

# Charting a Resilient Future



SUSTAINABILITY REPORT 2023





**As one of the largest players in the palm oil industry, we believe that the best strategy to ensure our continued success is to be the leading sustainable and responsible company.**



**Vision**

We strive to be the world’s preferred supply chain partner for palm oil and its derivatives.

**Mission**

Driven by a passion for excellence and commitment to continuous improvement, we strive to be the leader in the palm oil industry, producing all our products in an economically viable, socially responsible and environmentally appropriate manner in full compliance with all relevant legal requirements.

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# The Musim Mas Sustainability Pillars

Sustainability at Musim Mas means providing high quality and innovative palm oil products and derivatives in a responsible way.

## PILLAR 1

Improve the Lives of Smallholders, Workers, and Communities



## PILLAR 2

Deliver Positive Environmental Impacts



## PILLAR 3

Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders



## PILLAR 4

Drive Innovation in Sustainable Practices



## About This Report

[GRI 2-2, 2-3, 2-5]

**Welcome to the seventh Musim Mas Group ('Musim Mas' or the 'Group') report, updating the Group's sustainability performance for the 2023 calendar year. It has been prepared in accordance with the Global Reporting Initiative (GRI) Standards, including the GRI 13 Sector Standard for Agriculture, Aquaculture, and Fishing, and the Sustainability Accounting Standards Board (SASB) guidelines.**

GRI and SASB disclosures are included throughout the report and referenced under headings or sub-headings as GRI XXX-XX, GRI 13.X.X, and FB-AG-XXx.x. It also marks the first time we are reporting against the Taskforce on Climate-related Financial Disclosures (TCFD) requirements. This report is designed to be read in tandem with the sustainability disclosures on our [website](#).

▶ [SR2023 GRI Content Index](#)

▶ [SR2023 SASB Index](#)

## Report Scope and Boundaries

This report presents our sustainability performance data for the period of January 1 to December 31, 2023, covering all upstream operations of Musim Mas Group. Data for our midstream and downstream operations, as well as historical data is also disclosed where relevant and available. Given the timing of its publication, this report also includes significant 2024 achievements.

▶ [See also: 2019–2023 Sustainability Performance Data](#)

## Stakeholder Inclusiveness and Review

To ensure that we are responsive to our stakeholders, we consulted our operations teams at the local and site levels, as well as representatives of two media outlets, a sector organization, a global public-private partnership platform, a multi-stakeholder platform, and an academic institution. We also engaged technical experts from the Proforest-Daemeter Partnership (formerly known as Consortium of Resource Experts – CORE) to review the independent smallholder and supply chain-related disclosures in this report.

We are members of several international and sector-wide platforms and adhere to their guidelines and standards. These include the Roundtable on Sustainable Palm Oil (RSPO) and its technical working groups, and the Palm Oil Collaboration Group (POCG).

We also submit our sustainability data to leading benchmarks, such as the Zoological Society of London's Sustainability Policy Transparency Toolkit (ZSL SPOTT), CDP (formerly known as the Carbon Disclosure Project), EcoVadis, the Global Child Forum Benchmark, the World Benchmarking Alliance (WBA) Food and Agriculture Benchmark, the WBA Nature Benchmark, and the Palm Oil Transparency Coalition's (POTC) Importer Assessment.

## Verification and Assurance

The information and data in this report have been audited by the certification bodies of the respective sustainability schemes. We also contracted Ernst & Young LLP (EY) to provide independent limited assurance on selected disclosures in this report.

▶▶ [Assurance Statement](#)



# 2023 Summary Progress

## Key Highlights



### Governance, Recognition, and Assessments

#### Policies, Commitments, and Strategies

- ★ Published new addendum to Sustainability Policy on **Commitment to Children and Human Rights**
- ★ Committed to achieving **net-zero emissions** by 2050 through Science Based Targets Initiative (SBTi)
- ★ Signed first **Sustainability-linked Loan** with Rabobank and HSBC Bank in August 2024
- ★ Launched a **second landscape strategy** in September 2024 to encompass all remaining key landscapes in our target (Riau, South Sumatra, and West Kalimantan), along with two additional landscapes (North Sumatra and Central Kalimantan)

#### Membership, Recognition, and Assessments

- ★ Inaugural **Double 'A'** achievement for **CDP 2023 Ratings**: Forests (A), Water Security (A), Climate Change (B)
- ★ **2023 ZSL SPOTT assessment**: Ranked 7th out of 100 companies (91.8% score)
- ★ **2023 Global Child Forum Benchmark**: Achieved score of 8.7/10, **ranked 2nd** in the "Agricultural Products" sub-category
- ★ Received **Green PROPER** ratings for 11 mills, and **Blue PROPER** ratings for two mills and seven plantations
- ★ Received **RSPO Excellence Award** for Smallholder Impact with GAPSIMA
- ★ Received **Sawit Indonesia Award** for "Most Reputable Palm Oil Company in Empowering Independent Smallholders"
- ★ Together with Standard Chartered Bank (SCB), we won the Best Liquidity and Investments Solution at **The Asset Triple A Treasure Award 2024**



### Certification Progress

- ★ 100% of mills integrated with plantations **certified to RSPO P&C**
- ★ 100% of midstream and downstream palm processing facilities **certified to RSPO SCCS**
- ★ 100% upstream entities (PTs) **certified to ISPO**
- ★ 25 units are **certified to ISCC**
- ★ Our only refinery in Malaysia is **certified to MSPO SCCS**



### Employees and Communities

#### Employees

- ★ **100% employees in Indonesia** covered by collective bargaining agreements
- ★ **>58% reduction in accident rates** since 2019
- ★ **98% of workers' school-age children enrolled in schools**
- ★ Operating **47 childcare centers, 11 kindergartens, and 14 schools**
- ★ **93 scholarships** awarded to deserving students
- ★ **Providing 26 clinics and >2,600 first-aid kits**

#### Communities

- ★ **Contributed >IDR 32.9 billion** (~USD 2.1 million) to CSR
- ★ **Pledged SGD 5 million** (~USD 3.7 million) in donations to charitable causes



### Smallholders

#### Scheme Smallholders

- ★ **100%** of scheme smallholders covered by Musim Mas programs
- ★ **IDR 300 billion** (~USD 19.5 million) income generated from FFB sales
- ★ Conducted **169 training sessions** for scheme smallholders
- ★ **>77%** of scheme smallholder land is **RSPO-certified**

#### Independent Smallholders

- ★ **43,474** independent smallholders covered by Musim Mas programs
- ★ Trained **460 Village Extensions Officers (VEOs)**
- ★ **6,723** smallholders received training from VEOs
- ★ **4,586** smallholders **RSPO certified** and **1,959 ISPO certified** with Musim Mas support to date
- ★ Smallholders have collectively earned **~USD 2.6 million in RSPO credits** to date

### Climate Action and Operational Footprint

- Reported against the voluntary TCFD recommendations for the first time
- Began reporting on Scope 3 emissions
- Completed LCA for selected downstream products, with the scope of cradle to gate, following the ISO 14040 and ISO 14044 frameworks
- Exceeded our target of reducing upstream GHG emission intensity by 55% against 2006 baseline, two years ahead of schedule
- >95% of upstream energy consumption from renewable sources
- >25 million kWh of electricity exported to the national grid

### Conservation, Restoration, and Managing Fires

- Musim Mas operations continue to be 100% deforestation-free
- Shared findings and insights from the South East Asia Rainforest Research Partnership (SEARRP)'s independent biodiversity assessment of our operations with the RSPO
- Managing 28,513 ha of conservation area
- Covered 75 villages under the Fire-Free Village Program (>457,000 ha)
- Rewarded 35 villages for remaining fire-free

### Supplier Progress on NDPE

#### Suppliers NDPE Progress and Engagement

- 98.50%# of suppliers have NDPE commitments (including 100% of new suppliers)
- 96.34% of suppliers have attended NDPE workshops
- 81.86% of suppliers completed the Musim Mas Self-Assessment Tool
- 95.00%\* of supplier volumes are 'Delivering' on No Deforestation commitments, 85.69%\* of supplier volumes are 'Delivering' on No Peat development commitments
- Conducted one TTP training workshop for FFB dealers in Muar, Malaysia with Proforest as part of a joint program with Proforest-Daemeter Partnership and industry peers
- Conducted six in-person and online workshops to train suppliers on NDPE and new digital traceability system

#### Traceability

- Achieved 100% TTM since 2015
- Achieved 98%\* overall TTP<sup>1</sup> in 2023

#### Coconut Supply Base

- Achieved 99% TTP for coconut oil
- Completed one NDPE workshops for coconut suppliers

### Landscapes and Partnerships

- Established new partnership with Bunge to train independent smallholders through Smallholders Hub in Sambas
- Continued Biodiverse & Inclusive Palm Oil Supply Chain (BIPOSC) partnership with L3F, SNV, ICRAF, Danone, L'Oréal and Mars Incorporated to advance regenerative agriculture for independent smallholders in Labuhanbatu
- Continued ETH Zurich research program on how Musim Mas' Smallholders Hubs programs can drive and deliver on sustainability goals
- Renewed partnerships with AAK, and Nestlé to address deforestation outside concession areas through Smallholders Hub in Subulussalam
- Renewed partnership with General Mills to integrate smallholders into the sustainable palm oil supply chain through Smallholders Hub in Aceh Singkil



<sup>1</sup> Traceability to plantation (TTP) refers to traceability to place of production, i.e., a company's concession, a farm, or a village for certain FFB dealers and/or smallholders.

# EY has performed limited assurance procedures on this figure.

\* These figures have been independently verified by Control Union (Malaysia) Sdn. Bhd. See the verification statements for IRE and TTP.

## Targets and Progress

This section outlines our progress against Musim Mas sustainability targets, which includes targets from our 2022 [No Deforestation, No Peat, and No Exploitation \(NDPE\) roadmap](#), and our [Commitment to Children and Human Rights](#). Newly adopted targets from the Tropical Forest Alliance’s (TFA) [Agriculture Sector Roadmap to 1.5°C](#) as well as our 2022 [Biodiversity and Climate Resiliency Action Plan](#) are consolidated in the following tables. Targets from the TFA roadmap are marked with the icon .

While our target reporting aligns with the four main pillars of our [Sustainability Policy](#), some targets may cut across multiple pillars and are reflected accordingly. Our pillars and targets also align with the United Nations Sustainable Development Goals (for a more comprehensive overview, see [Musim Mas’ Contributions to the SDGs](#)).

### PILLAR 1 Improve the Lives of Smallholders, Workers, and Communities



Target	Year	Progress in 2023, unless otherwise stated	Status
<b>Musim Mas Operations</b>			
Update sustainability commitments on protecting children’s rights	2023	Strengthened commitments to protecting children’s rights in line with the UN Convention on the Rights of the Child through an addendum to our Sustainability Policy in July 2023.	 <b>Achieved</b>
Develop and implement Human Rights Due Diligence (HRDD) strategy for Musim Mas operations	2025	We continue to manage human rights risks through past and ongoing programs and efforts. We are on track to launch our HRDD strategy by 2025.	 <b>Progress made</b>
Certify 100% of scheme smallholders	2025 <sup>2</sup>	RSPO-certified scheme smallholder area increased from 6,039 ha to 6,163 ha; >77% of scheme smallholder areas are RSPO-certified.	 <b>Progress made</b>
Zero fatalities	Ongoing	We regret to report three fatalities, two at our upstream operations in Kalimantan, and one in Sumatra.	 <b>Not achieved</b>
<b>Independent Smallholders</b>			
Initiate at least two pilot projects to trial regenerative agriculture	2025	Partnered with L3F, SNV, ICRAF, Danone, L’Oréal and Mars Incorporated for the BIPOSC program since 2021 to promote regenerative agriculture practices among independent smallholders in Labuhanbatu, North Sumatra.	 <b>Progress made</b>
Continue to improve independent smallholder livelihoods through Smallholders Hubs - Training for Trainers	Ongoing	Trained 460 VEOs, who have in turn, trained 6,723 smallholders.	 <b>Progress made</b>
Increase number of smallholders complying with NDPE requirements through RSPO and ISPO certification	Ongoing	Supported 4,586 smallholders in obtaining RSPO certification, and 1,959 smallholders in obtaining ISPO certification to date.	 <b>Progress made</b>

<sup>2</sup> This target year is for existing scheme smallholders. Target is subject to change with the inclusion of new scheme smallholders in future.

