

An aerial photograph of a landscape with winding dirt roads and green vegetation. The roads are light brown and curve through a terrain of green shrubs and trees. The background shows more hills and a small waterfall on the left side.

PALM OIL TRADE FROM KEY LANDSCAPES IN ASIA: RISKS AND OPPORTUNITIES FOR SUSTAINABILITY ACTION

2021



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BACKGROUND

ABOUT THIS STUDY: WWF commissioned Stand.earth Research Group (SRG) to conduct this research. This study was prepared in good faith on the basis of information available at the date of publication. WWF and SRG do not guarantee the accuracy, completeness or currency of the information in this publication resulting from the lack of comprehensive, publicly-available data around companies' palm oil sourcing. WWF and SRG are not liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on information in this publication.

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ABOUT WWF: WWF is one of the world's largest and most respected independent conservation organisations. WWF's mission is to stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with nature.

More information on www.panda.org

ABOUT WWF'S WORK ON PALM OIL: WWF's vision is to halt the conversion of natural ecosystems by ensuring that palm oil production, trade and consumption is responsible; protects, restores and connects landscapes; and benefits both people and nature.

WWF believes that creating a sustainable and responsible palm oil industry that guarantees the wellbeing of people, wildlife and habitats requires a multi-faceted approach that is inclusive of, but not limited to certification. Only through the use of a variety of tools and strategies involving all actors along the palm oil supply chain can the adverse environmental and social impacts of unsustainable palm oil production be addressed.

To support both public and private efforts to improve the governance of palm oil production, WWF works in close collaboration with local governments, companies, communities and multi-stakeholder initiatives across all six palm producing landscapes considered in this study. WWF interventions focus on implementing integrated, landscape-level solutions¹ that aim to halt deforestation and conversion, ensure palm oil production is sustainable, restore degraded ecosystems, and support social equity.



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¹ WWF Forest Solutions Platform (2020). Sustainable Landscapes. Available at: <https://forestsolutions.panda.org/approach/sustainable-landscapes>

INTRODUCTION

CONTEXT

Palm oil makes a substantial contribution to many tropical economies. In Malaysia and Indonesia — which together produce 86% of the world’s palm oil — the industry supports the livelihoods of an estimated 4.3 million people² and delivers several economic development outcomes, including indirect benefits such as rural poverty reduction and infrastructure development. But palm oil expansion has also come at high social and environmental costs, causing widespread damage to forests, natural ecosystems, biodiversity and local communities in a number of palm producing landscapes.^{3, 4, 5, 6, 7}

The global palm oil value chain has drastically increased in complexity over time, making it particularly challenging to achieve sustainability outcomes. Harvested fresh fruit bunches (FFB) change hands many times between plantation and mill, with local traders, agents, and middlemen all playing a role in connecting producers to mills. The palm oil supply chain often spans across multiple countries and involves an ever-diversifying range of stakeholders, from producers, to processors, traders, consumer goods manufacturers (CGMs) and retailers. More often than not, the origins and associated environmental impacts of palm oil supplies are unknown by the time they are used in consumer goods.

Indonesia is the world’s largest producer of palm oil, accounting for 59% of global production.⁸ Oil palm plantations cover approximately 16.37 million hectares in 2019,⁹ with production occurring primarily in Kalimantan and Sumatra. In Kalimantan, the Indonesian part of Borneo, palm oil development accounted for an estimated 11-13% of deforestation between 1973 and 2015,¹⁰ with production totaling almost 25 million tonnes of crude palm oil (CPO) in 2019.¹¹ However, some efforts are underway to protect remaining forests: In 2017, the local government in Sintang, West Kalimantan, committed to becoming a “Sustainable District”, paving the way for the implementation of a jurisdictional approach aimed at ensuring



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sustainable land use and commodity production across the entire district. Meanwhile in Sumatra, an estimated 36% of all deforestation between 1985 and 2016 is attributed to the palm oil sector.¹² Sumatra is the largest palm oil production and processing hub in Indonesia, and oil palm-driven deforestation on the island is often linked to rogue operators encroaching on key conservation landscapes including Tesso Nilo and Bukit Tigapuluh National Parks. While plantation development in Papua is currently relatively limited, the region is projected to become the next frontier of oil palm expansion in Indonesia. Small-scale agriculture and plantations have also increasingly emerged as an important driver of deforestation across Indonesia, contributing to approximately one-fifth of the country’s forest loss between 2001 and 2016.¹³

Accounting for 27% of global palm oil production, Malaysia is the second largest producer in the world. Oil palm plantations in Malaysia covered

approximately 5.85 million hectares in 2018, with production areas split almost equally between Peninsular (46.6%) and East Malaysia (53.4%).¹⁴ While palm oil production in the country accounted for an estimated 47% of deforestation between 1972 and 2015,¹⁵ the Malaysian government committed to maintain at least 50% forest cover across the country and cap palm oil development to 20% of total land (6.5 million hectares) in 2018.¹⁶ In the Malaysian part of Borneo, the state government of Sabah has also created a unique enabling environment for sustainable palm oil by committing to adopt 100% Roundtable Sustainable Palm Oil (RSPO) Certified Sustainable Palm Oil (CSPO) by 2025, and comply with the national moratorium and government requirements for 100% Malaysian Sustainable Palm Oil (MSPO) certification. The state also has a policy to set aside 30% of the land as protected areas and 20% as production forest by 2025.

² Roundtable on Sustainable Palm Oil (RSPO) (2020). Protecting Labour Rights in the Palm Oil Sector. Available at: <https://rspo.org/news-and-events/news/protecting-local-labour-rights-in-the-palm-oil-sector>

³ Vijay, V., Pimm, S.L., Jenkins, C.N., Smith, S.J. (2016). The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss. PLoS ONE, 11, 7, e0159668. Available at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0159668>

⁴ Abram, N.K., Meijaard, E., Wilson, K.A., Davis, J.T., Wells, J.A., Ancrenaz, M., Budiharta, S., Durrant, A., Fakhruzzaki, A., Runting, R.K., Gaveau, D., Mengersen, K. (2017). Oil palm-community conflict mapping in Indonesia: A case for better community liaison in planning for development initiatives. Applied Geography, 78, pp. 33-44. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0143622816306087>

⁵ Pacheco, P., Gnych, S., Dermawan, A., Komarudin, H., Okardaet, B. (2017). The palm oil global value chain Implications for economic growth and social and environmental sustainability. CIFOR Working Paper 220. Available at: <http://www.cifor.org/knowledge/publication/6405/>

⁶ Meijaard, E., Garcia-Ulloa, J., Sheil, D., Wich, S.A., Carlson, K.M., Juffe-Bignoli, D., and Brooks, T.M. (2018). Oil palm and biodiversity. A situation analysis by the IUCN Oil Palm Task Force, xiii, p. 116. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2018-027-En.pdf>

⁷ Ayompe, L. M., Schaafsma, M., Egoh, B. N. (2021). Towards sustainable palm oil production: The positive and negative impacts on ecosystem services and human wellbeing. Journal of Cleaner Production, 278, 123914. Available at: <https://www.sciencedirect.com/science/article/pii/S0959652620339597>

⁸ United States Department of Agriculture Foreign Agricultural Service (USDA FAS) (2020). Production, Supply and Consumption database. Available at: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

⁹ Republic of Indonesia (2020). Ministerial Decree of Agriculture 833/2019. Available at: https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?FileName=Oilseeds%20and%20Products%20Update_Jakarta_Indonesia_02-01-2020

¹⁰ Gaveau, D. L., Sheil, D., Salim, M. A., Arjasakusuma, S., Ancrenaz, M., Pacheco, P., Meijaard, E. (2016). Rapid conversions and avoided deforestation: examining four decades of industrial plantation expansion in Borneo. Scientific Reports, 6, 32017. Available at: <https://www.nature.com/articles/srep32017>

¹¹ Republic of Indonesia, Ministry of Agriculture, Directorate General of Estate Crops data (2019). Available at: <https://www.bps.go.id/>

¹² Eyes on the Forest data (2019-2020). Available at: <https://www.eyesontheforest.or.id>

¹³ Austin, K.G., Schwantes, A., Gu, Y., Kasibhatla, P. S. (2019). What causes deforestation in Indonesia? Environmental Research Letters, 14, 024007. Available at: <https://iopscience.iop.org/article/10.1088/1748-9326/aaf6db>

¹⁴ Malaysian Palm Oil Council (MPOC) (2018). Oil Palm Planted area. Available at: http://www.data.gov.my/data/en_US/dataset/oil-palm-planted-area-2018

¹⁵ Meijaard, E., Garcia-Ulloa, J., Sheil, D., Wich, S.A., Carlson, K.M., Juffe-Bignoli, D., and Brooks, T.M. (2018). Oil palm and biodiversity. A situation analysis by the IUCN Oil Palm Task Force, xiii, p. 116. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2018-027-En.pdf>

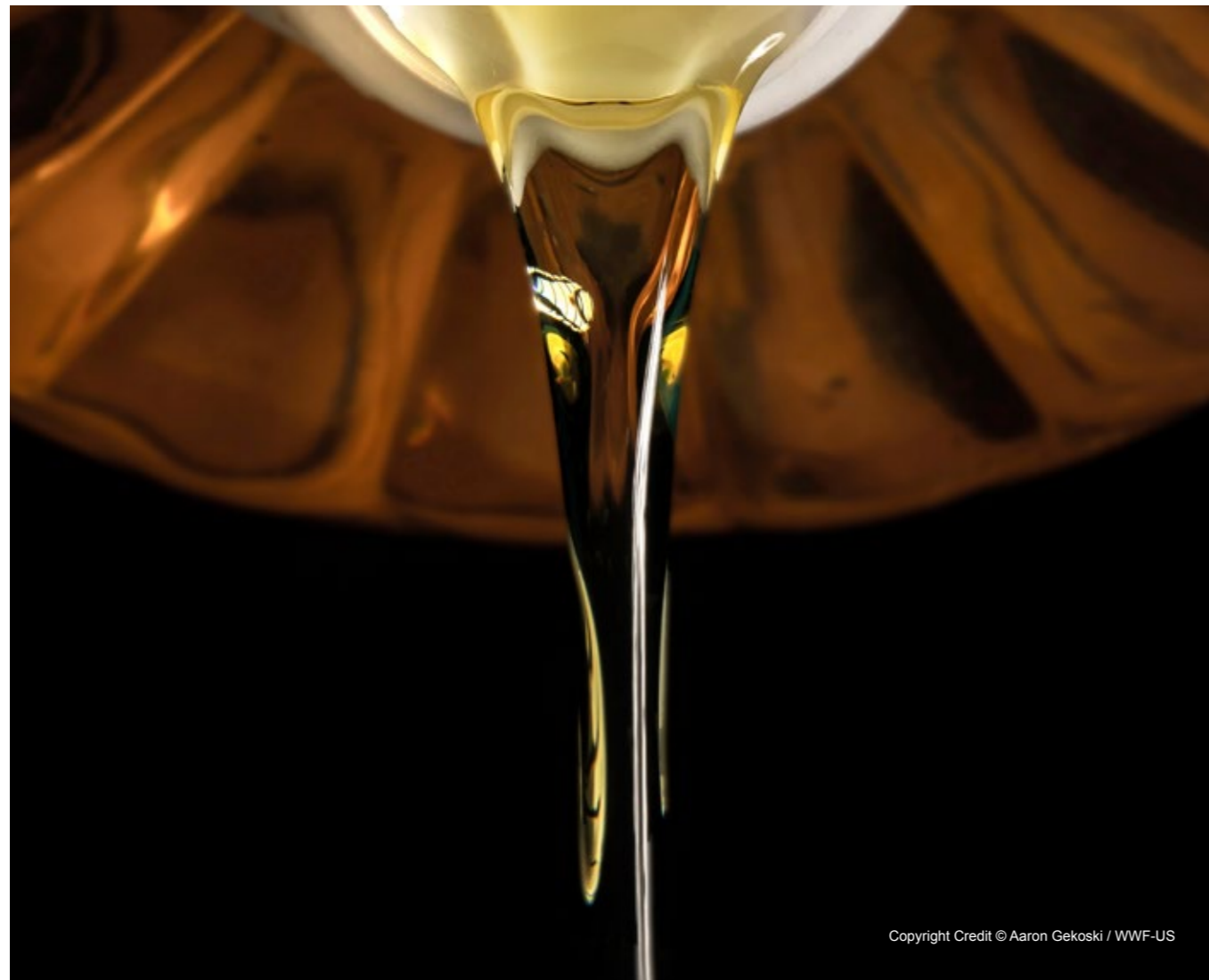
¹⁶ Mongabay (2019). Malaysia to ban oil palm expansion. Available at: <https://news.mongabay.com/2019/03/malaysia-to-ban-oil-palm-expansion/>

ABOUT THIS STUDY

To shed some light on palm oil volumes and flows from plantations in palm oil producing landscapes to major consumer markets, WWF commissioned a study from Stand.earth Research Group (SRG). This report summarises key findings from SRG's modelling analysis and **aims to provide insight into the global palm oil value chain linked to six landscapes that are rich in biodiversity and where palm oil production is prevalent:**¹⁷ Tabin, Tawau, Lower Sugut in Sabah, Malaysia; and Tesso Nilo, Sintang and South Papua in Indonesia. Protecting these landscapes¹⁸ is a WWF priority based on the wealth and variety of life they support.¹⁹ They hold some of the richest and most biodiverse tropical forests on the planet,^{20, 21} giving shelter to many rare species and providing livelihoods for millions

of people. Companies sourcing palm oil from these landscapes have a unique opportunity and responsibility to positively impact forests and habitats in these places by ensuring that their supply chain is sustainable and does not contribute to deforestation and ecosystem conversion.

