stakeholders in the FCP process should require verifiable evidence that APP is able to meet its sustainability commitments once it faces the operational imperative to supply 27 million m³ of wood fiber on an annual basis to its three Sumatra pulp mills. In the event it becomes clear that the group's plantations are unable to produce the volumes of wood required by the mills, stakeholders should be prepared to hold APP accountable for the decisions and commitments it has made. Collectively, these factors suggest that lenders, investors, and buyers who care about sustainable management of forests and peatlands will need to seriously evaluate APP's wood supply before the OKI mill begins production and closely monitor APP's adherence to the FCP commitments once the OKI mill begins production.

2) Improve due diligence practices to assess APP's wood supply plans, and understand material risks and social/environmental impacts associated with HTI plantation development as a source of wood supply.

For financial stakeholders in mega-scale pulp mill projects like OKI, knowing where the mill will source its wood fiber is essential information. A secure wood supply within a commercial distance of the mill is frequently a major driver of a BHK pulp project's profitability and economic competitiveness. Lenders and investors in such projects should carefully review long-term wood supply plans to ensure that key financial risks are fully assessed. In doing so, they should be sure to use independently supplied data and not to rely solely on plans and projections provided by the project sponsor. To the extent that wood fiber is to be supplied by intensively-managed plantations, they should review growth rates and yields achieved on these sites in the past and assess the risk factors that could influence whether productivity levels can be maintained or even improved on a sustainable basis. Careful risk assessment is especially needed for plantations developed on drained peatlands, which are susceptible to catastrophic fires and to irreversible subsidence and flooding. As a matter of due diligence, the risk assessment process should also include analysis of alternative wood sources and the anticipated costs involved if these plantations fail to generate the projected volumes of wood fiber.

For buyers and retailers committed to sourcing pulp and paper products from sustainable suppliers, it will be important to recognize the significant social and environmental impacts of HTI plantation development – even under corporate “zero deforestation” commitments. With the government issuing HTI concession licenses for periods of up to 100 years, plantation companies are now engaged in land conflicts

with potentially hundreds of communities, many of which are asserting customary claims over areas the companies seek to plant. The development of HTI plantations on drained peatlands is widely understood to have played a central role in creating the incendiary conditions that resulted in the massive fires and extended haze of 2015. The conversion of peatlands to commercial plantations has also contributed a substantial portion of Indonesia's overall carbon emissions. Buyers and retailers who are committed to ensuring sustainability in their supply chains will need to assess the extent to which these impacts are compatible with their standards and/or may pose reputational risks.

Obtain independent verification:

3) Before considering APP's operations to be sustainable or non-controversial, require genuinely independent third-party monitoring and verification of key performance indicators.

Buyers and retailers should not only depend on information from companies and their consultants to assess sustainability measures but seek genuinely independent opinions, i.e. organizations not paid by the companies. In evaluating purchasing options, they should wait and see until a truly independent, third party verification process confirms that the group has made significant progress to address critical problems based on key performance indicators developed by stakeholders and experts. The organizations publishing this report believe there should be regular assessments of APP's progress towards sustainability based on key performance indicators and that a co-funding mechanism should support such assessments.

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APP's Forest Conservation Policy

Effective February 1st this policy applies to:

1. APP and all its suppliers in Indonesia.
2. Any Indonesian fibre utilised by APP's mills elsewhere, including China
3. All future expansion.

High Conservation Value Forests (HCVF) and High Carbon Stock (HCS) Forests:

Policy commitment 1: APP and its suppliers will only develop areas that are not forested, as identified through independent HCVF and HCS assessments:

- From 1st February 2013 all natural forest clearance has been suspended whilst HCV and HCS assessments are completed. No further clearance of areas identified as forest will take place.
- APP has conducted an initial assessment of all of its supply chain. It has prioritised HCV and HCS assessments in those concessions that up to now have been supplying the company with natural forest fibre. HCV and HCS areas will be protected.
- On HCS work has started to identify the area and quality of forest cover. Satellite analysis, backed up by field work, will identify areas that will be protected as well as low carbon areas that can be developed as plantations.
- The HCS approach distinguishes natural forest from degraded lands with only small trees, scrub, or grass remaining. It separates vegetation into 6 different classes (stratification) through the combination of analysing satellite images and field plots. These thresholds are known in Indonesia as: High Density Forest (HK3), Medium Density Forest (HK2), Low Density/older regenerating Forest (HK1), Old Scrub/regenerating forest (BT), Young Scrub (BM), and Cleared/Open Land (LT). APP's threshold for HCS will be defined, following field analysis, within the category referred to as old scrub (BT).
- Any existing natural forest logs within APP's supply chain cut before 1st February 2013, such as stocks in log yards, will be utilised by its mills. Any fibre cleared from land which is not forest, such as scrub land, will also be utilised by its pulp mills.
- APP will withdraw from all purchase and other agreements with any supplier who is found not to be in compliance with these commitments.
- These commitments are being monitored by The Forest Trust. APP will welcome independent 3rd party observers to verify the implementation.

Peatland management

Policy commitment 2: APP will support the Government of Indonesia's low emission development goal and its target to reduce greenhouse gas emissions. This will be achieved by:

- Ensuring that forested peatland is protected as part of its commitment to maintain HCVF and HCS forests.
- Best practice management to reduce and avoid GHG emissions within the peatland landscape. As part of achieving this, no further canal or other infrastructure activities will



take place within undeveloped suppliers' concessions on non-forested peatland until independent HCVF assessments including input from peat experts has been completed.

Social and community engagement

Policy commitment 3: In order to avoid and resolve social conflicts across its supply chain APP will actively seek and incorporate input and feedback from a wide range of stakeholders, including civil society, as it implements the following set of principles:

- Free, Prior and Informed Consent of indigenous people and local communities
- Responsible handling of complaints
- Responsible resolution of conflicts
- Open and constructive dialogue with local, national and international stakeholders
- Empowering community development programs
- Respecting human rights
- Recognising and respecting the rights of its workers
- Compliance with all relevant laws and internationally accepted certification principles and criteria

Where new plantations are proposed, APP will respect the rights of indigenous peoples and local communities, including recognition of customary land rights. APP has committed to independent HCVF assessments as part of this commitment and will, in consultation with stakeholders, develop further measures to implement FPIC.

APP will consult with NGOs and other stakeholders to ensure that its protocols and procedures for FPIC and conflict resolution are in accordance with international best practice.

Third party suppliers

Policy commitment 4: APP sources fibre from all around the world and is developing measures to ensure that this sourcing supports responsible forest management.

Growth and yield from existing plantations

Recent independent assessments of the growth and yields of APP suppliers' plantation areas confirms that the company has sufficient plantation resources to meet the long term forecast demand for its pulp mills.