**PILLAR 2** Deliver Positive Environmental Impacts



Target	Year	Progress in 2023, unless otherwise stated	Status
Develop Group-level emissions reduction targets in line with the Science Based Targets initiative (SBTi)	2024	Committed to achieving net-zero emissions by 2050 through SBTi. We have developed near-and long-term emissions reduction targets following the SBTi framework and are undergoing validation by SBTi.	Progress made
Report own and supply chain emissions from land use change	2024	Our Scope 1 and 3 emissions disclosures include land-use change emissions from our own operations and supply chain.	Achieved
Develop a climate resiliency and mitigation strategy for our upstream operations, based on a climate risk assessment completed by 2023	2024	Completed climate risk assessment and scenario analysis, the findings of which will inform the development of our climate resiliency and mitigation strategy.	Progress made
Reduce GHG emission intensity by 55% against 2006 baseline at RSPO-certified upstream operations	2025	We exceeded our target two years ahead of schedule, reaching 2.66 <sup>#</sup> MT CO <sub>2</sub> e/MT CPO.	Achieved
Maintain mill water usage intensity below 1.2 m <sup>3</sup> /MT FFB processed	Ongoing	Our average mill water usage intensity was 1.12 <sup>#</sup> m <sup>3</sup> /MT FFB.	Achieved
Ensure 100% of Musim Mas refineries have completed NDPE IRF profiles		See Pillar 3 targets	
Supply chain traceability and deforestation-free targets		See Pillar 3 targets	

# EY has performed limited assurance procedures on these figures.





**PILLAR 3** Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders



Target	Year	Progress in 2023, unless otherwise stated	Status
Achieve 100% overall traceability to plantation <sup>3</sup>	2025	Achieved 98%* traceability to plantation, up from 97% in 2022.	Progress made
Ensure 100% of supply chain is deforestation-free	2025	Developed a methodology to track and report deforestation-free supply based on our traceability and risk management frameworks. Achieved 99.41%* deforestation-free supply chain.	Progress made
Maintain 100% completion of NDPE IRF profiles for Musim Mas refineries	Year-on-year	Maintained 100% completion of NDPE IRF for all refineries (see <a href="#">Musim Mas website</a> ).	Achieved
Ensure 100% of supplier volumes are 'Delivering' on No Deforestation and No Peat (NDP) commitments, based on the NDPE IRF framework	2025	95.00%* of supplier volumes are 'Delivering' on No Deforestation commitments, up from 89.05% in 2022. 95.69%* of all supplying volumes are 'Delivering' on No Peat commitments, up from 81.26% in 2022.	Progress made
Ensure suppliers progress towards implementing NDPE best practices	2025	98.50%# of suppliers have NDPE commitments (including 100% of new suppliers); 96.34% of suppliers have attended NDPE workshops; 81.86% of suppliers have completed the Musim Mas Self-Assessment Tool (SAT).	Progress made
Develop and implement HRDD strategy for third-party suppliers	2025	Piloted the draft NDPE IRF for land and labour rights, and integrated key criteria including HRDD elements into the Musim Mas SAT.	Progress made

<sup>3</sup> Traceability to plantation (TTP) refers to traceability to the place of production, i.e., a company's concession, a farm, or a village for certain FFB dealers and/or smallholders.

# EY has performed limited assurance procedures on these figures.

\* These figures have been independently verified by Control Union (Malaysia) Sdn. Bhd. See the verification statements for [TTP](#), [deforestation-free](#), and [IRF](#).


**PILLAR 4** Drive Innovation in Sustainable Practices

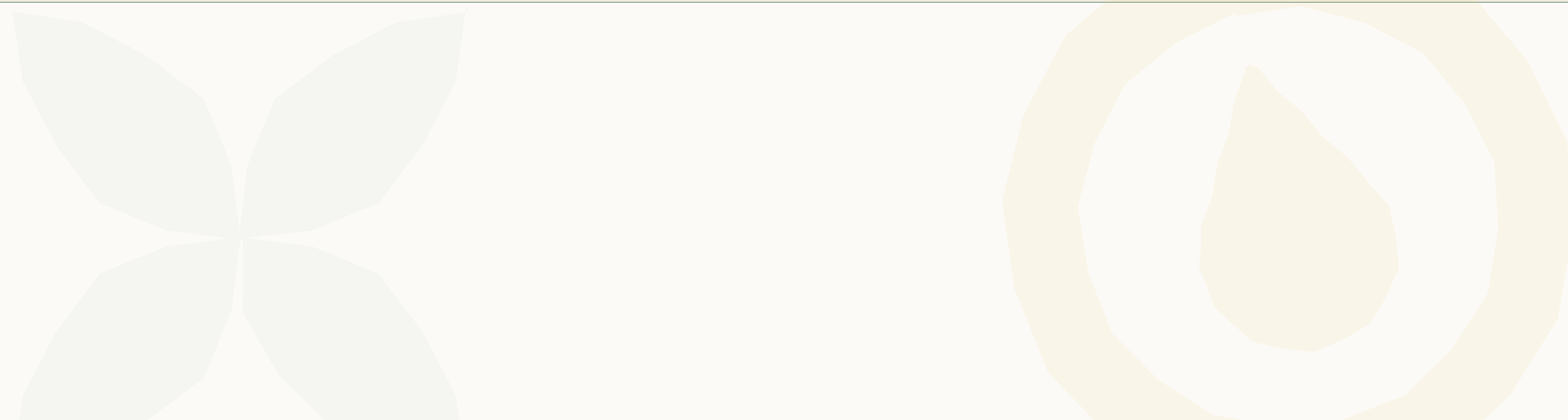


Target	Year	Progress in 2023, unless otherwise stated	Status
 Roll-out landscape strategies for key landscapes: Aceh, Riau, South Sumatra, and West Kalimantan	2025	We launched our <a href="#">first landscape strategy</a> focusing on Aceh in 2020. In September 2024, we launched a <a href="#">second comprehensive strategy</a> to cover all remaining key landscapes in our target (Riau, South Sumatra, and West Kalimantan), with two additional landscapes covered (North Sumatra and Central Kalimantan).	 <b>Achieved</b>
Increase support for independent smallholders through multi-stakeholder collaborations	Ongoing	We began a new partnership with Bunge in Sambas, West Kalimantan, and continued/renewed our partnerships with: <ul style="list-style-type: none"> <li>• L3F, SNV, ICRAF, Danone, L'Oréal and Mars Incorporated for the BIPOSC program in Labuhanbatu.</li> <li>• General Mills in Aceh Singkil.</li> <li>• AAK and Nestlé in Subulussalam.</li> </ul>	 <b>Progress made</b>

**CROSS-CUTTING ALL PILLARS** Sustainability Certification



Target	Year	Progress in 2023, unless otherwise stated	Status
100% of Musim Mas' upstream entities (PTs) in Indonesia ISPO certified	2025	As of August 2023, all Musim Mas' PTs have received ISPO certification.	 <b>Achieved</b>



# Chairman Statement

[GRI 2-22]

Dear Stakeholders,

As we present our Sustainability Report 2023, we are faced with three significant and converging long-term developments that are critical to our industry: climate change, regulatory intensification and the viability of independent smallholders. In this Chairman's Statement, I share our reflections, plans and actions taken as we navigate this complex and rapidly evolving landscape.

Naturally, climate change demands our immediate attention. Its impacts are far-reaching, affecting the environment, economic stability, and supply chain resilience. The escalating climate crisis has also spurred an uncertain regulatory environment. Businesses must therefore be able to continuously adapt to regulatory changes and the broader landscape of risks and possibilities. Smallholders too need to be equipped to keep up with these changes.



**\* Readiness on Climate Action**

Musim Mas is making great strides in taking climate action. We have established ambitious targets to reduce our carbon footprint and mitigate environmental impacts across our supply chain. Our steady work and proactive approach over the past decades have enabled us to meet our ambitious target of reducing upstream greenhouse gas (GHG) emissions by 55% against a 2006 baseline, two years ahead of our 2025 target; in part by equipping 17 of our mills with methane capture facilities.

Furthermore, we are now committed to net-zero by 2050 and have submitted targets for validation by the Science Based Targets initiative (SBTi) covering Scopes 1, 2, and 3 emissions. This is a significant commitment, underscoring our confidence and track record in meeting our environmental targets. In addition, true to our long-term commitment to collaboration, we joined 13 other companies as signatories of the Agriculture Sector Roadmap, announced at COP27. The Roadmap aims to halt commodity-linked deforestation in line with the 1.5°C warming pathway.

Last but not least, I am delighted to announce that this year, we achieved a double 'A' score on the CDP Forests and Water Security categories, making us the only palm oil company on the CDP 'double A' list. This recognition, awarded to only a select few of the 21,000 companies assessed, signifies our exceptional performance in addressing climate change and deforestation, as well as our commitment to transparency and environmental stewardship.



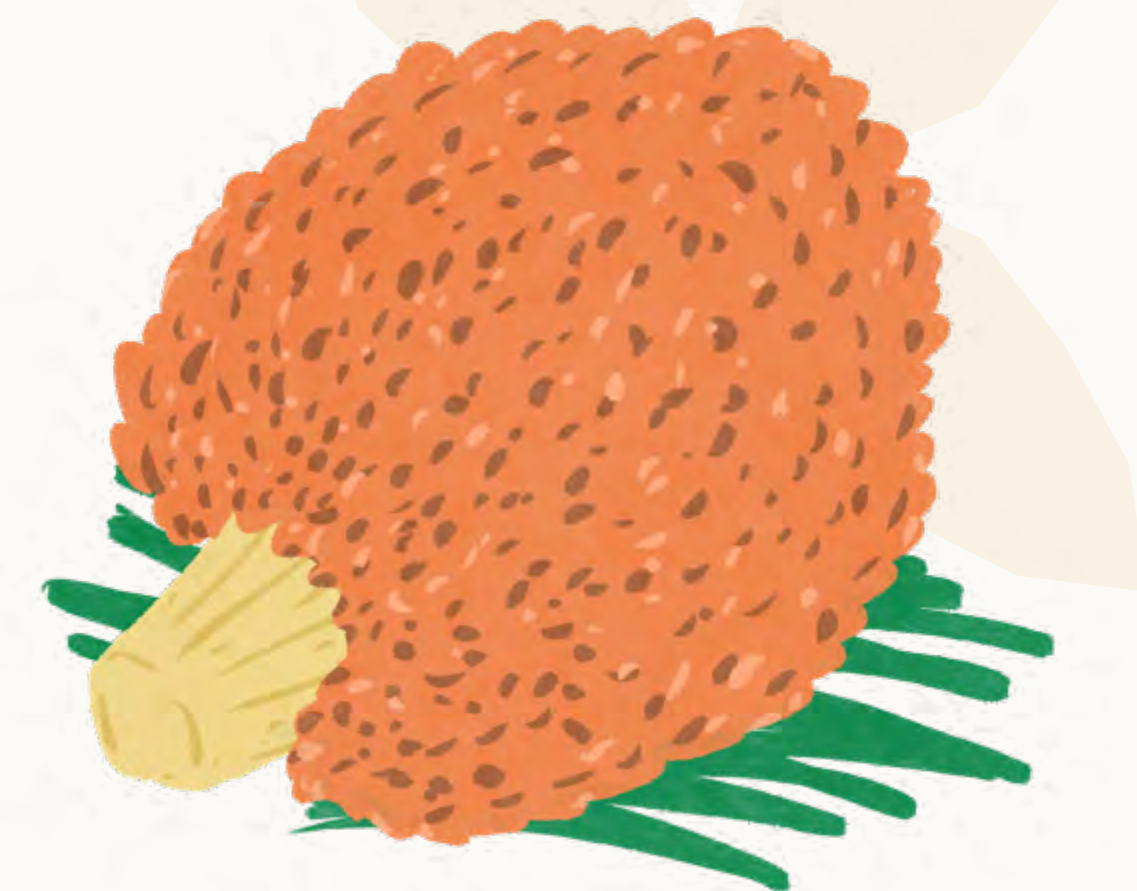
**\* Readiness to Respond to Evolving Regulatory Requirements**

The European market is vital for Musim Mas. It is an advanced market where product quality and sustainability are equally valued. 2023 saw the introduction of the European Union Deforestation Regulation (EUDR) mandating that from 30 December 2024, seven commodities, including palm oil and any derivative products, must be free of deforestation and legally produced to be placed on the EU market. However, demonstrating compliance throughout a supply chain is no simple task. This can only be achieved through effective traceability and due diligence to ensure that all supply chain actors, including smallholders and third-party suppliers, are compliant with the EUDR.

In fact, the EUDR has dovetailed with our own robust preparations to ensure 100% of our supply chain is deforestation-free by 2025, as detailed in our 'No Deforestation, No Peat, and No Exploitation' (NDPE) Roadmap. This includes adapting our comprehensive risk assessment measures and establishing specific supply and processing chains. As a result, we are ready to supply our EU customers from 30 December 2024 in compliance with the

EUDR and our dedicated due diligence and segregation procedures have already been established and undergone independent verification. We have also started preparing for other forthcoming EU regulations, such as the Corporate Sustainability Reporting Directive (CSRD) and the Corporate Sustainability Due Diligence Directive (CSDDD).

As a large private company, we are taking steps to adopt strict disclosure requirements to the level required of a public company. This year, we have aligned our reporting process with the Taskforce on Climate-related Financial Disclosures (TCFD) framework to more effectively disclose climate related risks, in line with International Sustainability Standards Board (ISSB) standards and Singapore's mandatory climate disclosures that come into force from 2025.



## \* Readiness to Future-Proof Our Supply Base: Smallholders and High-Yielding Seedlings

Smallholders are integral to the future of the palm oil industry and we are proud of our longstanding mission to protect their livelihoods, improve their lives and support their communities. We continue to empower smallholders through capacity-building programs, including practical programs on financial literacy and skills development. With EUDR on the horizon, the certification of smallholders has become imperative not only to our business, but to the long-term viability of smallholders as well. Our efforts include training over 43,000 independent smallholders and facilitating the Roundtable on Sustainable Palm Oil (RSPO) certification of 4,586 smallholders and the Indonesian Sustainable Palm Oil (ISPO) certification of an additional 1,959 smallholders. We have also trained 460 Village Extension Officers to extend our outreach in smallholder communities. This year, we also launched the Women Smallholders Program to empower women in these communities further, entrenching our commitment to inclusivity. Our smallholders' initiatives have earned

numerous accolades, including the RSPO Excellence Award for Smallholders Impact and the *Majalah Sawit Indonesia* Award for the 'Most Reputable Palm Oil Company Empowering Independent Smallholders' in 2023.