For each landscape, this study **identifies key companies involved in the production, trade and purchase of palm oil; and assesses their level of exposure**, i.e. the likelihood they are sourcing from the considered landscape. This study concludes with a **set of recommendations** that stakeholders can act upon to ensure palm oil production and trade from these landscapes delivers benefits for both people and nature.



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¹⁷ A landscape is defined as a socio-ecological system that consists of natural and/or human modified ecosystems, and which is influenced by distinct ecological, historical, economic and socio-cultural processes and activities.

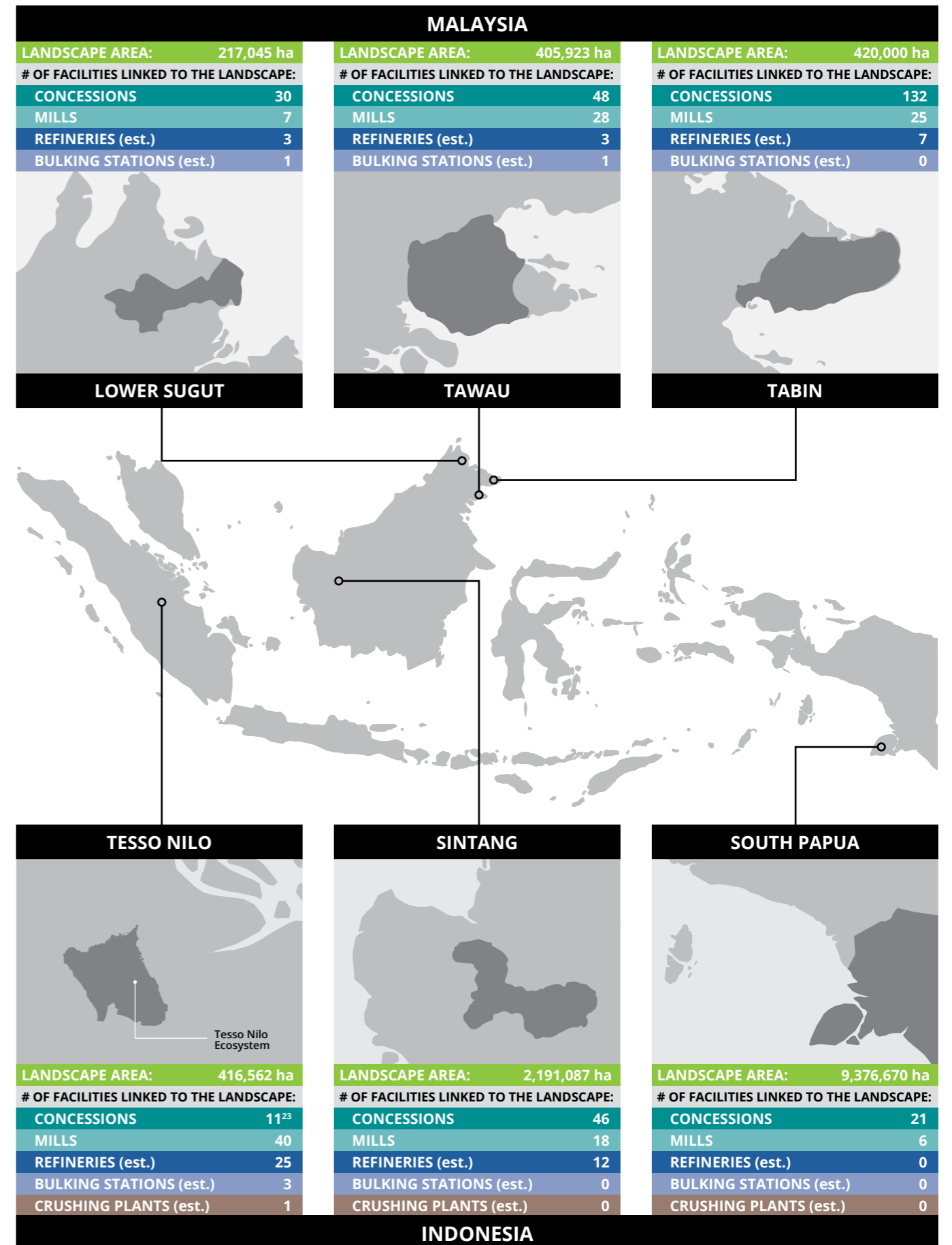
¹⁸ WWF International (2021). Forest Solutions Platform: Sustainable Landscapes. Available at: <https://forestsolutions.panda.org/approach/sustainable-landscapes>

¹⁹ WWF-United States (undated). Priority places. Available at: <https://www.worldwildlife.org/places>

²⁰ WWF-Indonesia and WWF-Malaysia (2016). The Environmental Status of Borneo. Available at: https://d2ouvy59p0dg6k.cloudfront.net/downloads/supplementary_report_rev_6_web_version_1.pdf

²¹ Myers, N., Mittermeier, R., Mittermeier, C., Da Fonseca, G.A.B., Kent, J. (2000). Biodiversity hotspots for conservation priorities. Nature, 403, pp. 853-858. Available at: <https://doi.org/10.1038/35002501>

OVERVIEW OF THE SIX LANDSCAPES ACROSS MALAYSIA AND INDONESIA CONSIDERED IN THIS STUDY²²



²² The majority of these key statistics are estimates from the model developed by SRG for this study.

²³ Does not include smallholders that are located outside delineated concessions and planted areas within the Tesso Nilo Park.

METHODOLOGY

MODELLING APPROACH

Given the lack of full traceability in Malaysia and Indonesia for palm flows between the supply base, mill and refinery, the research carried out by SRG — which forms the basis of this study — complemented direct tracing of palm oil volumes with a risk-based approach to assess the likelihood that downstream supply chain actors are buying palm oil from producers in six landscapes.

CPO volume flows were modelled from plantation to export using a range of publicly available data — including FFB and CPO yields; national average oil extraction rates (OER) for mature areas; supply base disclosures; mill disclosures; export and import data; national statistics; in-depth analysis of ownership, management, inter-island and domestic trade; and prior WWF studies of the landscapes. The resulting volume allocation estimates for each mill, refiner, trader, importer and buyer were then used to estimate the likelihood that each of them was sourcing palm oil from the six landscapes considered in this study. Given the diversity of data sources and disclosures, the model developed by SRG adopted a general timeframe of January 1, 2019 – June 30, 2020 to collect and compare data (with some exceptions).

The result is an overview of palm oil supply chain actors and connections, and their exposure to sourcing from the six selected landscapes. Although a risk-based approach is less accurate than direct

volume tracing, it remains a meaningful way, for most trade flows, to gauge the potential exposure of companies to social and environmental issues across these landscapes.

The modelling approach used in this study is a **major breakthrough in terms of traceability — showing that for any landscape in Indonesia and Malaysia, trade flow models can be developed to show the likely connections between issues on the ground and the customers driving demand.**²⁴

It also presents a unique opportunity for companies to identify their impact and influence across the supply chain, and develop a clearer picture of the landscapes they are sourcing from. The approach can help inform palm oil buyers of their level of exposure to particular landscapes, thereby serving as a basis for more targeted interventions and supplier engagement efforts aimed at ensuring that the palm oil they source from these landscapes are in compliance with their deforestation and conversion free commitments.



²⁴ **Note:** While this study aims to highlight the key actors linked to these landscapes, the research does not provide any evidence that these companies are linked to environmental and social issues on the ground.

ASSUMPTIONS & LIMITATIONS

The in-depth research conducted by SRG revealed several opportunities and constraints to understanding the volume flows from oil palm plantations. Each landscape and country is distinct and brings its own set of challenges and opportunities, requiring tailored data collection and analysis techniques.



Some of the most prominent limitations inherent to the modelling approach developed by SRG are outlined below:

- While a general timeframe of January 1, 2019 – June 30, 2020 was used to analyse the data, the time periods of individual datasets was not always consistent;
- Malaysian customs data is not publicly available. To compensate for this, national and sub-national statistics, UN Comtrade data, and complimentary customs data was used (i.e. import data obtained from the various countries that have been identified as recipients of Malaysian palm oil) to map trade flows out of Sabah;
- Allocation of CPO from landscapes was not possible for CPO production that could not be traced, resulting in less than 100% traceability

from landscapes. Hence, only large volumes from the landscapes were traced to importers and buyers;

- Volumes of palm kernel oil (PKO) were not traced in this trade flow analysis, as they were so low compared to CPO and Refined, bleached, and deodorised (RBD) palm oil. PKO traceability is possible with further development of the model design.

Finally, it is important to note that all company findings presented in this study cover the entire corporate group (in an effort to simplify data presentation and interpretation). Corporate groups with small mature areas and low volumes are collectively represented as “others” in figurative illustrations in this report.

LANDSCAPES IN SABAH

OVERVIEW

Tabin, Tawau and Lower Sugut – three landscapes located in Sabah – are home to a range of vulnerable and threatened species, including Bornean elephants, orangutans, and bantengs; helmeted hornbills; and Sunda clouded leopards. A wide variety of primate and bird species also inhabit their forests.

At the same time, the State of Sabah is the largest palm oil producing state in Malaysia, accounting for more than 26%²⁵ of the palm oil produced by the country in 2019. Approximately 20% (1.7 million hectares) of the State is covered in oil palm plantations, the bulk of which was cleared from forest lands in the eastern lowlands in the late 1980s and 1990s. Today, the rate of deforestation is declining, and there is a state policy to retain 50% of the land under forest. The state has also committed to set aside 30% of the land as protected areas by 2025, along with a focus on implementing a jurisdictional approach to deliver 100% RSPO CSPO by 2025.

WWF supports the implementation of national and state policies for landscape conservation and sustainable palm oil production through the [Sabah Landscapes Programme \(SLP\)](#). The latter aims to support the achievement of sustainable development goals by integrating the protection of forests, wildlife and rivers with RSPO certified production of palm oil, and the restoration of ecological corridors and riparian reserves.