Concurrently, we continue to advance our productivity through cutting-edge research and development. In 2023, after more than a decade of R&D, we launched the Musim Mas GS Series of oil palm planting material. The new varieties are designed to enhance productivity, improve land-use efficiency and achieve high yields. This achievement is a testament to the strength and value of our R&D efforts and reminds us of the need to constantly grow and improve as a leader in seed-to-shelf agribusiness.

### \* Looking Ahead

Musim Mas remains steadfast in our belief that a sustainable palm oil industry is crucial to the environmental, social and economic future of our region. We will continue to lead by example, fulfilling our unwavering commitment to sustainability and ensuring our stakeholders remain a cornerstone of our business.

On that note, we are already looking towards our next sustainability milestone. The forthcoming revision of our Sustainability Policy in 2025 will further crystallize stakeholder expectations, climate goals, net zero commitments, sustainability ratings, and human rights due diligence. We will also be streamlining the policy for greater clarity and reiterating our support for landscapes and smallholders, building on our existing programs.

Sustainability is the key to the longevity of our industry upon which millions of livelihoods depend. We will not shirk from our obligations toward our lands, our communities and our stakeholders. Musim Mas is ready to do its part and more.

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**Executive Chairman and CEO**  
Musim Mas Group



# About Musim Mas

[GRI 2-1, 2-6, 201-1] [SASB FB-AG-000.A,

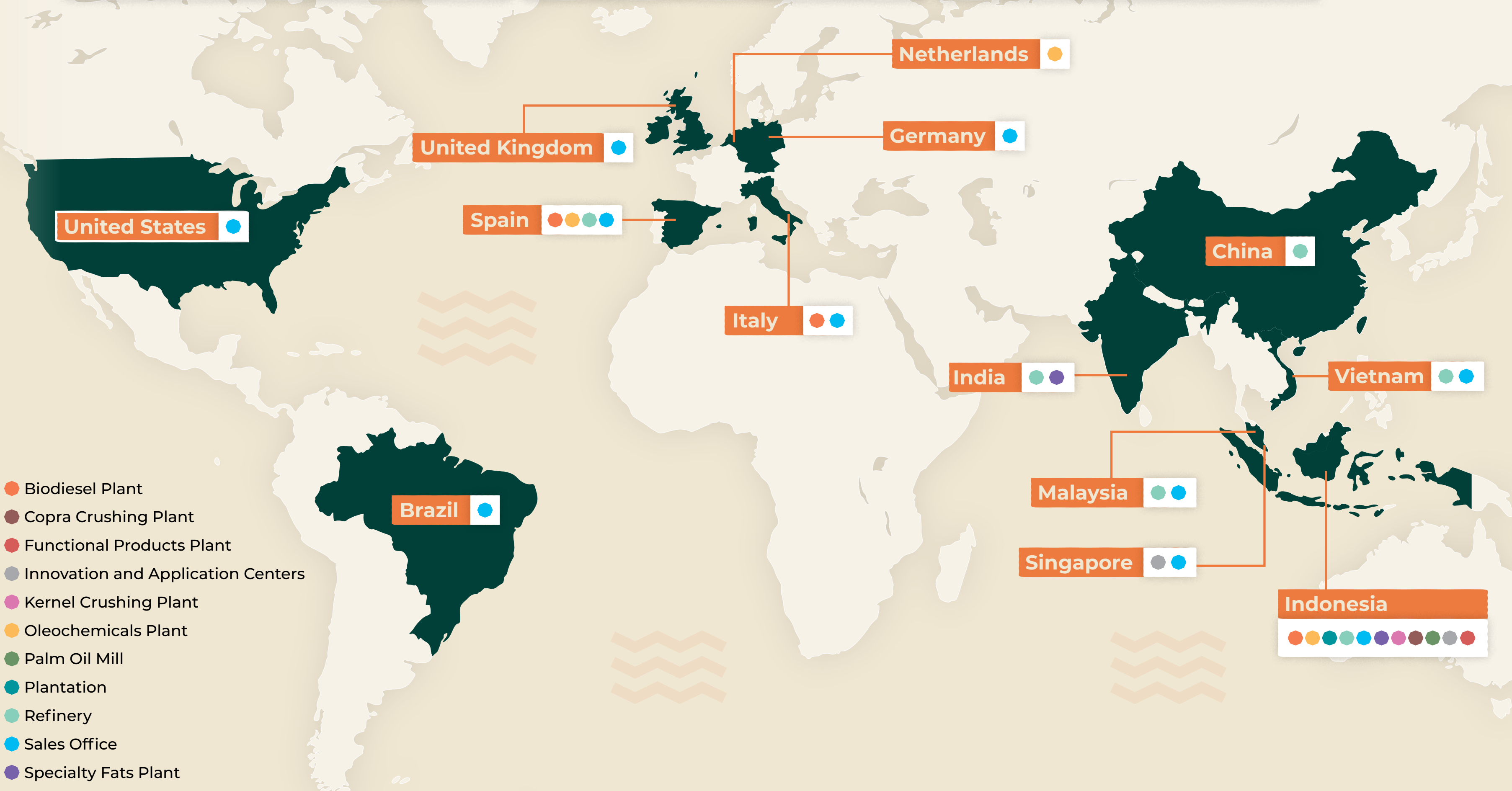
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## Our Business in Brief

Headquartered in Singapore, Musim Mas Group (“Musim Mas” or the “Group”) is a private company and one of the world’s largest integrated palm oil companies. With a presence in 13 countries, we are engaged in every aspect of the palm oil supply chain, from upstream to downstream operations, including plantations, milling, refining, manufacturing, and commercial and consumer sales, with our primary operations in Indonesia. Our integrated business model allows us to produce diverse, raw and processed palm-based industrial and consumer products catering to the global market. A small part of our business is in coconut oil.

### Global and Operational Presence

- 🌳 202,690 ha of land bank
- 🌳 179,299 ha of land managed
- 🏭 18 palm oil mills
- 🌀 9 kernel crushing plants
- 🌀 1 copra crushing plant
- 🏭 23 refineries
- 🌿 11 oleochemicals plants
- 🏭 8 specialty fats plants
- 🏭 8 biodiesel plants<sup>4</sup>
- 🏭 4 functional products plants
- 💡 2 innovation and application centers
- 👥 >42,000 employees worldwide
- 💰 USD 8.9 billion in revenue

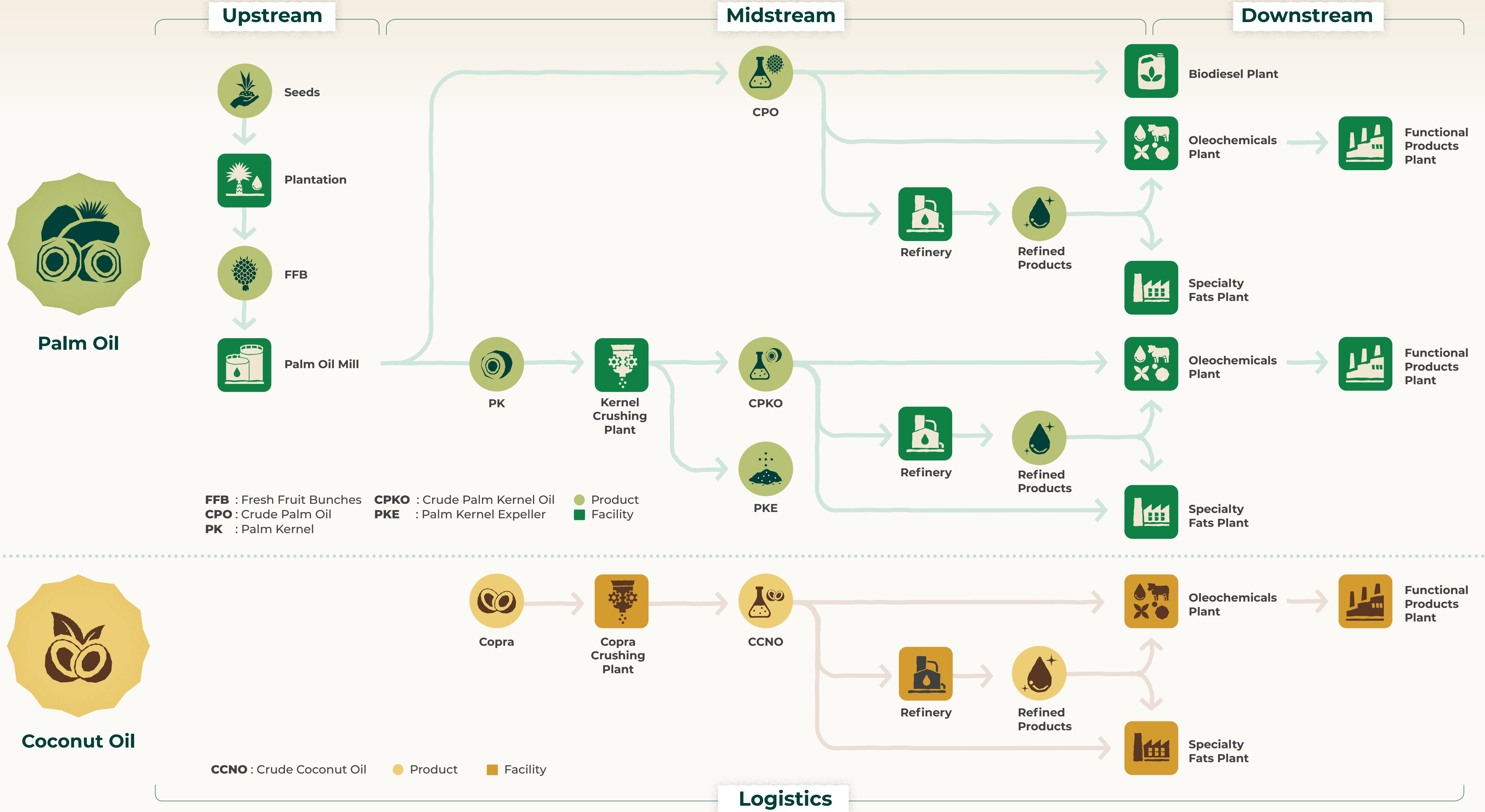


Musim Mas Integrated Business

Global Presence

<sup>4</sup> This figure has been restated from our 2022 Sustainability Report.

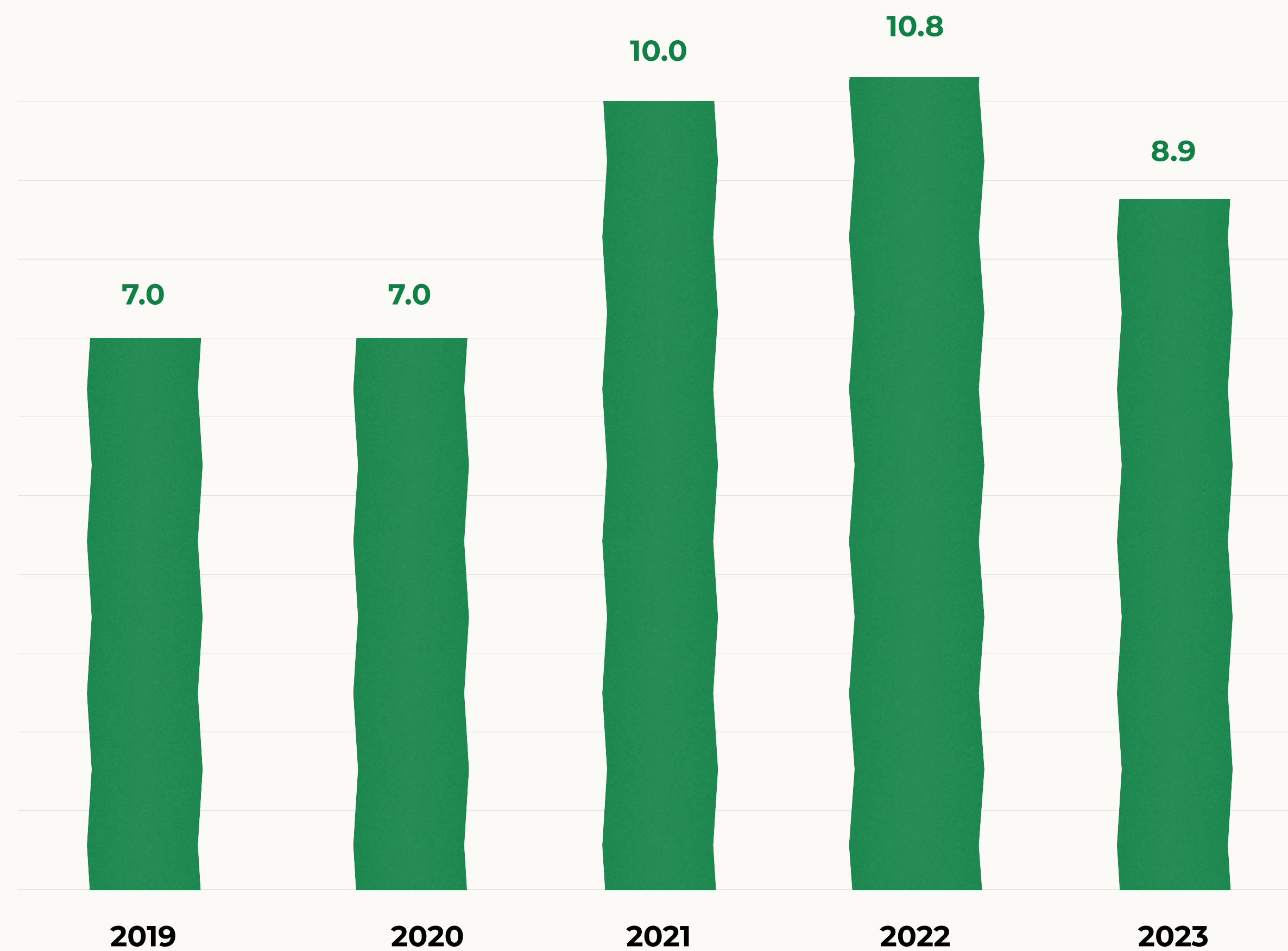
# Musim Mas' Integrated Business



## Financial Overview

The Group's 2023 revenues were USD 8.9 billion, a USD 1.9 billion reduction from 2022. This was mainly due to lower commodity prices in 2023, whereas exceptional market conditions drove higher sales in 2022.

Revenue 2019-2023 (USD Billion)

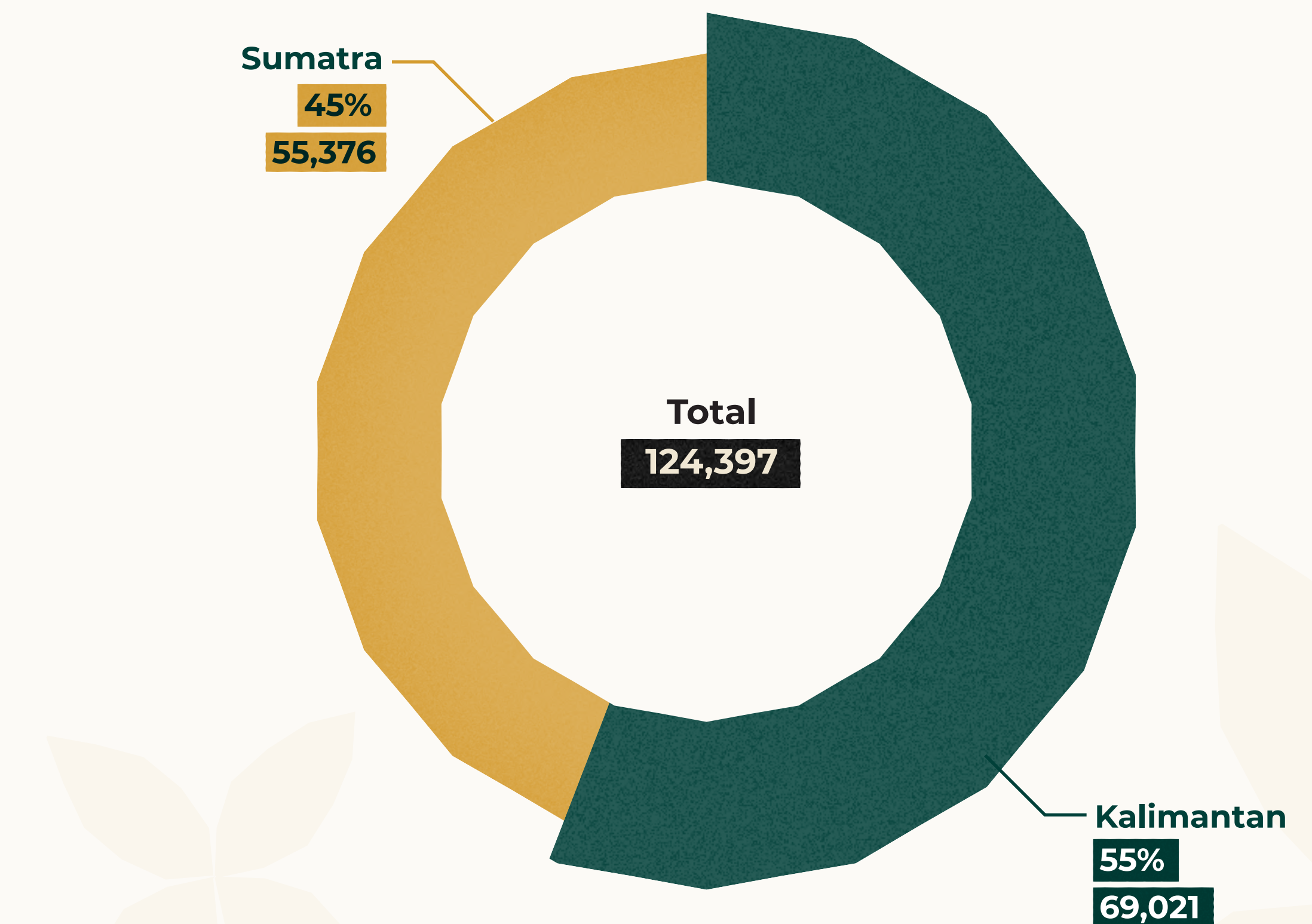


## Operational Overview

### Upstream Operations

We manage a 202,690 hectare (ha) landbank in Sumatra and Kalimantan, including 124,397 ha of planted area. Our landbank has grown in recent years with the expansion of a plantation in Kalimantan in 2023. We also manage 18 palm oil mills as part of our upstream operations.

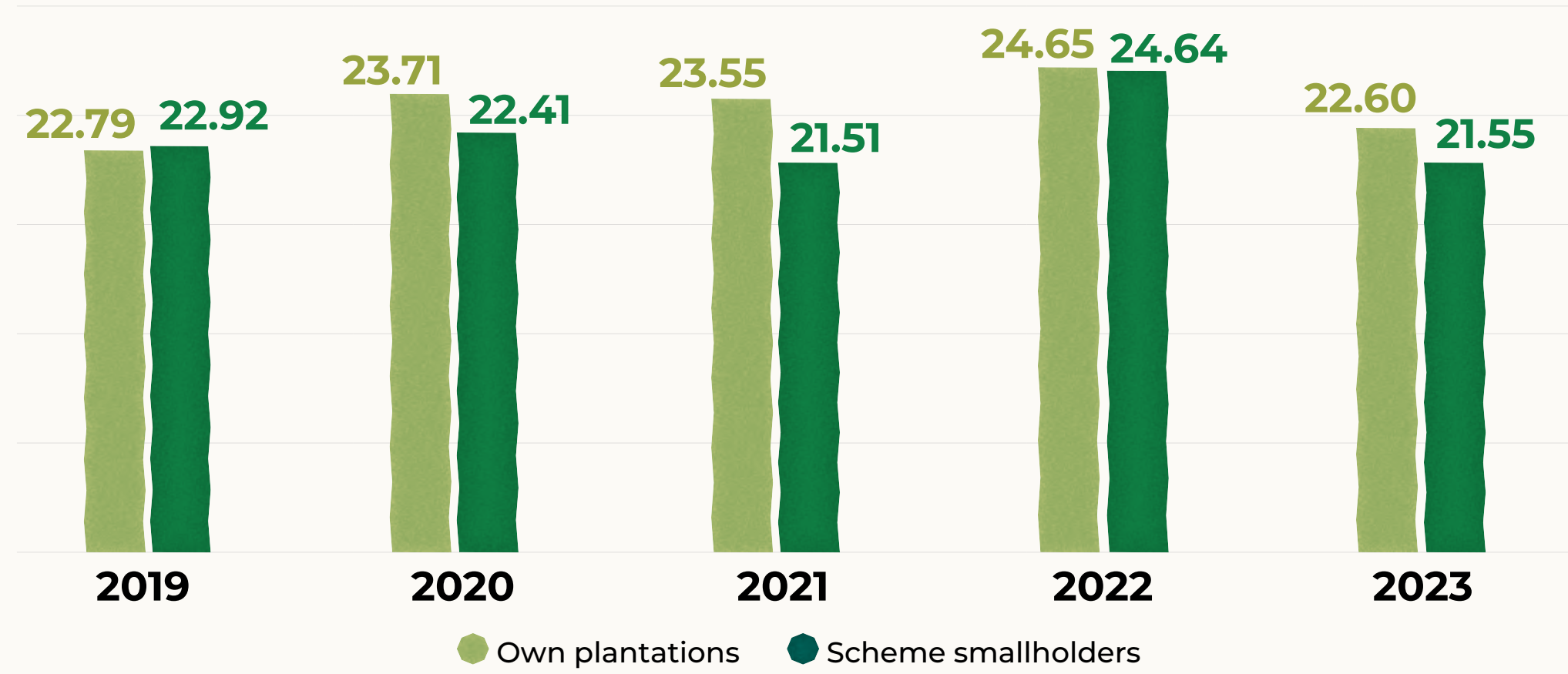
Musim Mas Planted Area by Region 2023 (% , ha)



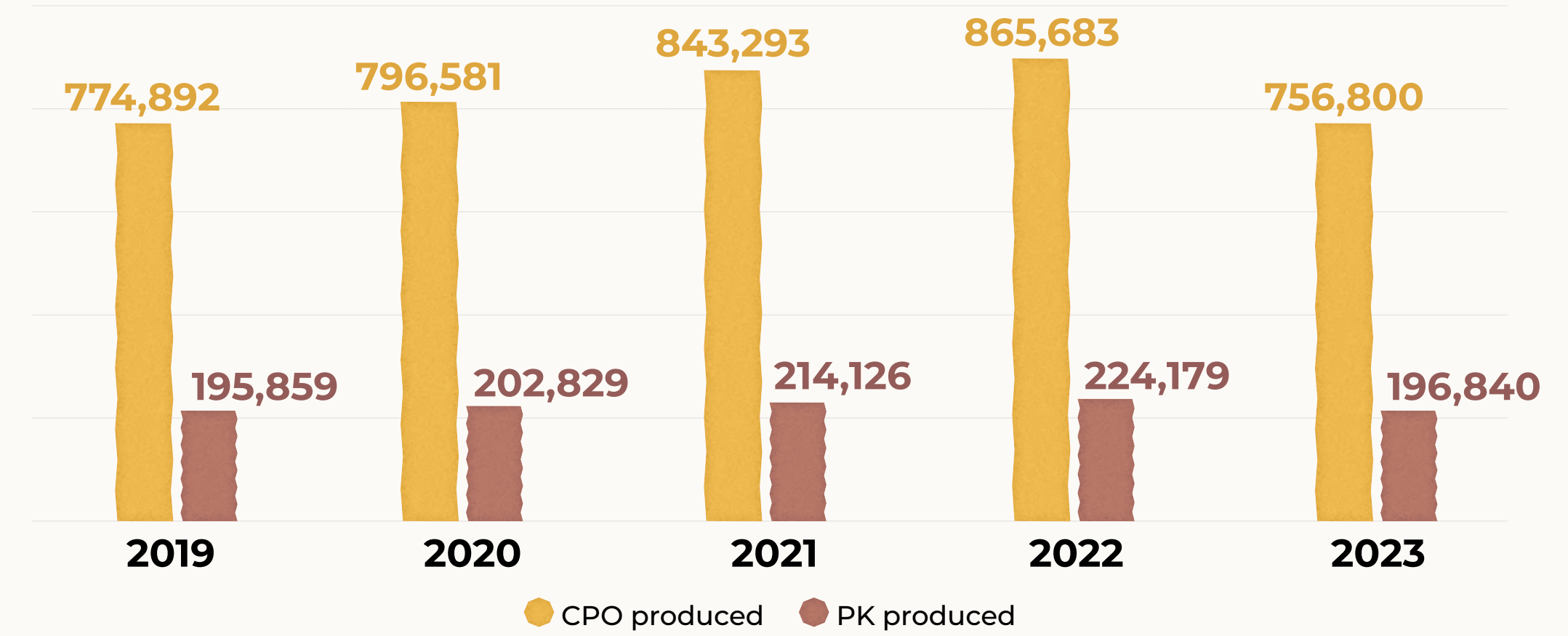


In 2023, our overall yield of fresh fruit bunches (FFB), as well as processing and production of crude palm oil (CPO) and palm kernel (PK), fell to the lowest levels since 2019. A key factor contributing to this decline was the increase in replanting activities during the year. Extraction rates have remained relatively stable at our operations, with a slight increase in 2023 compared to previous years.