LANDSCAPES IN SABAH: KEY STATISTICS

In the three landscapes of Tabin, Tawau and Lower Sugut, our modelling analysis captured the following:



210
CONCESSIONS

PLANTED AREA OF
389,968
HECTARES

6,886,833
TONNES OF FFB PRODUCTION
PER YEAR, LINKED TO
60 MILLS, 13 REFINERIES
AND 2 BULKING STATIONS

LOWER SUGUT (2019)	TAWAU (2019)	TABIN (2019)
FFB YIELD: 1,436,139 TONNES/YEAR	FFB YIELD: 2,277,649 TONNES/YEAR	FFB YIELD: 3,173,045 TONNES/YEAR
CPO YIELD: 302,516 TONNES/YEAR	CPO YIELD: 479,777 TONNES/YEAR	CPO YIELD: 668,388 TONNES/YEAR

²⁵ MPOC (2020). Oil Palm Planted Area. Available at: https://bepi.mpob.gov.my/images/area/2020/Area_summary.pdf

KEY FINDINGS

FGV Holdings has the largest planted area across all three landscapes in Sabah, accounting for more than a quarter of the total planted area (26.7%). Mills owned by FGV Holdings and Wilmar have the highest exposure, while Wilmar and Kuala Lumpur Kepong (KLK) refineries source the largest CPO volumes, particularly from Tabin.

RSPO uptake varies considerably across the three landscapes in Sabah, emphasising the many opportunities that remain to accelerate sustainable palm oil production across these landscapes. While 42% of the supply base was found to be RSPO certified in Tawau, only 20% of the Tabin and Lower Sugut landscapes were RSPO certified. The groups with the largest RSPO certified supply base include Hap Seng Plantations, IOI Group, Wilmar, Sime Darby, KLK and TSH Resources.

An estimated 27% of annual palm oil exports from Sabah comes from Tabin, Tawau and Lower Sugut, with KLK, Wilmar and the Genting - Musim Mas joint venture being the main exporters.²⁶ The Lahad Datu port plays a central role in trade flows from these landscapes, concentrating 60% of the estimated 1.2 million tonnes of CPO produced across all three landscapes.

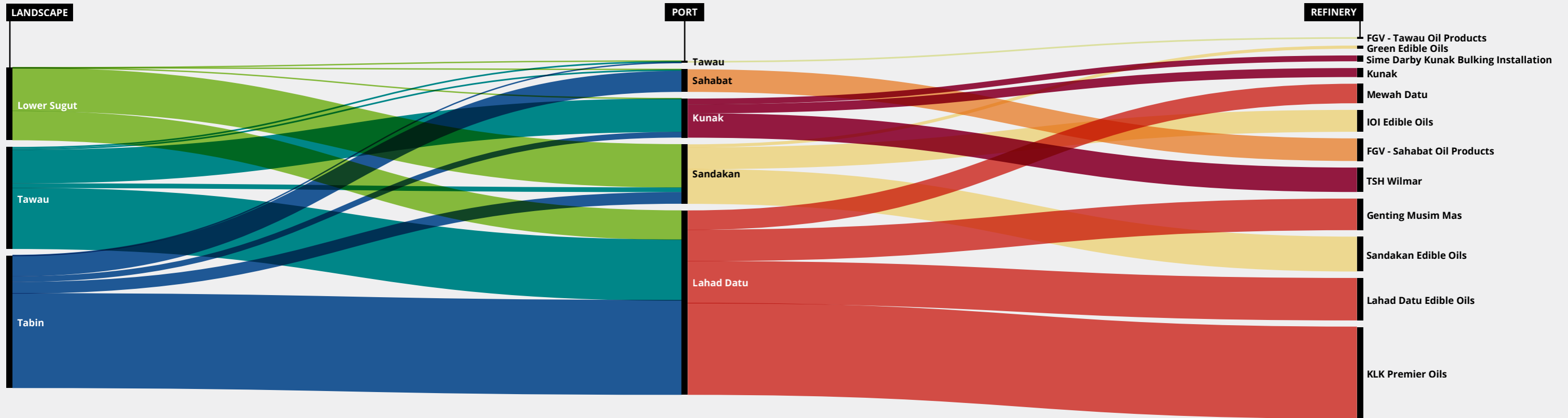
China (44%), the Netherlands (23%), the United States (10%) and the Philippines are the major importers of palm oil from the three landscapes in Sabah. Import data was used to link destination markets to key buyers in this study.²⁷ Buyers with significant volumes include Wilmar, COFCO, IOI Group and Sinar Mas.



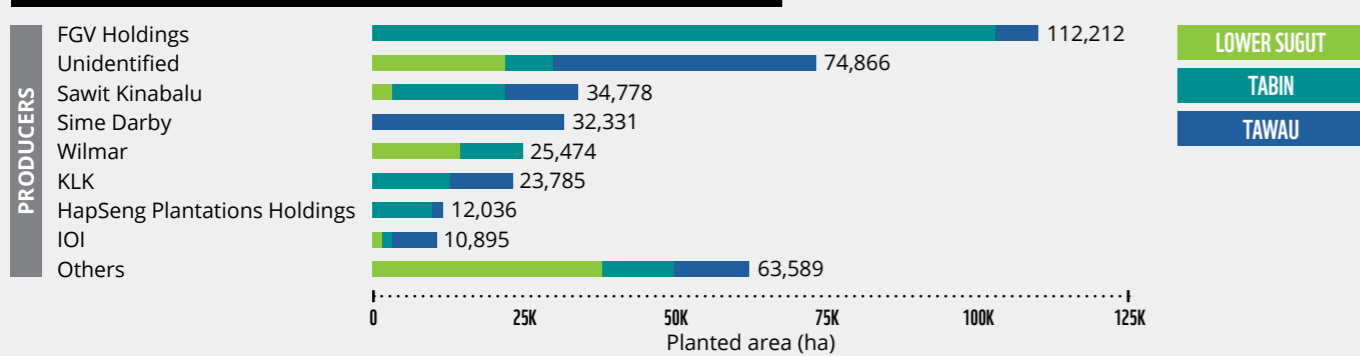
²⁶ Given the lack of Malaysian data and the gaps in the import data for partner countries, the proportion of trade out of Sabah that comes from each landscape is difficult to calculate. Instead, this study modelled the overall volumes going out from Sabah ports to different countries, in an effort to highlight the exposure of traders, importers and buyers to palm oil from the three landscapes. Based on the modeling, 27% of the total exports through the Sabah ports are estimated to come from the three selected landscapes.

²⁷ While import data is not available for the Netherlands, Japan, South Korea, and Singapore, the estimates suggest that these are important importers of Sabah palm oil, potentially accounting for a third of the trade.

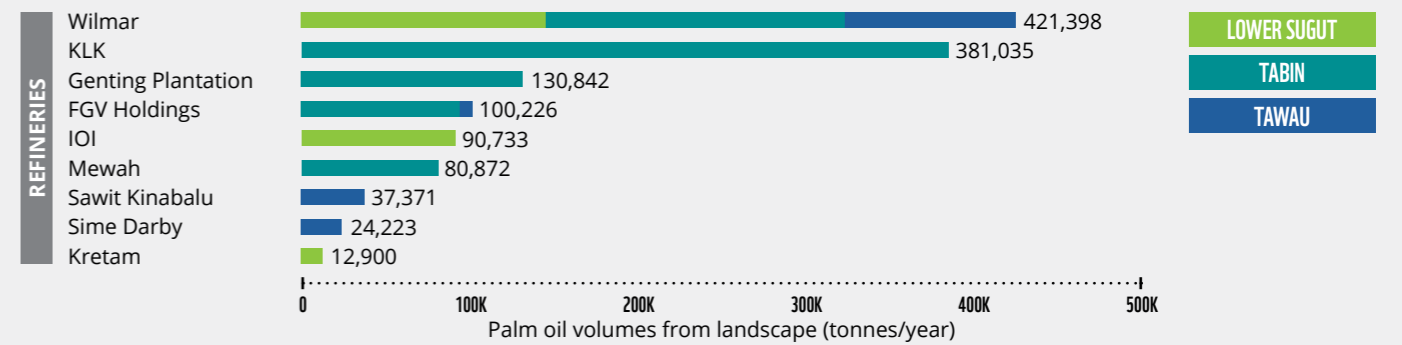
PALM OIL TRADE FLOWS FROM THE THREE SELECTED LANDSCAPES IN SABAH TO PORTS AND REFINERIES (2019)



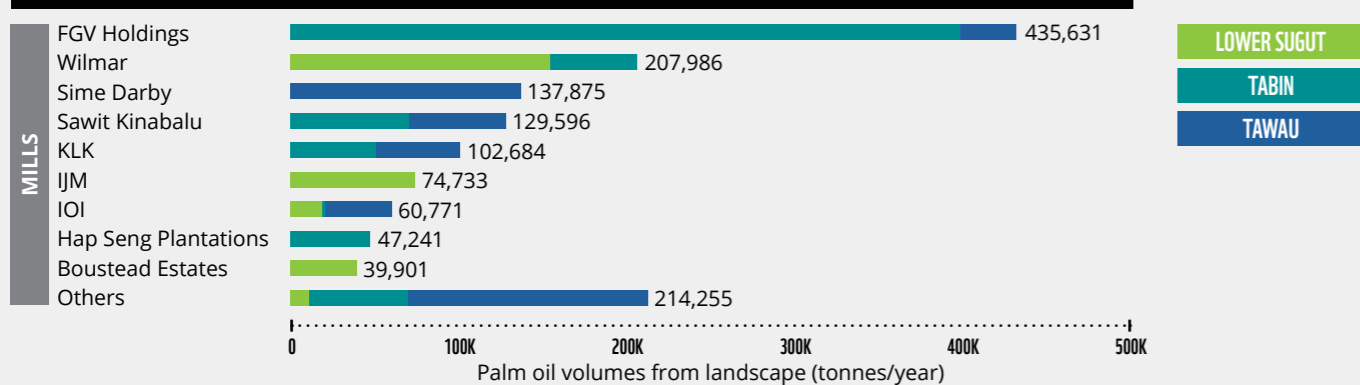
PRODUCER GROUPS WITH PLANTED AREA IN THE THREE SELECTED LANDSCAPES IN SABAH (2019)



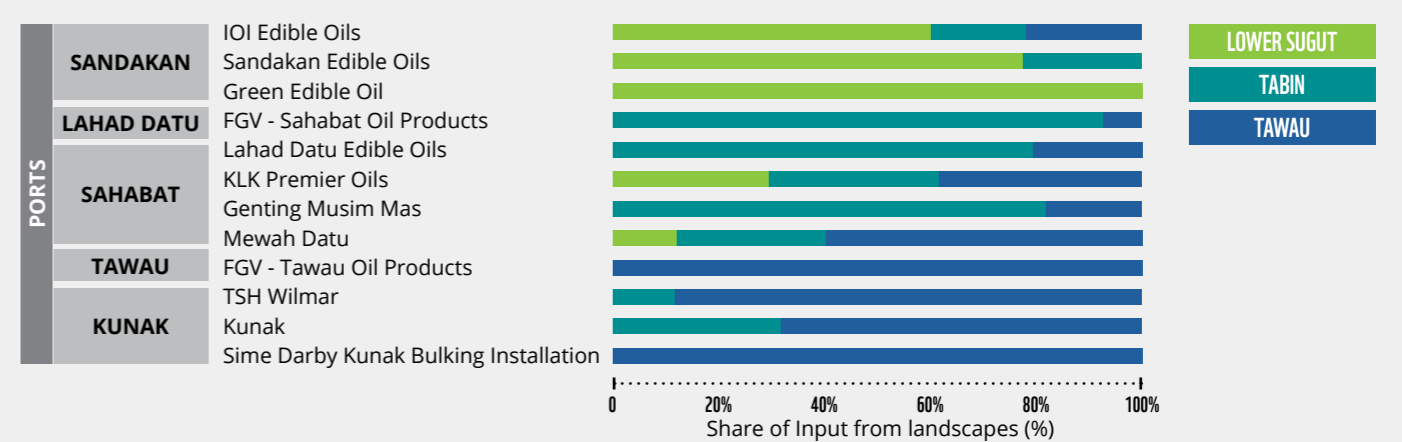
REFINERS SOURCING FROM THE THREE SELECTED LANDSCAPES IN SABAH (2019)



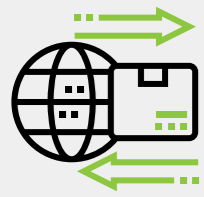
MILLS SOURCING FROM THE THREE SELECTED LANDSCAPES IN SABAH (2019)



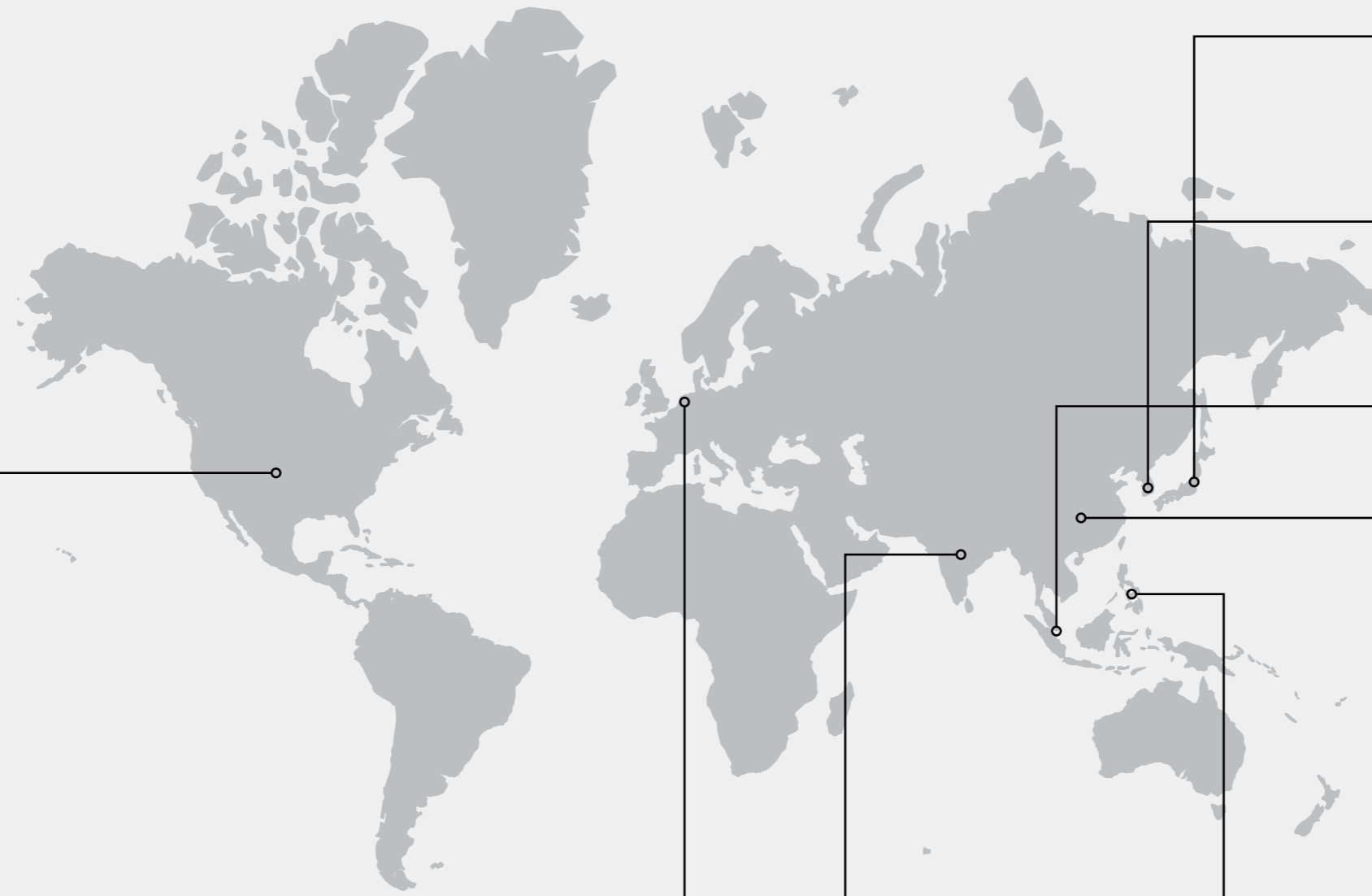
REFINERS AND BULKERS AT KEY PORTS OF EXPORT SOURCING FROM THE THREE SELECTED LANDSCAPES IN SABAH (2019)



KEY PALM OIL IMPORTERS AND BUYERS LIKELY TO SOURCE PALM OIL FROM SELECTED LANDSCAPES IN SABAH (2019)



27% OF SABAH'S PALM OIL EXPORTS COMES FROM THE LOWER SUGUT, TABIN AND TAWAU LANDSCAPES



UNITED STATES
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
337,938

PORT OF ORIGIN:
 LAHAD DATU, SANDAKAN

KEY BUYERS:
 INDUSTRIALIZADORA OLEOFINOS, ARCHER DANIELS MIDLAND (ADM), LODERS CROKLAAN USA, BUNGE LODERS CROKLAAN, AAK USA RICHMOND (AAK), PERDUE AGRIBUSINESS, WILMAR OILS AND FATS (STOCKTON)

NETHERLANDS
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
526,496

INDIA
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
75,743

PORT OF ORIGIN:
 SAHABAT, KUNAK

KEY BUYERS:
 BCL INDUSTRIES & INFRASTRUCTURES, BHARAT FOODS CO OPERATIVE, CARGILL INDIA, COFCO INTERNATIONAL INDIA, LOUIS DREYFUS CO. INDIA, KANPUR EDIBLES, AJANTA SOYA, RUCHI SOYA INDUSTRIES

PHILIPPINES
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
322,349

PORT OF ORIGIN:
 LAHAD DATU, KUNAK

KEY BUYERS:
 A.D. GOTHONG MANUFACTURING CORP, RICOR MILLS CORPORATION, DAVAO BAY COCONUT OIL MILLS, DISCOVERY INDUSTRIA, RASON EDIBLE OILS, WILMAR, TAP OIL MANUFACTURING CORP

JAPAN
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
256,282

SOUTH KOREA
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
197,954

SINGAPORE
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
122,326

CHINA
 TONNES OF PALM OIL FROM SABAH LANDSCAPES:
1,483,388

PORT OF ORIGIN:
 KUNAK

KEY BUYERS:
 WILMAR OLEOCHEMICALS (DONGGUAN, LIANYUNGANG, SHANGHAI, TIANJIN), SASOL YIHAI (LIANYUNGANG) ALCOHOL INDUSTRIES, YIHAI (GUANGZHOU) OILS & GRAINS INDUSTRIES, KERRY SPECIALTY FATS (SHANGHAI), KERRY OILS & GRAINS (TIANJIN), YIHAI (LIANYUNGANG) SPECIALITY FATS INDUSTRIES

EXPOSURE TO THE THREE SELECTED LANDSCAPES

- HIGH EXPOSURE
- MODERATE EXPOSURE

TESSO NILO LANDSCAPE

OVERVIEW

Located on the island of Sumatra, the Tesso Nilo landscape is one of the last havens for critically endangered species such as Sumatran tigers and elephants. With over 4,000 plant species recorded so far,²⁹ the area's forests have some of the highest levels of lowland forest plant biodiversity known to science. Tesso Nilo is also a water catchment for most of the rivers in Sumatra that flow eastbound.

Sumatra has a long history of human intervention, and a significant portion of the island's natural forests have been lost since the mid-1980s due to agricultural production.³⁰ The Tesso Nilo landscape – which spans almost 417,000 hectares, and includes the Tesso Nilo National Park – is heavily encroached by oil palm plantations. Since 2010-2015, illegal oil palm plantations make up large portions of the Tesso Nilo National Park³¹ resulting in many FFBs illegally grown inside the park to enter the supply chains of large producers, mills and traders operating around the landscape.³²

WWF's work in the Tesso Nilo landscape includes monitoring land use change and increasing traceability, in an effort to ensure that FFB supplies from the landscape are produced legally and sustainably.



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KEY FINDINGS

While most of the mature area in the Tesso Nilo landscape belongs to smallholders, companies such as Wilmar, RGE Group, and Siak Raya Group also own major concessions in the landscape. No plantations in the landscape were found to be RSPO certified.

Mills owned by RGE Group have the largest supply base linked to the landscape, followed by Gama Plantations and Peputra. Mills owned by RGE Group, Gama Plantations and Sarimas were also found to have links to plantations in Tesso Nilo National Park.

A total of 25 refineries, three bulkers and one crushing plant were linked to mills identified as sourcing from the Tesso Nilo landscape. The majority of CPO and RBD volumes from the landscape can be traced to refineries owned by five groups, including Apical, Wilmar, KLK, HSA Group, and Musim Mas.

Four ports have been found to be exporting palm oil sourced from the Tesso Nilo landscape, but the port of Dumai, in Riau Province, is particularly important due to its geographic proximity to Singapore, which re-exports Indonesian palm oil to major trading partners such as China, India, Pakistan, Bangladesh as well as several European countries (Netherlands, Spain, and Italy). Dumai handles 42% of Indonesian international exports of palm oil products and 82% of the estimated 467,000 tonnes of CPO produced in the Tesso Nilo landscape.

Countries likely to import palm oil originating from the Tesso Nilo landscape include China, India, Singapore, Russia, Myanmar and Vietnam. Buyers with the highest exposure to the landscape include Shanghai Continental CO., COFCO Group, Wilmar, and Wilmar subsidiaries in China, through Wilmar and Musim Mas refineries in Dumai. Emami Agrotech and Gokul Agro in India have also been found to be sourcing large CPO volumes from the landscape through Apical's refinery in Dumai.



WITH OVER 4000 PLANT SPECIES RECORDED SO FAR

FORESTS IN THE TESSO NILO LANDSCAPE HAVE SOME OF THE HIGHEST LEVELS OF LOWLAND FOREST PLANT DIVERSITY KNOWN TO SCIENCE

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TESSO NILO LANDSCAPE: KEY STATISTICS

In the Tesso Nilo landscape, our modelling analysis captured the following:



11
CONCESSIONS

MATURE AREA OF
131,722
HECTARES

2,189,915
TONNES OF FFB PRODUCTION
PER YEAR, LINKED TO
40 MILLS, 25 REFINERIES,
3 BULKERS, AND
1 CRUSHING PLANT

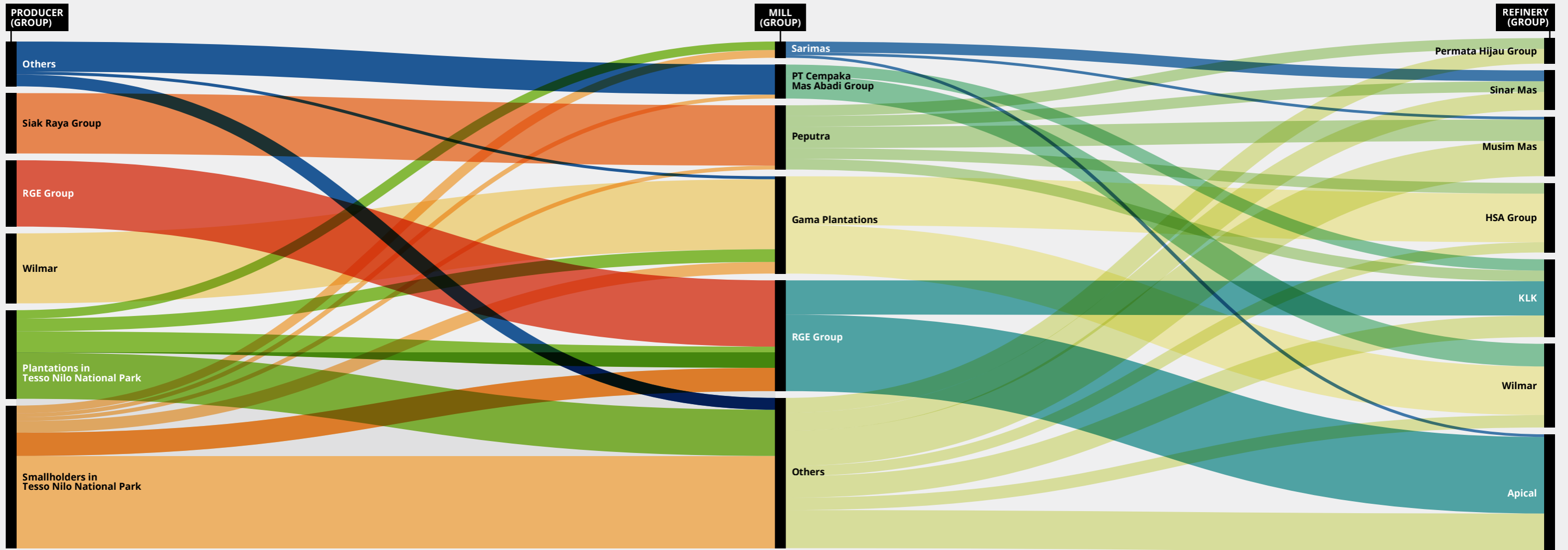
²⁹ WWF (2004). WWF welcomes Indonesian government's declaration of Tesso Nilo National Park. Available at: <https://wwf.panda.org/714596/WWF-welcomes-indonesian-governments-declaration-of-Tesso-Nilo-National-Park>