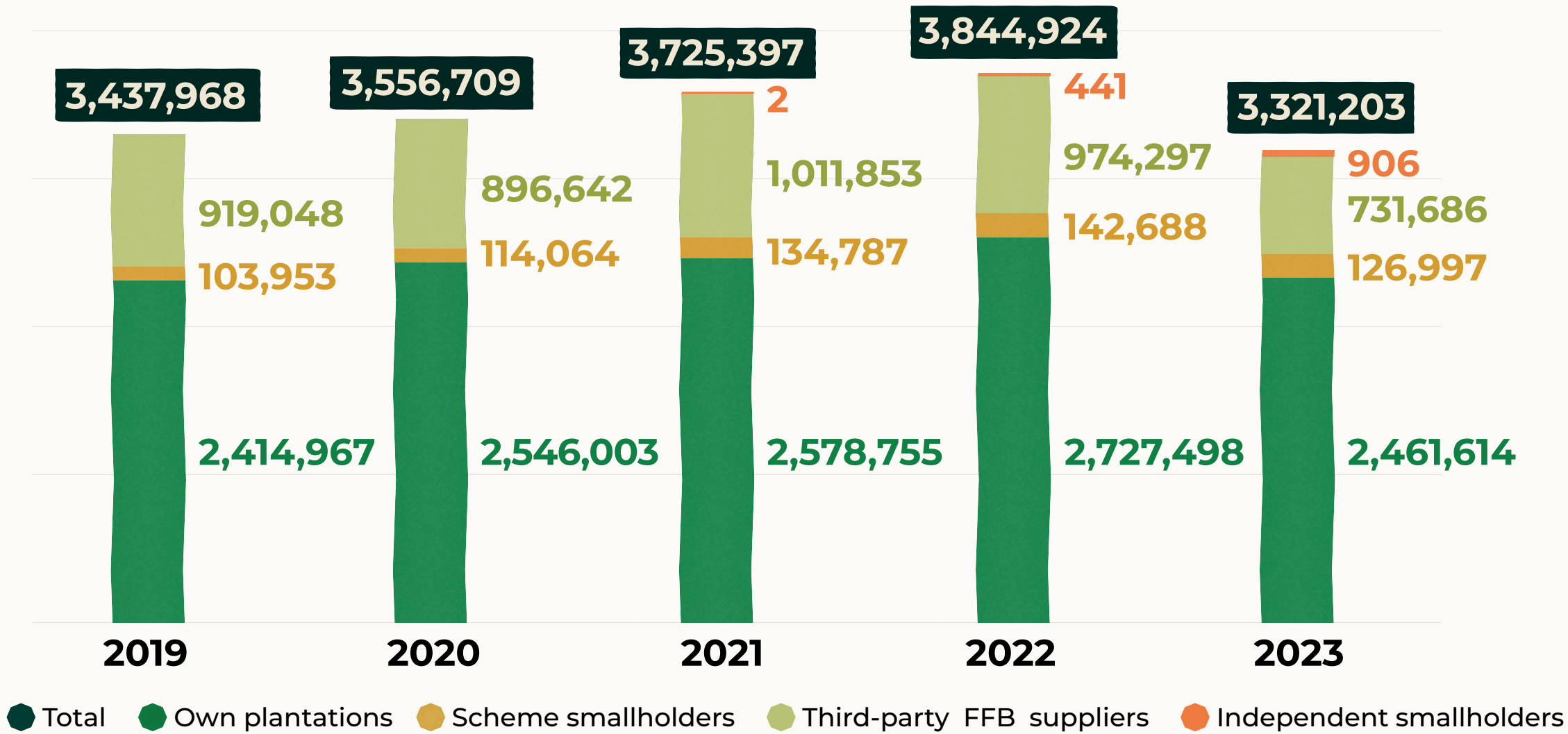
FFB Yield 2019-2023 (MT FFB/ha)



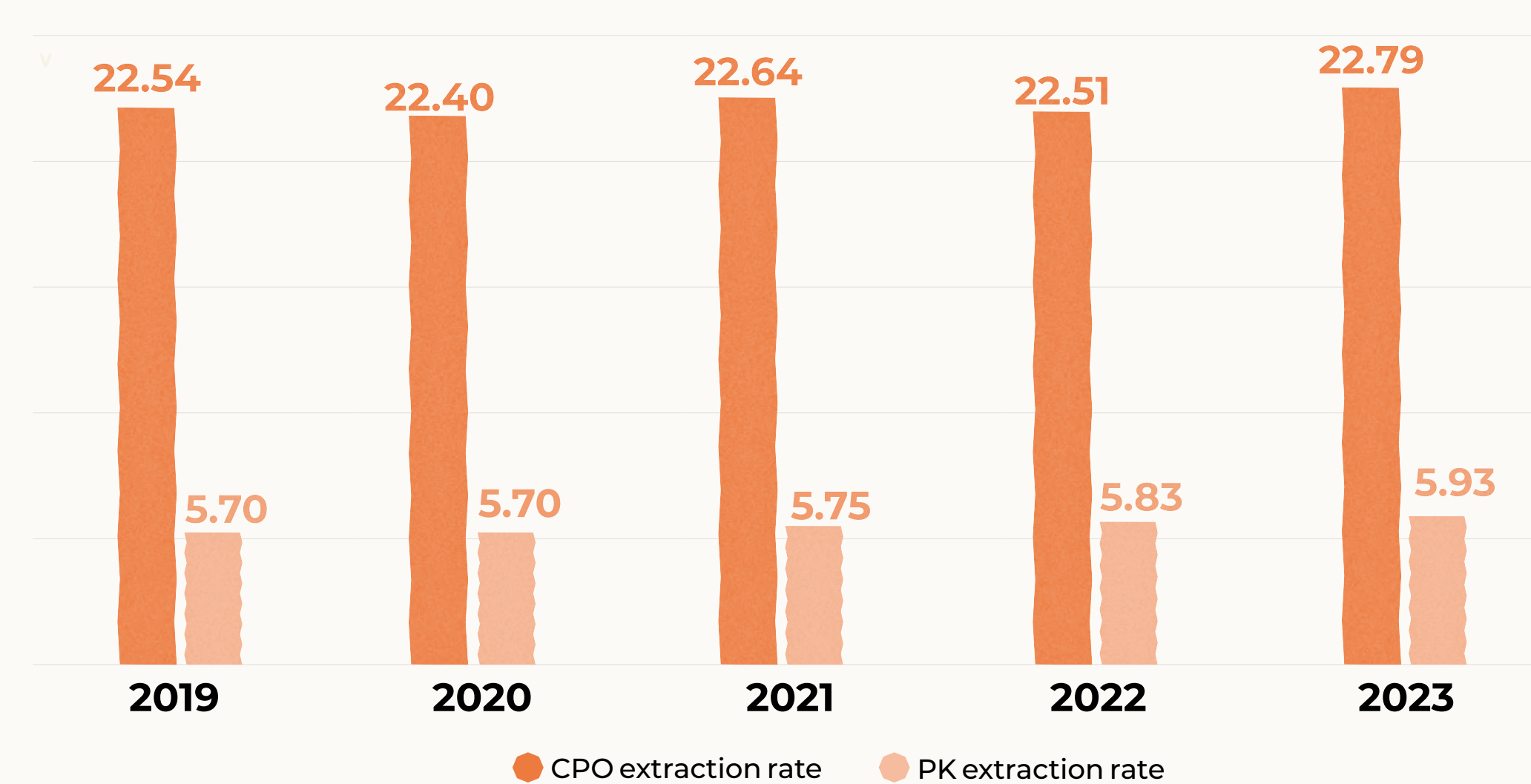
CPO and PK Produced 2019-2023 (MT)



FFB Processed by Source 2019-2023 (MT)



Extraction Rates 2019-2023 (%)



Note:

- 2022 data on FFB from own plantations has been restated.
- We began reporting FFB directly sourced from independent smallholders in 2021. Previously, these volumes were reported as part of the total volumes sourced from all third-party FFB suppliers.

## \* Midstream Operations

Our midstream operations comprise nine kernel crushing plants in Sumatra, Kalimantan, and Sulawesi that process PK into crude palm kernel oil (CPKO). We also operate 23 refineries that refine and process CPKO and CPO into edible oils and other intermediate products in these areas. We sell the by-product of the crushing plant process – palm kernel expeller (PKE) to third parties for various applications, including animal feed.



We also operate a copra crushing plant in Madidir, Bitung, in the North Sulawesi region. It produces coconut oil from copra sourced from independent smallholders. The coconut oil is sent to our KIM II complex in North Sumatra for further refining. In addition to the coconut oil we produce, we also source a small proportion of our coconut oil supply from third-party producers.

[How is Coconut Processed from a Plant into Oil and Oleochemicals](#)

## \* Downstream Operations

Our downstream operations include eight specialty fats, 11 oleochemicals plants and four functional products plants globally. These facilities produce high-quality palm oil-based, palm kernel oil-based, and coconut oil-based product ingredients for a diverse range of downstream consumer and industrial applications, including food and beverages, personal care and cosmetics, pharmaceuticals, and plastics. We also manufacture packaged consumer goods for our house brands and private-label products for well-known brands. In addition, we operate eight biodiesel plants that cater to the global demand for sustainable fuel.<sup>5</sup>

[Musim Products](#)

Musim Mas operates an extensive and efficient logistics network to sell and distribute our products. It comprises tankers, tugboats, and other vessels supported by our Singapore-based global marketing division, Inter-Continental Oils and Fats (ICOF), and its satellite offices in Asia, Europe, the United States, and South America.

[How Is Palm Oil Transported? Navigating the Journey from Plantation to Supermarket Shelf](#)

## \* R&D

Musim Mas owns and operates two innovation and application centers in Singapore and Indonesia. These centers are equipped with state-of-the-art facilities that leverage advanced technologies and cutting-edge innovations, enabling us to stay ahead of market trends, product trends, customer preferences, and customer requirements. Our centers also provide application expertise and technical support to customers worldwide.

[Research and Development Centers](#)

We operate a Genetic and Agriculture Research Center in Riau, which focuses on advancing research and development in key agronomic areas. These include optimizing crop protection, improving peat management on our plantations, and developing oil palm varieties with superior genetic traits.

[Yield and Extraction Improvements](#)

[Driving Innovation in Sustainable Practices](#)



*In 2023, we released four new oil palm seed varieties (the Musim Mas GS Series) with traits that result in enhanced yield, land-use efficiency, and productivity.*



<sup>5</sup> This figure has been restated from our 2022 Sustainability Report. Musim Mas currently has eight operational biodiesel plants across our operations.

# Approach to Sustainability

[GRI 2-23, 2-24]

**Guided by our 2020 Sustainability Policy and our latest No Deforestation, No Peat, and No Exploitation (NDPE) roadmap, we are unwavering in our commitment to meeting and exceeding the strictest sustainability standards across our operations. Our policy and commitments extend to the third parties we work with, including our suppliers and contractors.**

Given the size and reach of our operations, as well as the ever-evolving sustainability issues and challenges, we proactively review our policies regularly to ensure they remain relevant and effective. We are currently reviewing our 2020 Sustainability Policy and expect to launch a revised policy in 2025.

## Commitment to Children’s and Human Rights 2023-2025

Upholding children’s and human rights are a critical component of Musim Mas’ sustainability commitments, as demonstrated by our active participation in the Roundtable on Sustainable Palm

Oil (RSPO), the recently concluded Palm Oil Innovation Group (POIG), and more recently, the United Nations Global Compact (UNGC).

In July 2023, we published an addendum to our Sustainability Policy to strengthen our commitments to protecting children’s rights based on the UN Convention on the Rights of the Child; as well as to upholding human rights according to the UN Guiding Principles on Business and Human Rights, national regulations, and fundamental International Labour Organization (ILO) conventions. The commitment applies to all Musim Mas operations and its suppliers, and further embeds respect for children’s and human rights into our business strategies and decisions.

» Ensuring No Child or Forced Labour

» Improving Our Labour and Human Rights Practices

## Coconut Sustainability



Since 2022, we have extended our sustainability commitments beyond our main operations in palm oil to include our coconut oil business. Although the coconut industry is still in the preliminary stages of developing a comprehensive sustainable production standard, we achieved significant progress for copra traceability in 2023 by leveraging our extensive experience and expertise in palm oil traceability.

» Sustainable Coconut Sourcing Strategy

» Pillar 3: Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders



## Contributing to the SDGs

We recognize the role of businesses in the success of the United Nations' Sustainable Development Agenda and the importance of its Sustainable Development Goals (SDGs) in establishing a common language to communicate sustainability progress.

Since 2021, we have defined priority goals and targets we directly contribute to as our "Primary SDGs" and subordinate goals and targets we directly or indirectly contribute to as our "Secondary SDGs". The corresponding SDG icons are displayed throughout this report. For more information, see [Musim Mas' Contributions to the SDGs](#).