³⁰ WWF (2020). Deforestation Fronts: Drivers and responses in a changing world. Available at: <https://wwfint.awsassets.pan>

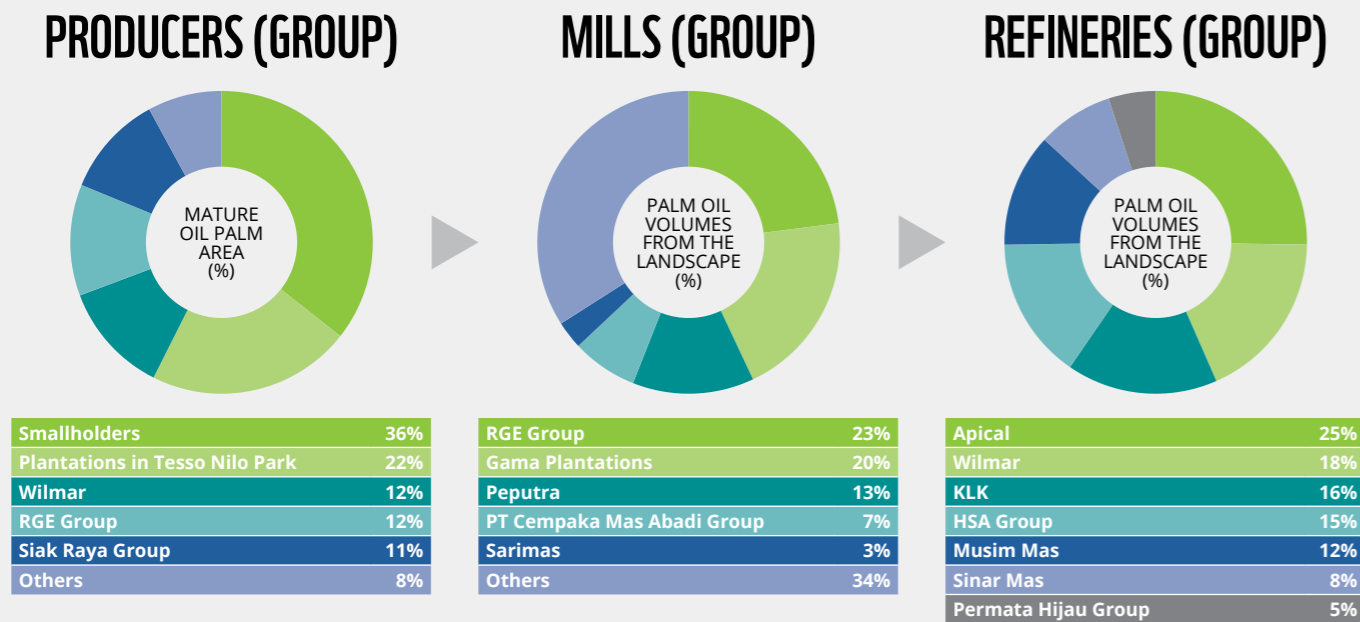
³¹ WWF (2018). Investigative report reveals palm oil from major traders compromises deforestation free commitments of major global brands. Available at: https://wwf.panda.org/wwf_news/press_releases/2331173/Investigative-report-reveals-palm-oil-from-major-traders-compromises-deforestation-free-commitments-of-major-global-brands

³² WWF (2018). Investigative report reveals palm oil from major traders compromises deforestation free commitments of major global brands. Available at: https://wwf.panda.org/wwf_news/press_releases/2331173/Investigative-report-reveals-palm-oil-from-major-traders-compromises-deforestation-free-commitments-of-major-global-brands

PALM OIL TRADE FLOWS FROM CONCESSIONS AND MILLS IN THE TESSO NILO LANDSCAPE TO REFINERIES (2019)



EXPOSURE OF KEY PRODUCERS, MILLS AND REFINERIES TO THE TESSO NILO LANDSCAPE (2019)



EXPOSURE TO THE TESSO NILO LANDSCAPE BY PORT AND EXPORTER (2019)

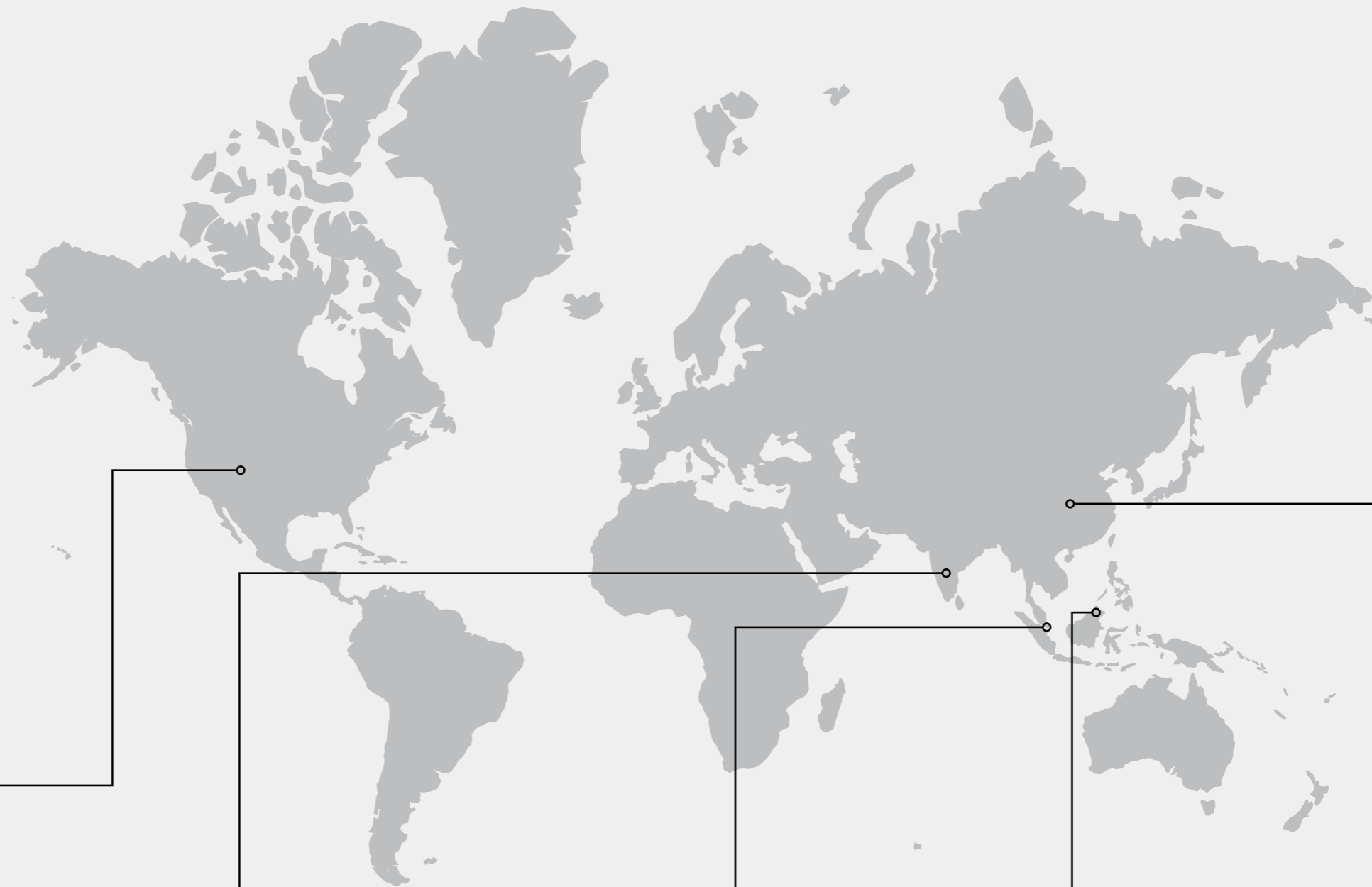
PORTS	PARENT COMPANY		EXPORTER	% inputs from the landscape*	CPO RBD
BELAWAN	HSA Group	HSA Group	HSA Group	0.2%	
	Musim Mas	Musim Mas	Musim Mas	0.6%	
DUMAI	HSA Group	HSA Group	HSA Group	8.9%	
	Musim Mas	Intibenua Perkasatama	Intibenua Perkasatama	2.8%	
	Permata Hijau Group	Permata Hijau Group	Permata Hijau Group	22.6%	
	RGE	Apical	Apical	4.7%	
	Sinar Mas	Ivo Mas Tunggal	Ivo Mas Tunggal	3.9%	
MANGGAR	Wilmar	Wilmar Nabati Indonesia	Wilmar Nabati Indonesia	20.7%	
				5.4%	
TELUK BAYUR	KLK	Steelindo Wahana Perkasa	Steelindo Wahana Perkasa	27.4%	
	Musim Mas	Wira Inno Mas	Wira Inno Mas	1.2%	

*(out of the total volumes exported by the company)

KEY PALM OIL IMPORTERS AND BUYERS LIKELY TO SOURCE PALM OIL FROM THE TESSO NILO LANDSCAPE (2019)



DUMAI HANDLES 42% OF INDONESIAN INTERNATIONAL EXPORTS OF PALM OIL PRODUCTS AND 82% OF THE ESTIMATED 467,000 TONNES OF CPO PRODUCED IN THE TESSO NILO LANDSCAPE



EXPOSURE TO THE LANDSCAPE

- HIGH EXPOSURE
- MODERATE EXPOSURE

UNITED STATES

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): **13,221**

TRADERS: WILMAR, APICAL, MUSIM MAS

PORT OF ORIGIN: DUMAI

KEY BUYERS: ADM, AAK, CARGILL, WILMAR

INDIA

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): **40,722**

TRADERS: APICAL

PORT OF ORIGIN: DUMAI

KEY BUYERS: EMAMI AGROTECH, GOKUL AGRO, BUDGE BUDGE REFINERIES

SINGAPORE

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): **87,203**

TRADERS: SINAR MAS, WILMAR, KLK

PORT OF ORIGIN: DUMAI, MANGGAR

KEY BUYERS: SINAR MAS, WILMAR, NESTE, GOLDEN AGRI INVESTMENTS

MALAYSIA

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): **26,967**

TRADERS: KLK, HSA GROUP, MUSIM MAS

PORT OF ORIGIN: DUMAI, MANGGAR

KEY BUYERS: VANCE BIOENERGY, IOI, NATURAL OLEOCHEMICALS

CHINA

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): **34,348**

TRADERS: MUSIM MAS, KLK, WILMAR

PORT OF ORIGIN: DUMAI, MANGGAR, BELAWAN

KEY BUYERS: SHANGAI CONTINENTAL, COFCO, WILMAR, CARGILL

SINTANG LANDSCAPE

OVERVIEW

With 925,585 hectares of pristine forests, the Sintang landscape is located on the island of Borneo, home to some of the world’s largest remaining areas of tropical rainforest. The landscape includes a vast national park which straddles the country’s longest river – the Kapuas – and holds flagship species of global concern such as the Bornean orangutan along with locally distinct species such as the rhinoceros hornbill, proboscis monkey and giant Rafflesia flower.

Forests cover more than 50% of the Sintang landscape, but the area has one of the highest rates of degradation, deforestation and fires in West Kalimantan.³³ The local economy is dominated by land and natural resource-based sectors, and pressure from logging operations, followed by transmigration and plantation developments, have placed pressure on forests.³⁴

Since declaring its commitment to becoming a “Sustainable District” in 2017, the government of Sintang has been working alongside a variety of stakeholders — including WWF — to implement a jurisdictional approach aimed at ensuring sustainable land use and commodity production across the entire district to conserve remaining natural forest. In 2018, district authorities adopted the Sintang Lestari Regional Action Plan (RAD-SL) and the Sustainable Palm Oil Regional Action Plan (RAD-KSB), two strategies which pave the way for a transition to sustainability. The district has also been working to increase the uptake of sustainable production practices in the area since 2014, with an emphasis on smallholder capacity building and institutional strengthening, and developing study analyses for HCV and “no go areas” for the Sintang Agricultural Master Plan.

SINTANG LANDSCAPE: KEY STATISTICS

In the Sintang landscape, our modelling analysis captured the following:



46
CONCESSIONS

MATURE AREA OF
154,864
HECTARES

2,404,170
TONNES OF FFB PRODUCTION
PER YEAR, LINKED TO 8 MILLS
& 12 REFINERIES

KEY FINDINGS

Lyman Agro is the largest producer in the Sintang landscape, accounting for more than a quarter of the total mature oil palm area (28%). Mills owned by the group also process the largest volumes of palm oil from the landscape (33%).

Other key producers sourcing from the Sintang landscape include Golden Agri-Resources (GAR), Incasi Raya, Everbright and Evershine. Mills owned by these four groups process roughly half of the palm oil from Sintang. However, five independent mills (i.e. mills that do not have their own plantations) were also

found to be processing FFB from identified concessions. Such mills are usually set up to handle smallholder supply, and are highly likely to accept FFB with limited traceability.³⁵ No plantations in the landscape were found to be RSPO certified.

A total of 12 refineries were identified as sourcing from mills in the Sintang landscape, but none are located nearby. Several refineries are located in Bintulu and Sarawak in Malaysia, which are sourcing palm oil from the Sintang landscape through the land border crossing at Nanga Badau. Other refineries include one in Pontianak, two in Sumatra, one in Jakarta, one at the Malaysian port of Pasir Gudang, and two in the Netherlands. Sinar Mas, BLD Plantation, and Wilmar are the three largest refiners with links to the landscape, together accounting for about 90% of the palm oil volumes originating from Sintang.

CPO flows from the Sintang landscape were traced to the ports of Tanjung Priok, Tarahan, and Dumai. The port of Dumai handles approximately 51% of the estimated 411,000 tonnes of palm oil produced in the Sintang landscape, while the land crossing in Nanga Badau handles about 43%.

CPO exports from the landscape could be traced to Malaysia, Singapore, China, Bangladesh, Pakistan and the United States — although a large share was not traceable. Buyers with the highest exposure include SOP Edible Oils, Kirana, JPY Trading and Services and YLL Trading in Malaysia. GAR Singapore, Cargill USA, IFFCO Pakistan, and Golden Natural Resources in China (a subsidiary of GAR) are also highly likely to source from the Sintang landscape via Dumai.



WITH 2.2 MILLION HECTARES OF PRISTINE FORESTS, THE SINTANG LANDSCAPE IS HOME TO SOME OF THE WORLD’S LARGEST REMAINING AREAS OF TROPICAL RAINFOREST

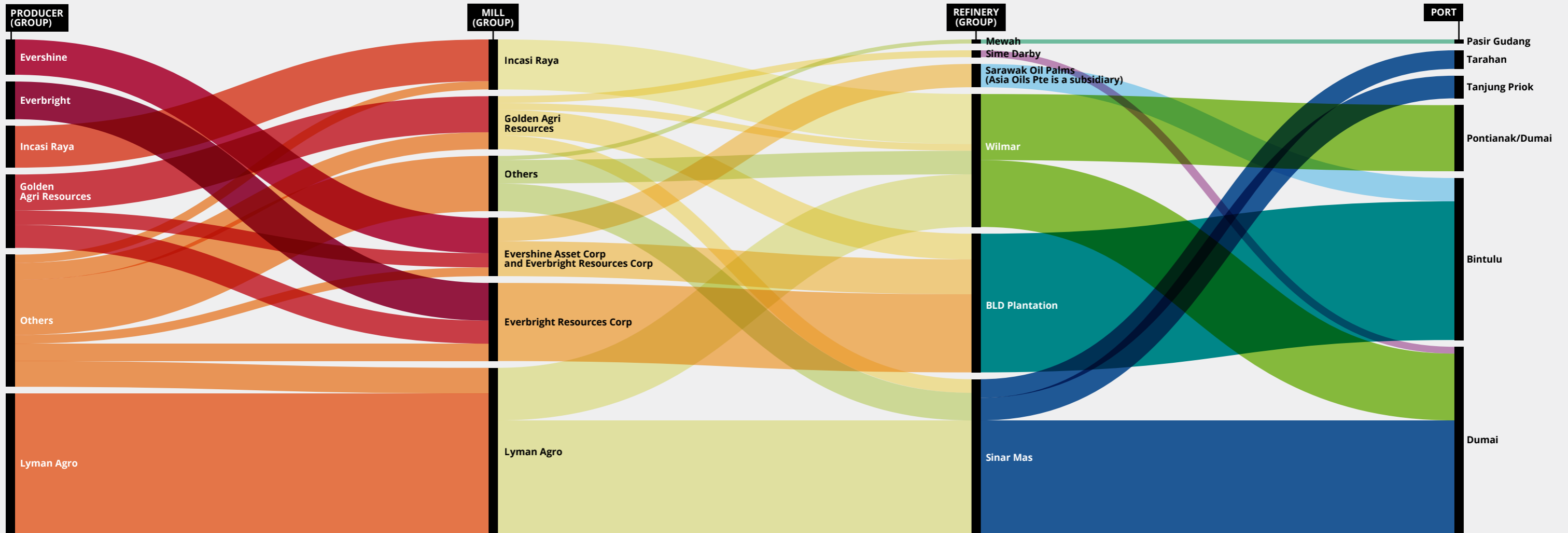
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³³ Earth Innovation Institute (2020). Sintang Jurisdictional Profile. Available at: https://earthinnovation.org/wp-content/uploads/2018/09/profiles_led/SJS_Profiles_ENG/Indonesia/Profile_SINTANG_Sukri_2020_ENG.pdf

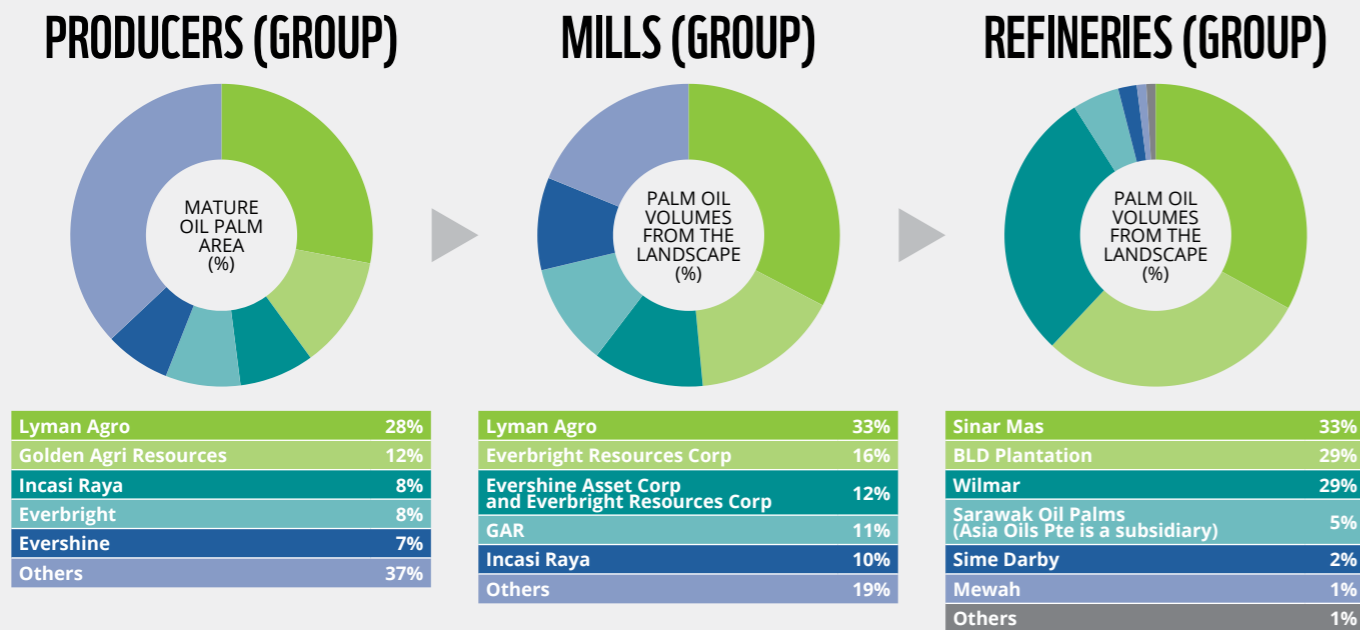
³⁴ WWF (2020). Deforestation Fronts: Drivers and responses in a changing world. Available at: https://wwfint.awsassets.panda.org/downloads/deforestation_fronts_drivers_and_responses_in_a_changing_world_full_report_1.pdf

³⁵ George, C., Schoneveld, G.C., van der Haar, S., Ekowati, D., Andrianto, A., Komarudin, H., Okarda, B., Jelsma, I., Pacheco, P. (2019). Certification, good agricultural practice and smallholder heterogeneity: Differentiated pathways for resolving compliance gaps in the Indonesian oil palm sector. Global Environmental Change, 57, 101933. Available at: <https://www.sciencedirect.com/science/article/pii/S0959378018306897>

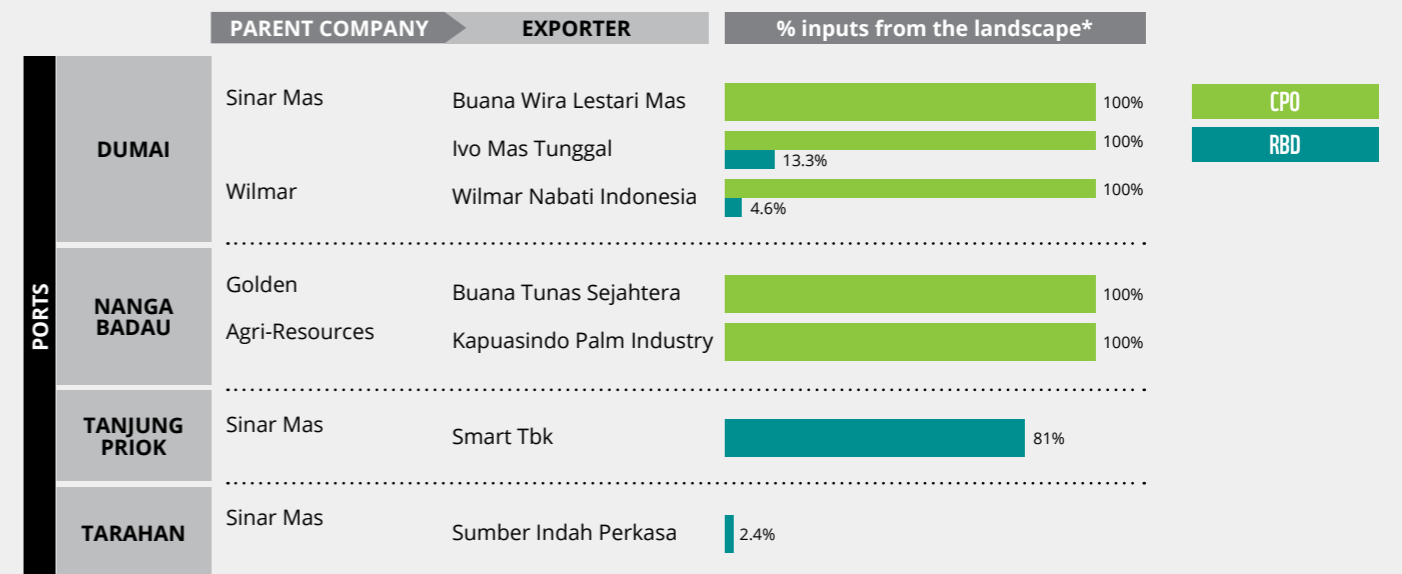
PALM OIL TRADE FLOWS FROM CONCESSIONS AND MILLS IN THE SINTANG LANDSCAPE TO REFINERIES AND PORTS (2019)