# Materiality

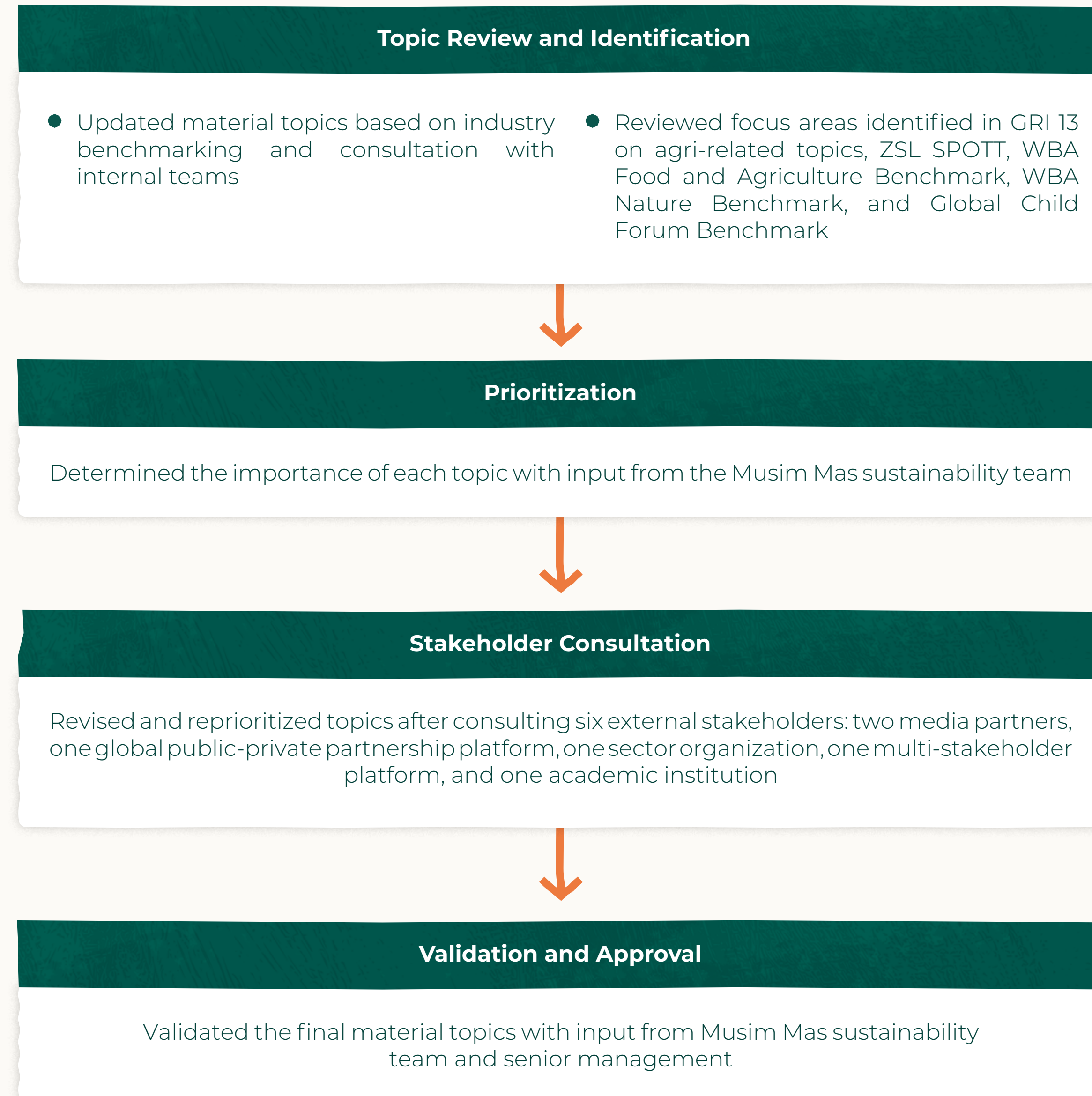
[GRI 2-14, 2-29, 3-1, 3-2]

This report covers the material environmental, social, and governance (ESG)-related topics most relevant to our business and stakeholders. These topics are reviewed and updated annually to reflect Musim Mas’ actual and potential impacts. They are aligned with the four pillars of our Sustainability Policy and the SDGs to which we contribute.

In Q1 2024, we also considered responsible marketing and the environmental and community impacts on children in our materiality review. Musim Mas takes children’s rights seriously and is committed to safeguarding children’s welfare and increasing our positive impacts in the communities where we operate.

 [Commitment to Children and Human Rights](#)

## ✦ Materiality Process



## ✦ Changes to Material Topics

### Revised Topic Name

**‘Biodiversity, conservation, and restoration’** updates ‘Conservation and management of HCV, HCS, and peat areas’ to better align with our wider global focus and reporting trends

### Removed Topic

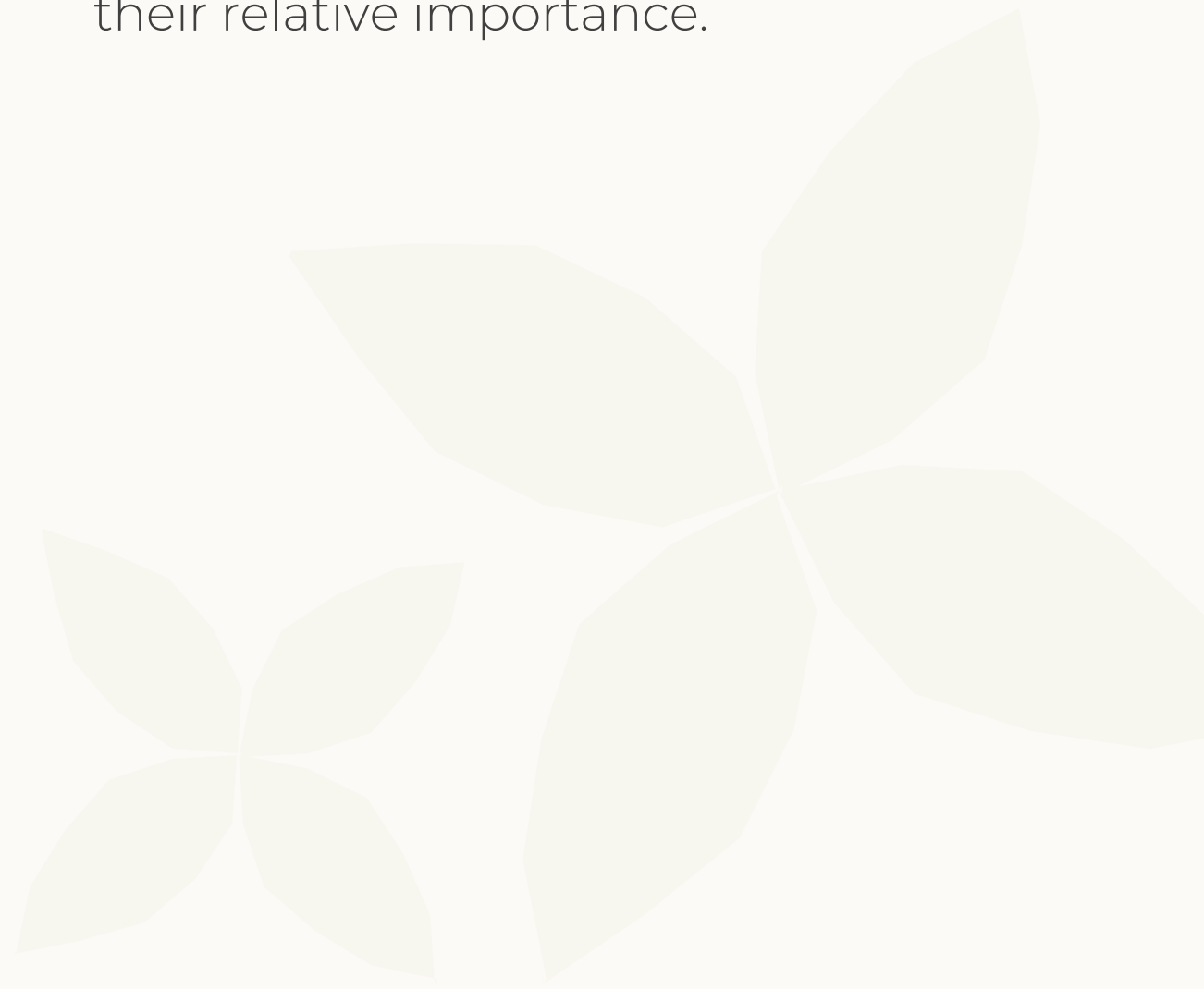
‘Business continuity’ has been removed but is still a critical focus area for all businesses






### Changes in Importance

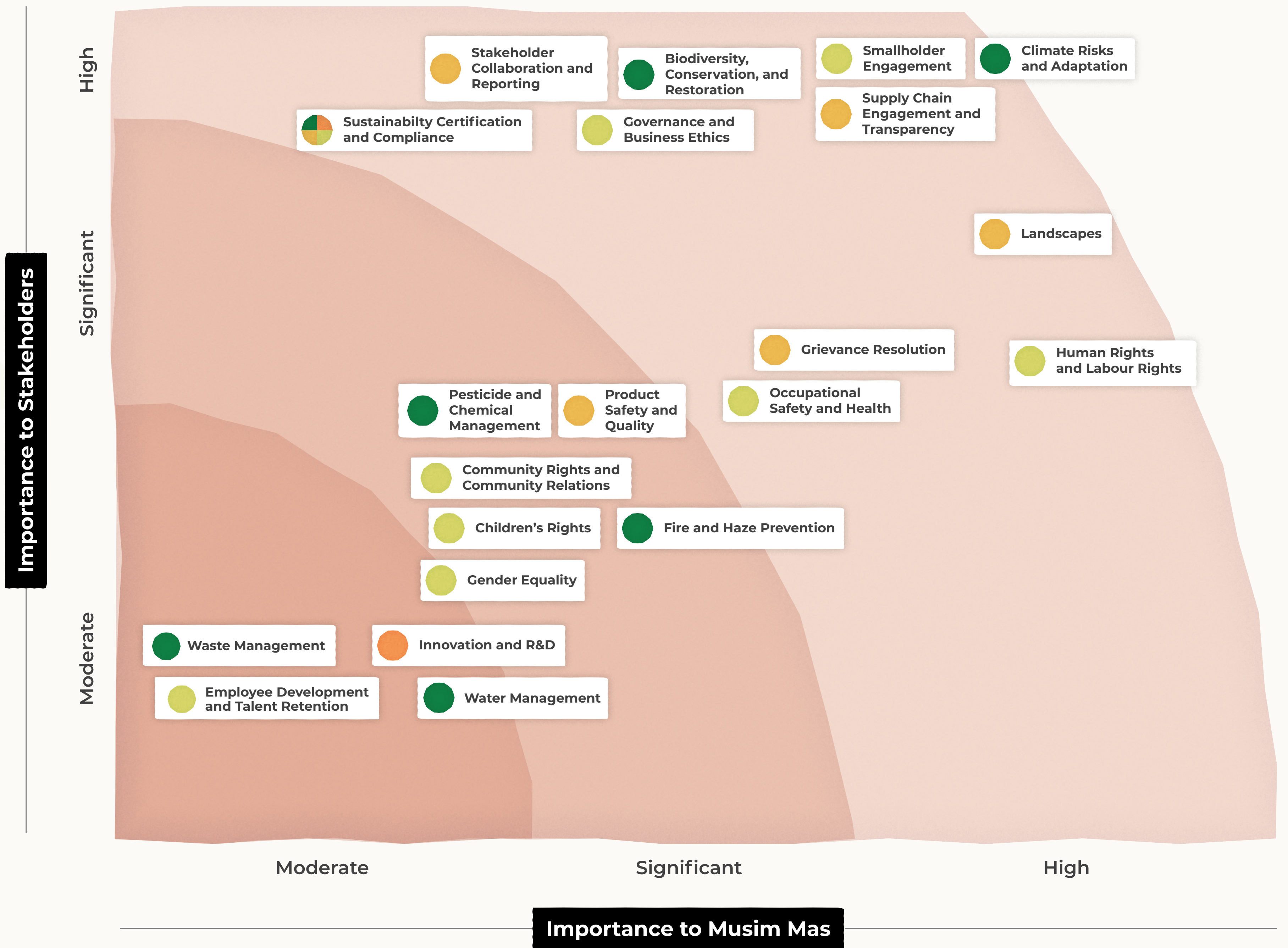
- Smallholder engagement
- Landscapes
- Human rights and labour rights
- Biodiversity, conservation, and restoration
- Governance and business ethics
- Stakeholder collaboration and reporting
- Grievance resolution
- Fire and haze prevention
- Innovation and R&D
- Children’s rights

## \* Materiality Matrix

Our materiality matrix covers the most important issues to Musim Mas and our stakeholders, and prioritizes them based on their relative importance.



-  **Musim Mas Pillar 1:**  
Improve the Lives of Smallholders, Workers, and Communities
-  **Musim Mas Pillar 2:**  
Deliver Positive Environmental Impacts
-  **Musim Mas Pillar 3:**  
Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders
-  **Musim Mas Pillar 4:**  
Drive Innovation in Sustainable Practices
-  **Cross-Cutting All Pillars**



## Corporate and Sustainability Governance

[GRI 2-9, 2-11, 2-12, 2-13, 2-14, 2-16, 2-24]

The Musim Mas Board considers sustainability a core component of our corporate identity. The Board oversees critical sustainability and ESG issues (including climate-related risks and opportunities), human rights (including children’s rights and child protection), NDPE strategies, and supply chain progress, ensuring that they are embedded into our business strategies and decisions. Led by our Executive Chairman, who also serves as our Chief Executive Officer (CEO), the Board comprises four members, including one woman.

The Board and senior management, including department heads and directors, convene quarterly meetings led by our Executive Chairman to discuss sustainability and ESG issues and assess the Group’s sustainability performance. Between meetings, the Board receives monthly reports highlighting key issues, grievances, and critical concerns raised by stakeholders.

Our Director of Sustainability oversees all sustainability matters, including the implementation of our sustainability

policies and strategies, as well as climate-related management programs and action plans for conservation initiatives at the Group level, reporting progress to the Executive Chairman and the Board at least quarterly. The Director of Sustainability is supported by senior management and our sustainability team which is made up of over 150 employees across Indonesia, Singapore, and Europe. The team implements our day-to-day sustainability commitments, including on-the-ground training and outreach programs for suppliers and smallholders to ensure the dissemination of sustainable practices throughout our operations and supply chain.