EXPOSURE OF KEY PRODUCERS, MILLS AND REFINERIES TO THE SINTANG LANDSCAPE (2019)



EXPOSURE TO THE SINTANG LANDSCAPE BY PORT AND EXPORTER (2019)



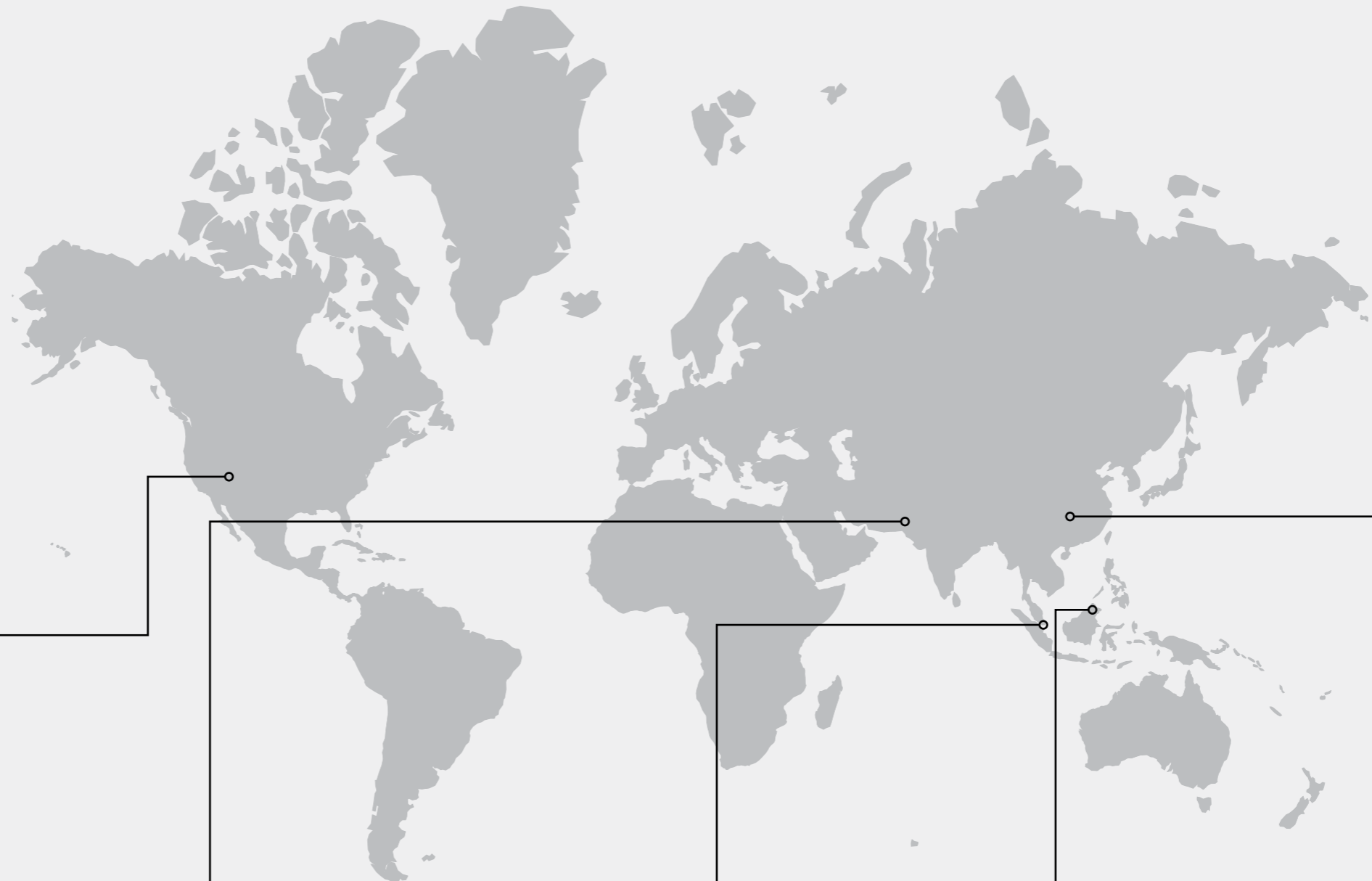
*(out of the total volumes exported by the company)


CPO EXPORTS FROM THE SINTANG LANDSCAPE COULD BE TRACED TO MALAYSIA, SINGAPORE, CHINA, BANGLADESH, PAKISTAN AND THE UNITED STATES —
ALTHOUGH A LARGE SHARE WAS NOT TRACEABLE




EXPOSURE TO THE LANDSCAPE


- HIGH EXPOSURE
- MODERATE EXPOSURE





 **UNITED STATES**

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES):
15,683


 **TRADERS:**
 SINAR MAS WILMAR


 **PORT OF ORIGIN:**
 DUMAI TARAHAH


 **KEY BUYERS:**
 SINAR MAS, CARGILL, ADM, AAK, WILMAR


 **PAKISTAN**

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES):
26,670


 **TRADERS:**
 SINAR MAS WILMAR


 **PORT OF ORIGIN:**
 DUMAI TARAHAH


 **KEY BUYERS:**
 AHMED OIL AND GHEE INDUSTRIES, IFFCO, HUNZA GHEE INDUSTRIES, MAHBOOB INDUSTRIES


 **SINGAPORE**

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES):
127,413


 **TRADERS:**
 SINAR MAS WILMAR


 **PORT OF ORIGIN:**
 DUMAI TARAHAH


 **KEY BUYERS:**
 MEWAH OLEO, SINAR MAS, WILMAR, NESTE

 **MALAYSIA**

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES):
178,241

 **TRADERS:**
 GOLDEN AGRI RESOURCES (SINAR MAS GROUP)

 **PORT OF ORIGIN:**
 NANGA BADAU

 **KEY BUYERS:**
 KIRANA PALM OIL REFINERY, SOP EDIBLE OIL, JPY TRADING AND SERVICES

 **CHINA**

VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES):
11,035

 **TRADERS:**
 SINAR MAS WILMAR

 **PORT OF ORIGIN:**
 TANJUNG PRIOK DUMAI

 **KEY BUYERS:**
 SHINING GOLD FOODSTUFFS (NINGBO), WILMAR, GOLDEN NATURAL RESOURCES (SHANGHAI)

SOUTH PAPUA LANDSCAPE



OVERVIEW

The South Papua landscape (9.4 million hectares) covers three districts: Merauke (4.7 million hectares), Mappi (2.6 million hectares) and Boven Digoel (2.7 million hectares). The landscape has rich and rare ecosystems, including riverine, mangrove, savannah and monsoon forests; swamp forests; and lowland tropical forest vegetation. These make South Papua home to several large protected areas.

Palm oil development in Papua province has been slow to develop, but has picked up pace since 2008. As lands for plantations in Sumatra and Kalimantan become scarce, Papua has emerged as the next frontier for oil palm expansion. Recent estimates indicate that 1.1 million hectares of the province’s natural forests are earmarked for logging and oil palm development,³⁶ and permit issuance has often failed to secure the free, prior and informed consent (FPIC) of local communities and indigenous people.³⁷ In many cases however, land clearing for plantation development has not fully started. Urgent action is therefore needed to establish spatial plans which set aside key forest areas and monitor deforestation rates across the landscape.

In the South Papua landscape, civil society is supporting the implementation of a jurisdictional approach by actively working with the local government, and communities on a Regional Development Strategic Plan and FPIC guidance to be adopted under Governor Regulation. The latter aims to ensure that conservation outcomes, social equity and the rights of indigenous peoples are at the heart of economic development in Papua.

SOUTH PAPUA LANDSCAPE: KEY STATISTICS

In the South Papua landscape, our modelling analysis captured the following:



21
CONCESSIONS

MATURE AREA OF
99,969
HECTARES

1,930,547
TONNES OF FFB PRODUCTION
PER YEAR, LINKED TO **6** MILLS

KEY FINDINGS

A total of 21 concessions were identified in South Papua, however only 18 concessions showed evidence of having productive areas at the time of the study. Korindo was found to be the largest producer, owning more than half of the total mature oil palm area in the landscape.

There are six mills in the South Papua landscape — four owned by Korindo and two owned by Posco. The two Korean companies are closely linked, with Korindo managing Posco plantations and mills. There are no refineries in or near the landscape.

It is estimated that about 25% of the CPO production from the South Papua landscape was exported internationally, suggesting that 75% would have been consumed or routed domestically first.³⁸

The ports of Asike, Bade and Irian Jaya are key points of export for palm oil from the South Papua landscape. Exporters include Bumi Indawa Niaga (Korindo Group) and Bio Inti Agrindo (POSCO/ Korindo). The same shippers also exported some CPO volumes from the landscape through the ports of Belawan and Dumai in Sumatra.

Palm oil originating from the South Papua landscape was traced to India, South Korea and Singapore, and was likely re-exported (most of these volumes couldn’t be traced beyond the primary importer). Buyers likely to source from the landscape include 3F Industries and Emami Agrotech in India, along with Posco International in South Korea and Agritrade International in Singapore.



THE SOUTH PAPUA LANDSCAPE HAS RICH AND RARE ECOSYSTEMS
INCLUDING RIVERINE, MANGROVE, SAVANNAH AND MONSOON FOREST; SWAMP FORESTS; AND LOWLAND TROPICAL FOREST VEGETATION.

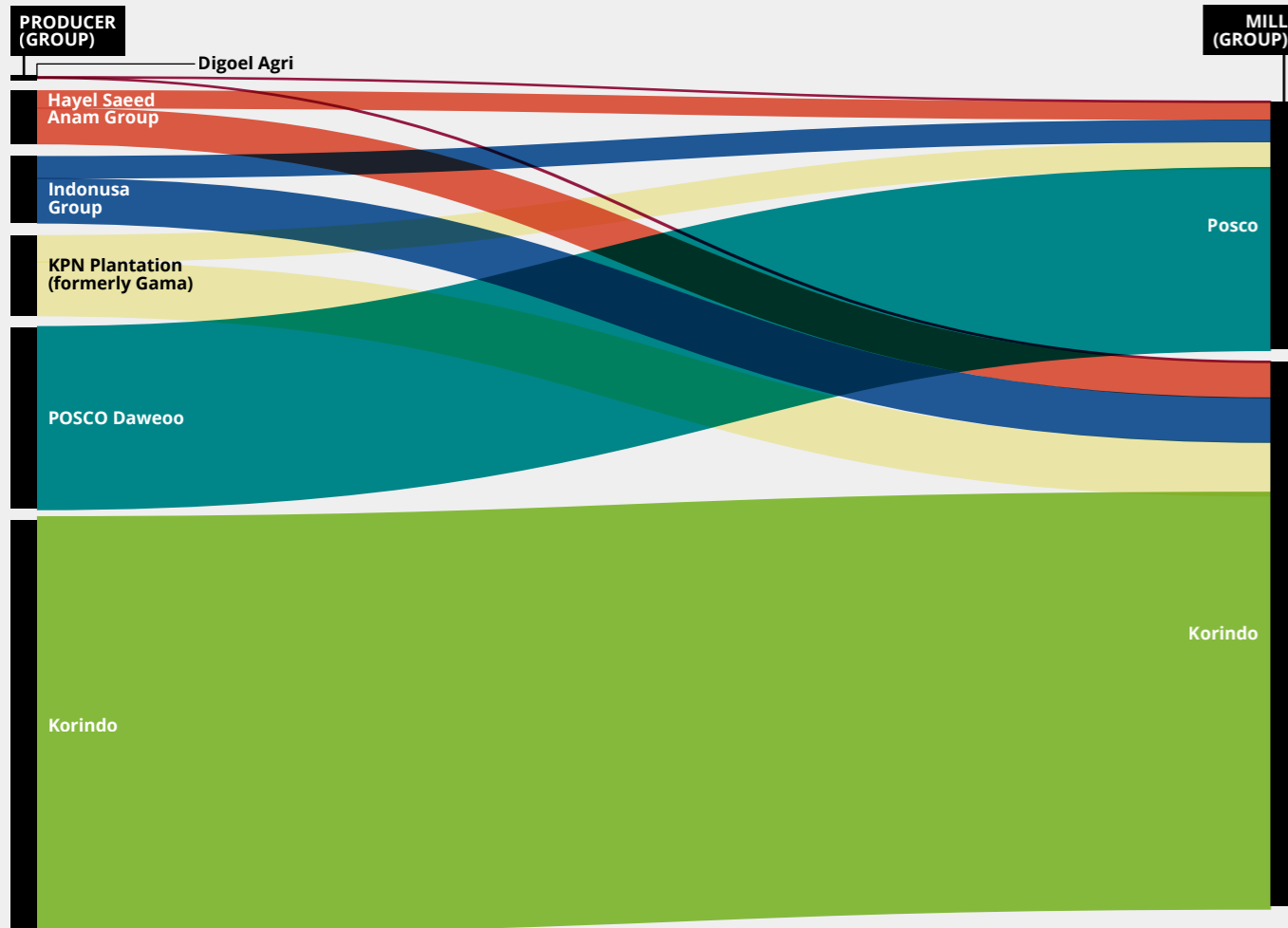
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³⁶ Mongabay (2021). A million hectares of Papua forest licensed for clearing, report shows. Available at: <https://news.mongabay.com/2021/03/papua-forest-licensed-for-clearing-future-deforestation-report/>

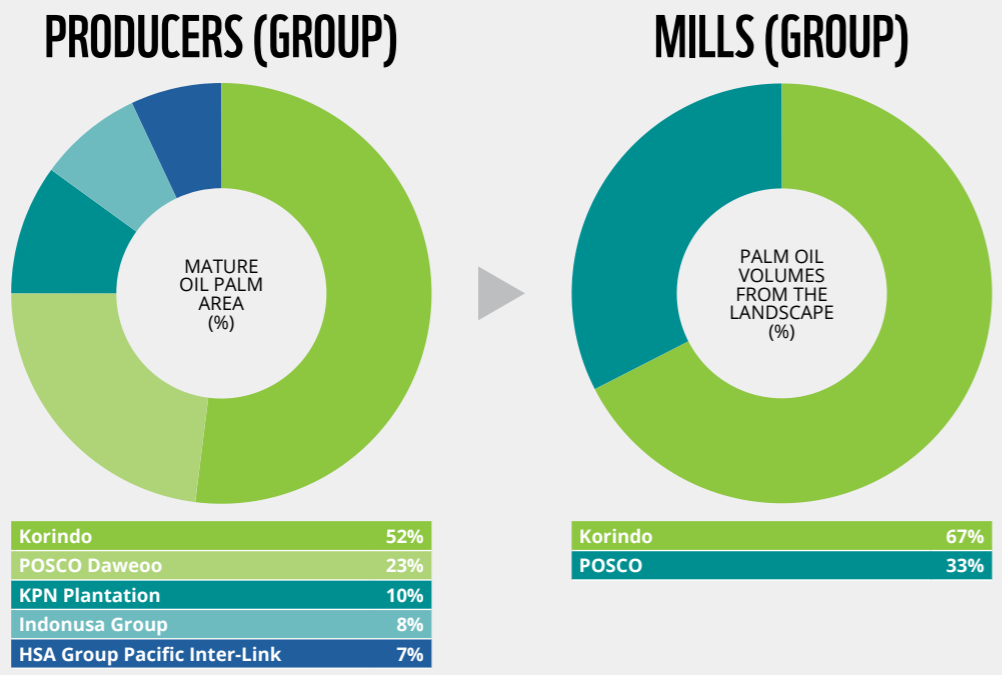
³⁷ Andrianto, A., Komarudin, H., Pacheco, P. (2019). Expansion of Oil Palm Plantations in Indonesia’s Frontier: Problems of Externalities and the Future of Local and Indigenous Communities. Land, 8, 56. Available at: <https://doi.org/10.3390/land8040056>

³⁸ Trase.earth, in data from 2015, lists only Indonesian domestic consumption for palm oil from the three districts in the landscape.

PALM OIL TRADE FLOWS FROM CONCESSIONS TO MILLS IN THE SOUTH PAPUA LANDSCAPE (2019)

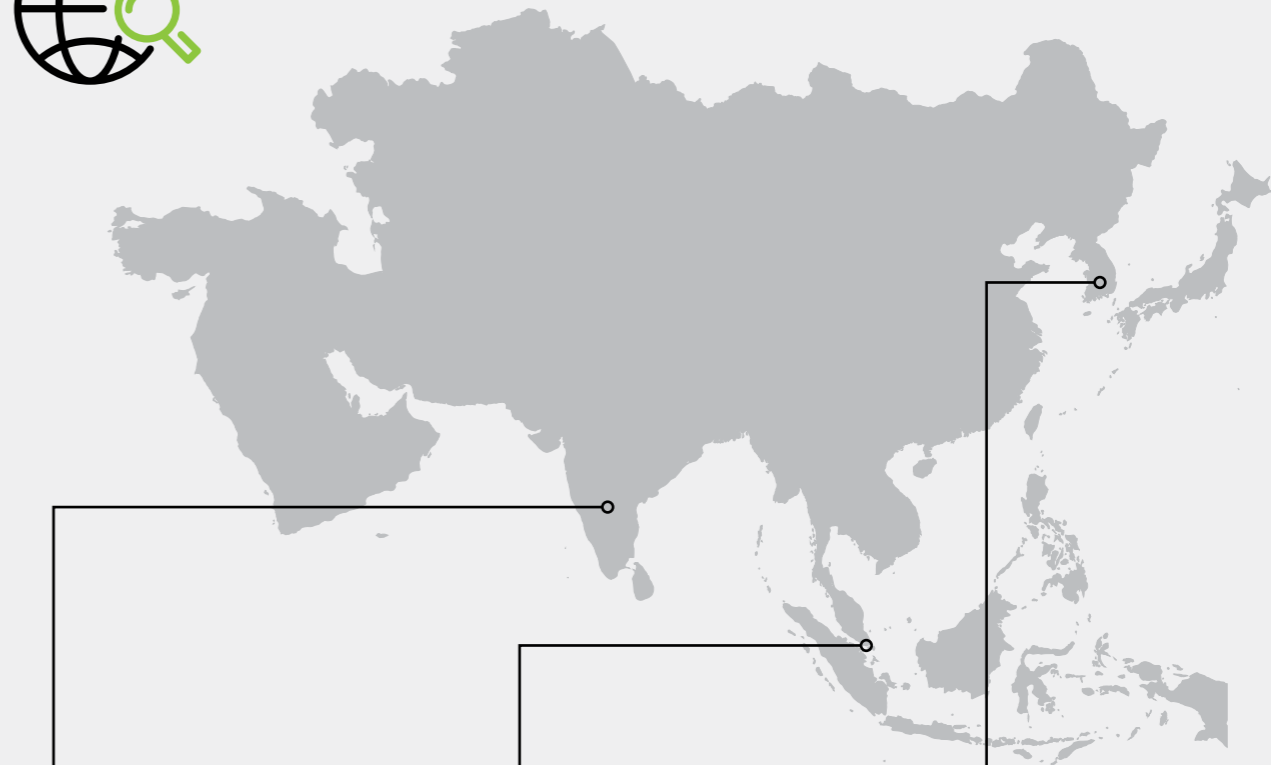


EXPOSURE OF KEY PRODUCERS AND MILLS TO THE SOUTH PAPUA LANDSCAPE (2019)



KEY PALM OIL IMPORTERS AND BUYERS LIKELY TO SOURCE PALM OIL FROM THE SOUTH PAPUA LANDSCAPE (2019)

PALM OIL ORIGINATING FROM THE SOUTH PAPUA LANDSCAPE WAS TRACED TO INDIA, SOUTH KOREA AND SINGAPORE



EXPOSURE TO THE LANDSCAPE

- HIGH EXPOSURE
- MODERATE EXPOSURE

<p> INDIA</p> <p>VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): 30,873</p> <p>TRADERS: POSCO</p> <p>PORT OF ORIGIN: ASIKE</p> <p>KEY BUYERS: EMAMI AGROTECH, 3F INDUSTRIES, BUDGE BUDGE REFINERY INDIA</p>	<p> SINGAPORE</p> <p>VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): 12,686</p> <p>TRADERS: KORINDO</p> <p>PORT OF ORIGIN: ASIKE / BADE</p> <p>KEY BUYERS: AGRITRADE INTERNATIONAL, KPB TRADING</p>	<p> SOUTH KOREA</p> <p>VOLUME OF PALM OIL FROM THE LANDSCAPE (TONNES): 26,136</p> <p>TRADERS: KORINDO</p> <p>PORT OF ORIGIN: ASIKE</p> <p>KEY BUYERS: POSCO INTERNATIONAL CORP</p>
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RECOMMENDATIONS

While the methodology employed in this study reveals that it is possible to trace supply chain connections, it equally shows how disparate and volatile publicly available data can be – and how much variability exists in reporting.

The multiple challenges and gaps encountered throughout the data collection and analysis process of this study underline the extreme urgency to increase transparency in the palm oil value chain, along with due diligence and monitoring of suppliers.

WHAT SHOULD COMPANIES DO?

Companies can take steps to ensure that their own supply chain is sustainable and free from deforestation and conversion of natural ecosystems through tracing their palm oil to source. They also have a responsibility and role to play in supporting a responsible and sustainable palm oil industry by transitioning from simply de-risking their own supply chain towards a pro-environment, pro-people approach.

WWF's recommendations for companies sourcing from these landscapes:

OWN SUPPLY CHAIN

- Adopt a company/group level commitment to source palm oil that is free from deforestation and conversion.
- Make an ambitious time-bound commitment to source 100% RSPO CSPO and/or Palm Oil Innovation Group (POIG)-verified oil. Increase CSPO uptake including transitioning to physical supply chains with segregated (SG) or identity preserved (IP) oil, and supporting independent smallholders (IS) through the purchase of IS-Credits.
- Encourage suppliers to adopt and implement a deforestation and conversion-free policy.
- Establish robust monitoring and verification systems and processes to assess, measure, and monitor supplier compliance and support suppliers to achieve compliance with these commitments.

BEYOND SUPPLY CHAIN

- Collaborate with governments, civil society organisations and buyers to implement sustainable land use and development policies and planning at the national, sub-national, and local scale, as well as landscape level approaches that turn the tide on biodiversity loss, climate change, and social inequity.
- Support policy action in producer and consumer countries which tackles deforestation and conversion, and encourages/requires legal and sustainable palm oil production.
- Actively participate in action-oriented initiatives and advocacy.
- Invest in on-the-ground projects in palm oil production landscapes, to support transformational change in the palm oil industry. This can include projects focused on the conservation and restoration of habitats and biodiversity at risk from, or impacted by, unsustainable palm oil, and actions that support smallholder farmer sustainability.



TRANSPARENCY & TRACEABILITY

- Understand the supply chain by requiring suppliers to have traceability to the plantation level, and to monitor and manage environmental and social risks.
- Use standardised, accepted, and technically sound reporting systems such as the Accountability Framework and the Global Reporting Initiative (GRI) reporting principles.
- Publicly report progress at least annually using these systems, including progress and actions taken towards achieving commitments and palm oil sources and usage.

WWF recommends that companies and all relevant stakeholders use the Accountability Framework to ensure adherence to the above. The Accountability Framework initiative (AFi) was published in June 2019 as a set of common norms, definitions and guidelines for establishing, implementing, and demonstrating progress on ethical supply chain commitments in the agriculture and forestry sectors. WWF endorses the framework as the backbone of its expectation for companies to set, implement, and measure commitments.



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NATURE AND REDUCE THE
MOST PRESSING THREATS
TO THE DIVERSITY OF
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