The Director of Sustainability’s remuneration is contingent on meeting sustainability-related key performance indicators (KPIs) aligned with our decarbonization strategy and NDPE targets and commitments. This includes reducing greenhouse gas (GHG) emissions, complying with sustainability regulations and standards, engaging with customers and stakeholders, as well as continuously improving the company’s reputation as an industry

leader. Across the organization, we have also established ESG-linked KPIs for relevant personnel such as maintaining or attaining the RSPO and International Sustainability and Carbon Certification (ISCC) certifications, and implementing our NDPE commitments.

The Board also engages with an external sustainability advisor who serves as a senior strategic consultant on the organization’s sustainability issues. Our senior management team approves our annual sustainability reports and all relevant stakeholder communications.

[Sustainability Governance Structure](#)

[Business Ethics](#)

[For more specific information on our climate governance, see: Aligning with the Recommendations from the Taskforce for Climate-related Financial Disclosures \(TCFD\).](#)

## ✦ Grievance Mechanisms

[GRI 2-25, 2-26]

We provide all Musim Mas stakeholders access to a transparent and accountable grievance mechanism that safeguards the anonymity of whistleblowers and complainants, including employees, who can file complaints without fear of reprisal or dismissal. Our grievance mechanism is also available to external stakeholders who wish to file complaints against Musim Mas or our suppliers regarding potential breaches of our sustainability policy and certification commitments. We promptly address all grievances, including those raised through external platforms such as the RSPO complaints process, and follow the appropriate resolution procedures.

[Grievance Mechanisms](#)

[Worker Access to Grievance Mechanisms](#)

[Grievances](#)

# Certification and Compliance



[GRI 2-27, 3-3]

Musim Mas strictly complies with national, regional, and local regulations in the countries where we operate. We subscribe to and comply with voluntary industry-leading sustainability certification and verification schemes.

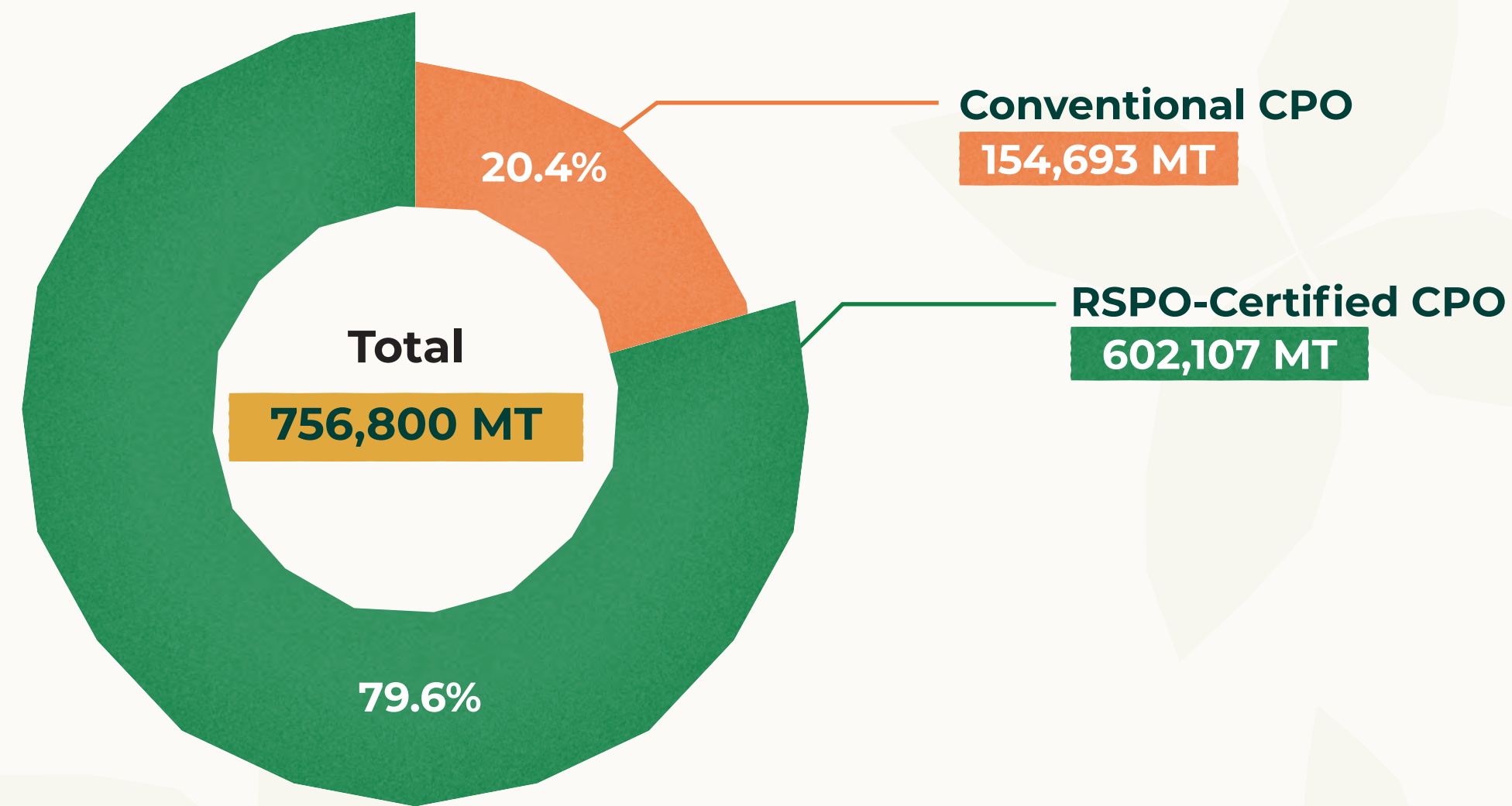
## Upstream Certification

### RSPO

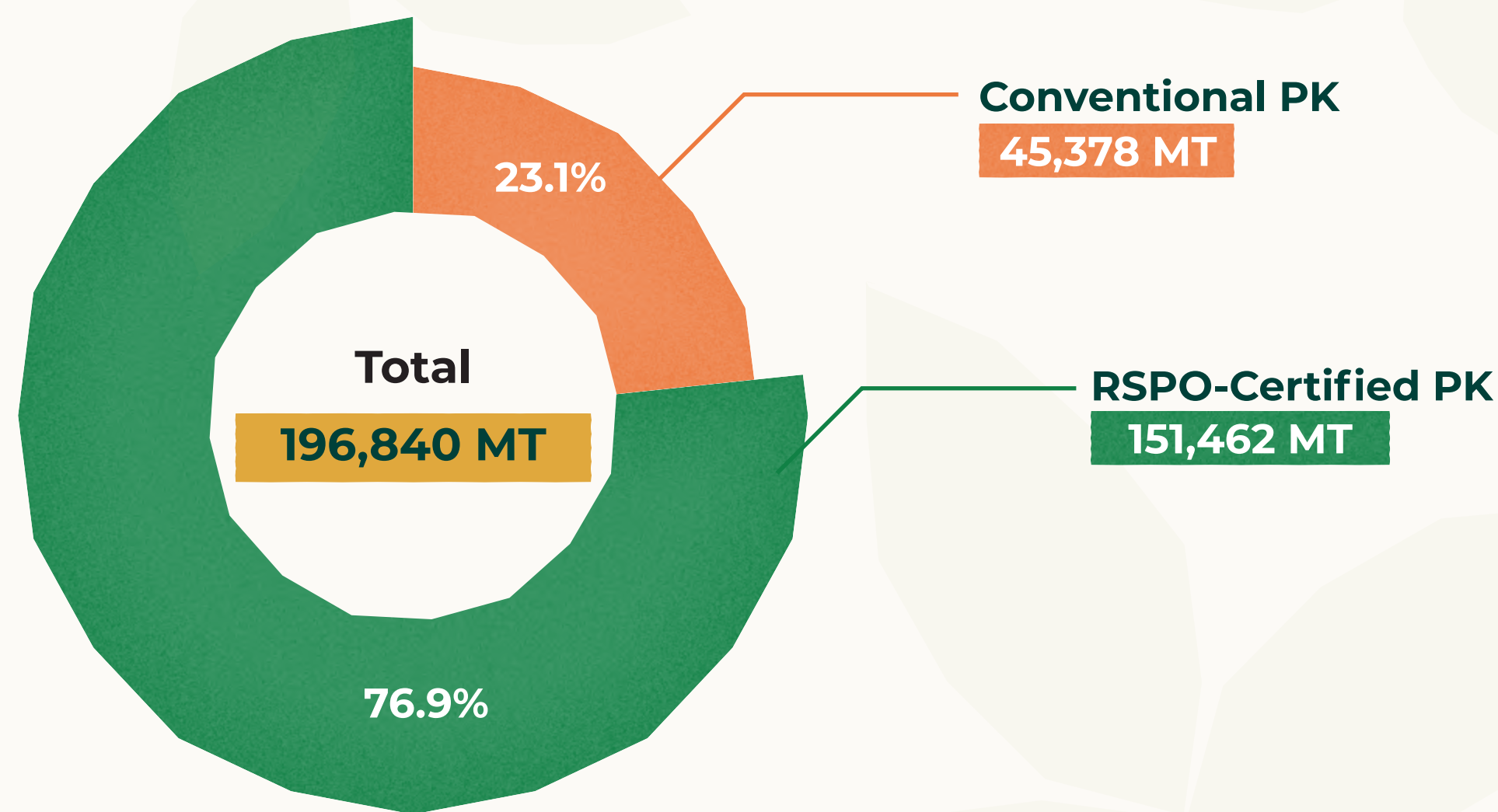
Musim Mas was one of the first Indonesian companies to join the RSPO when it was founded in 2004 and remains an active member. All 15 Musim Mas mills integrated with our plantations are fully certified against the RSPO Principles and Criteria (P&C). Approximately 153,086 hectares of our plantations, including scheme smallholder areas, are RSPO-certified, representing around 85.38% of our total managed area.<sup>6</sup> We strive to certify 100% of our plantations against the RSPO P&C.

In 2023, we produced 602,107 tonnes of RSPO-certified sustainable crude palm oil (CSPO) and 151,462 tonnes of RSPO-certified sustainable palm kernel (CSPK), respectively accounting for 79.6% and 76.9% of our mill output.

CPO Produced by Certification Status 2023 (% , MT)



PK Produced by Certification Status 2023 (% , MT)



### ISPO

We adhere to Indonesia's national certification scheme for sustainable palm oil – the Indonesian Sustainable Palm Oil (ISPO) standard. **We are pleased to announce that all 17 of our upstream entities (PTs) have achieved ISPO certification as of August 2023.**<sup>7</sup>

[Musim Mas Achieves Full ISPO Certification for Upstream Operations](#)

### ISCC

A total of 25 business units, including all our mills, several supply bases, and numerous scheme smallholders, are certified against the International Sustainability and Carbon Certification (ISCC) standard.

### POIG

After a decade of impactful work, the Palm Oil Innovation Group (POIG) concluded in 2023. Musim Mas was featured in the final series of POIG publications, detailing the impact, achievements, and challenges we encountered over the years. Although POIG is no longer active, its pioneering efforts continue to influence the industry through the RSPO and its various working groups.

[10 Years of Palm Oil Innovations](#)

<sup>6</sup> The percentage is based on our RSPO Annual Communication of Progress (ACOP) submissions.

<sup>7</sup> The month we achieved this (August) has been restated from our 2022 Sustainability Report.

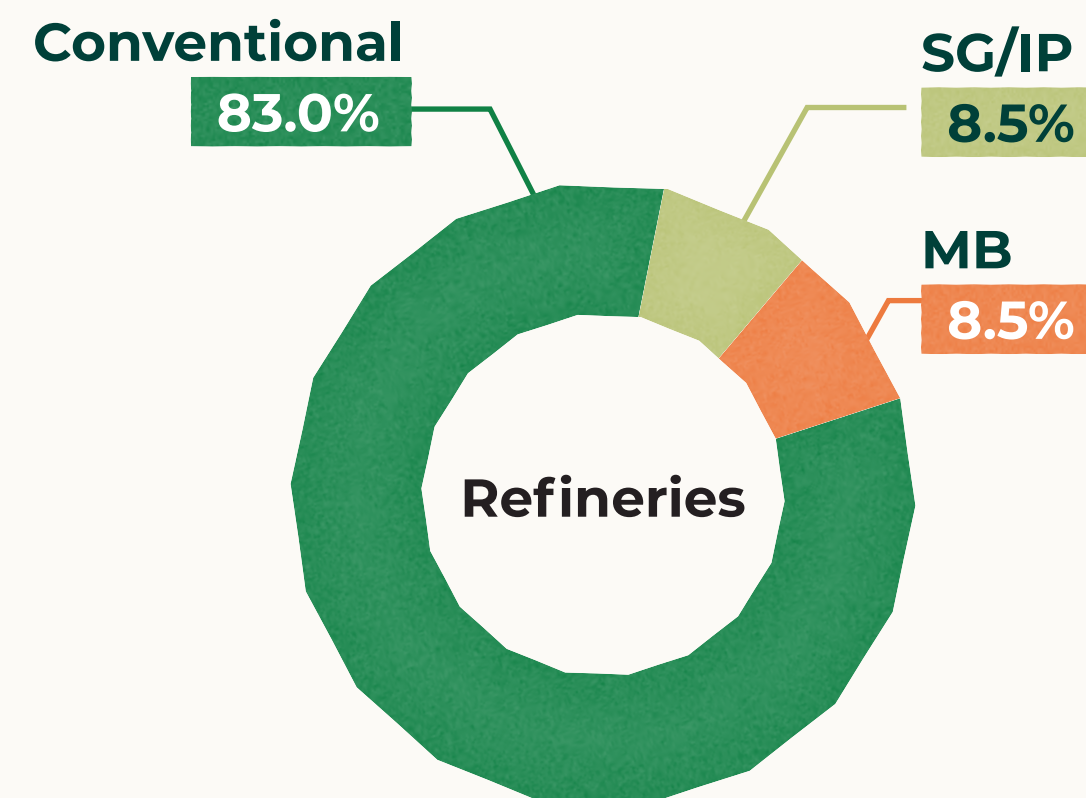


## Supply Chain Certification

[GRI 13.23.3]

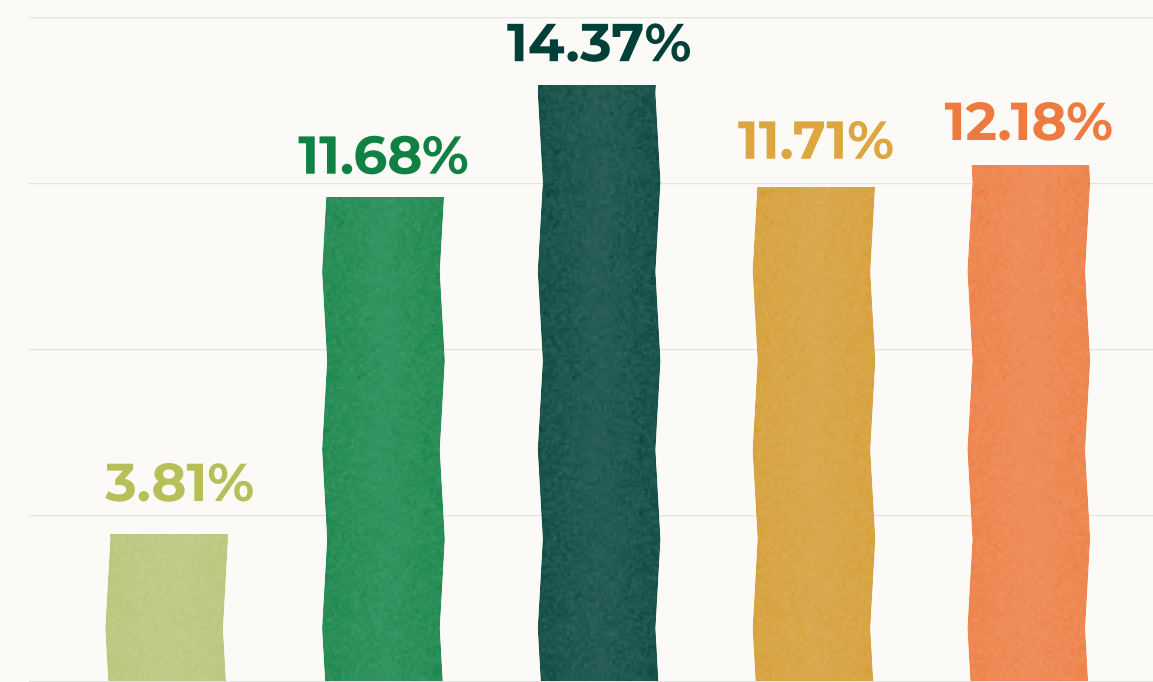
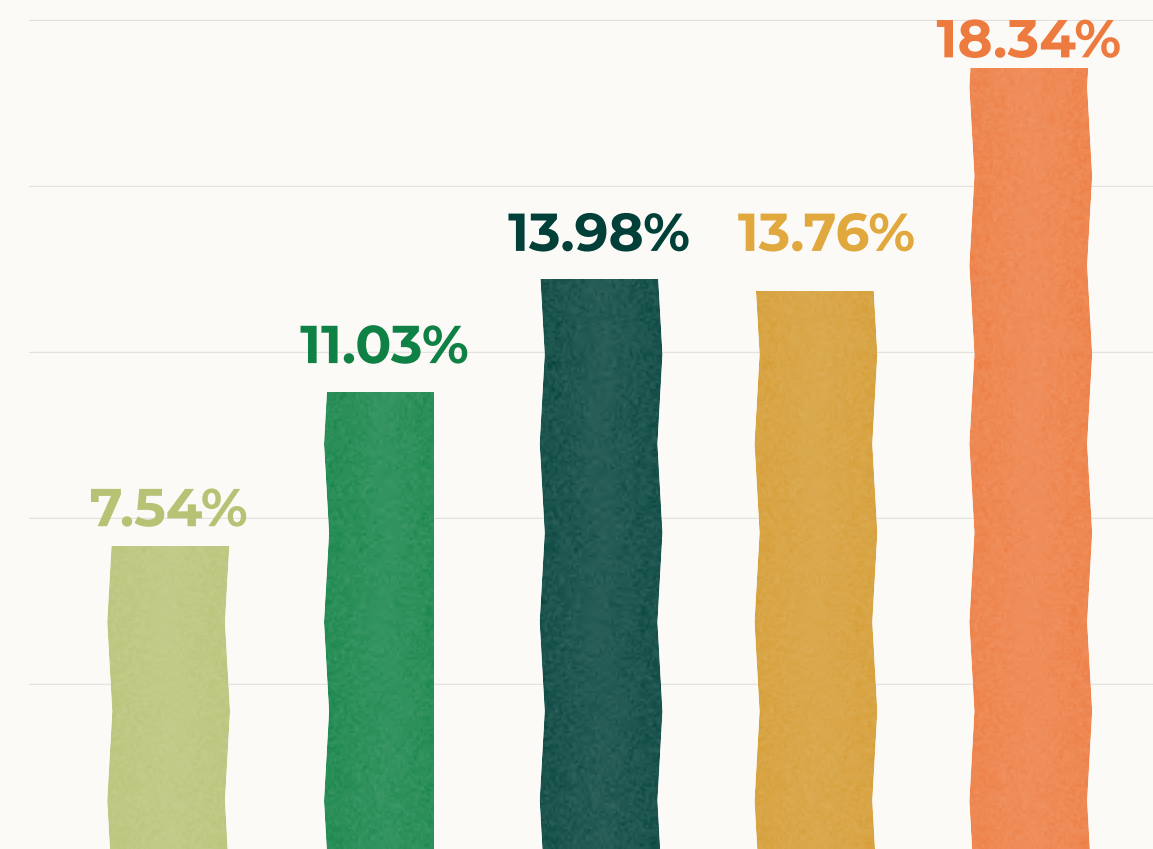
Our certification efforts extend across our entire value chain. All our midstream and downstream palm processing facilities, which include our refineries in Indonesia and our wholly-owned refinery in Malaysia, are certified under the RSPO SCCS (Supply Chain Certification System).<sup>8</sup> The Malaysian refinery is also certified against the Malaysian Sustainable Palm Oil (MSPO) SCCS standard. We continue to pursue RSPO SCCS certification at our three independent mills. In 2023, 8.5% of the CPO and crude palm kernel oil (CPKO) we sourced were RSPO Segregation (SG) and Identity Preserved (IP) oils, while another 8.5% were RSPO Mass Balance (MB) oils.

**Certification Status Raw Material Sourced by Supply Chain Model 2023 (% of volume)**



Compared to 2022, the volume of RSPO-certified CPO processed at our refineries increased from 13.76% to 18.34%, while the volume of RSPO-certified CPKO processed remained relatively stable.

**RSPO-Certified Raw Material Sourced 2019-2023 (% of total volume) - Refineries**



2019 2020 2021 2022 2023



### Meeting Increasing Regulatory Requirements

Globally, sustainability has progressively shifted from voluntary practice to a regulatory requirement. This trend is most pronounced in the European Union (EU) but is also evident in other countries, including Singapore. For instance, the European Green Deal, which was established in 2020 as a package of policy initiatives, set the EU on the path to a green transition to reach climate neutrality by 2050. Among the EU regulations impacting Musim Mas are the European Union Deforestation Regulation (EUDR), the Corporate Sustainability Reporting Directive (CSRD), and the Corporate Sustainability Due Diligence Directive (CS3D). Musim Mas is dedicating substantial resources to meeting evolving regulatory demands and customer expectations.

The EUDR requires companies supplying certain agricultural commodities to the EU – including palm oil – to ensure their products are deforestation-free and legally produced. **Thanks to our long-standing Sustainability Policy and NDPE commitments, established well before these regulations came into effect, and our robust due diligence procedure, we are well-prepared to comply with the EUDR by December 30,**

**2024.** In terms of reporting, we are taking the necessary steps to comply with the CSRD and preparing for the CS3D, which will require compliance between 2027 and 2029, depending on its scope.

Beyond the EU, [Singapore](#) will mandate climate reporting aligned with the International Sustainability Standards Board (ISSB) standards for large non-listed companies incorporated in the country by 2028. To build our foundation in climate reporting and ensure readiness for Singapore's forthcoming mandate, we have begun reporting against the Taskforce on Climate-related Financial Disclosures (TCFD) framework, a predecessor of the ISSB standards.<sup>9</sup>

We continue to actively monitor regulatory developments in countries and regions where we operate, including new advancements in the EU, emerging legislation on deforestation in the United States and the United Kingdom, as well as carbon pricing mechanisms and incentives in Indonesia. As we navigate this increasingly complex regulatory environment, Musim Mas remains focused on adaptability, collaboration, as well as advocacy for smallholders, ensuring that regulatory advancements do not inadvertently exclude them from value chains.

<sup>9</sup> The ISSB Standards marks the culmination of the work of the TCFD. For more information, click [link](#).

<sup>8</sup> Palm processing facilities refer to all our facilities that process CPO, PK, CPKO, and their derivatives.

## The Importance of Sectoral Collaboration

Commentary by

**Eddy Esselink**

Senior Manager Sustainable Development  
MVO - The Netherlands Oils and Fats Industry



Sustainable commodity initiatives such as the RSPO emerged at a time when sustainability efforts were largely voluntary. However, we are now witnessing a significant shift towards mandatory regulatory frameworks, including the EUDR and other initiatives under the European Green Deal, such as the recently approved CS3D and the Forced Labour Regulation.

The adoption of stricter sustainability standards creates considerable challenges for the private sector. Companies like Musim Mas are well-positioned to meet the new regulatory requirements through their alignment with the RSPO. However, they must operate within new limits and fine-tune their existing systems to ensure adherence or risk fines and sanctions.

Sectoral collaboration through organizations like MVO is crucial to meet these challenges. Collaborating will allow industry peers to exchange knowledge and insights to better prepare for regulatory compliance. It can also put companies in a better position to enter into discussions with national governments and relevant authorities, directly engage with the EU to address the impact of new regulations on the palm oil industry and advocate for practical solutions.

“You have to work together to implement change” is MVO’s motto. Sustainable development requires stakeholders and supply chain players to adopt shared values and practices. Musim Mas’ ongoing efforts to engage with supply-chain stakeholders and other MVO members exemplify the collaborative spirit needed to make real progress.

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*MVO represents the Dutch oils and fats industry. Its members include diverse supply chain actors, including Musim Mas. Its work focuses on trade policy negotiations, food and feed safety, and sustainable products and manufacturing processes. MVO collaborates with industry associations in other sectors, like the food and rubber industries, to address shared sustainability concerns.*

## Musim Mas’ Responsibilities as an Industry Leader

Commentary by

**Sascha Tischer**

Deputy Chairman, Forum for Sustainable Palm Oil (FONAP)



FONAP recognizes the positive impact intentions behind the new EU regulations. However, their implementation creates significant obstacles for companies managing their risks to avoid fines, penalties, and other legal repercussions. Many corporations are rather equipped to meet the stringent criteria of the new regulations. However, smallholders may be excluded from the palm oil, coffee, and other value chains because they lack the tools to navigate the administrative hurdles imposed by the new guidelines.

In the last 20 years, Musim Mas has been recognized as one of the private sector entities with industry-leading sustainability commitments and performance. The company’s European subsidiary, Inter-

continental Oils and Fats (ICOF), is a FONAP member and an active participant in our working groups and discussions on supply chain traceability and transparency. In addition, as its parent company Musim Mas operates in palm oil-producing countries, it has a deeper understanding of supply chain issues.

Musim Mas can leverage its position to provide on-the-ground support to smallholders and engage in dialogue with governments in producing countries to arrive at a middle ground on EUDR compliance. As ICOF’s parent company, Musim Mas should clearly increase its European visibility and engage with German and EU authorities, alerting them to critical issues.

A top-down solution is the wrong approach in these challenging times. FONAP believes in bridging gaps and collaborating to develop workable and credible solutions.

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*FONAP is a multi-stakeholder platform based in Germany. It advances sustainable palm oil production through industry dialogue, working groups, and other initiatives focusing on smallholders. Its members include scientific platforms, business associations, civil society organizations, government ministries, and private sector companies, including Musim Mas’ subsidiary, ICOF.*



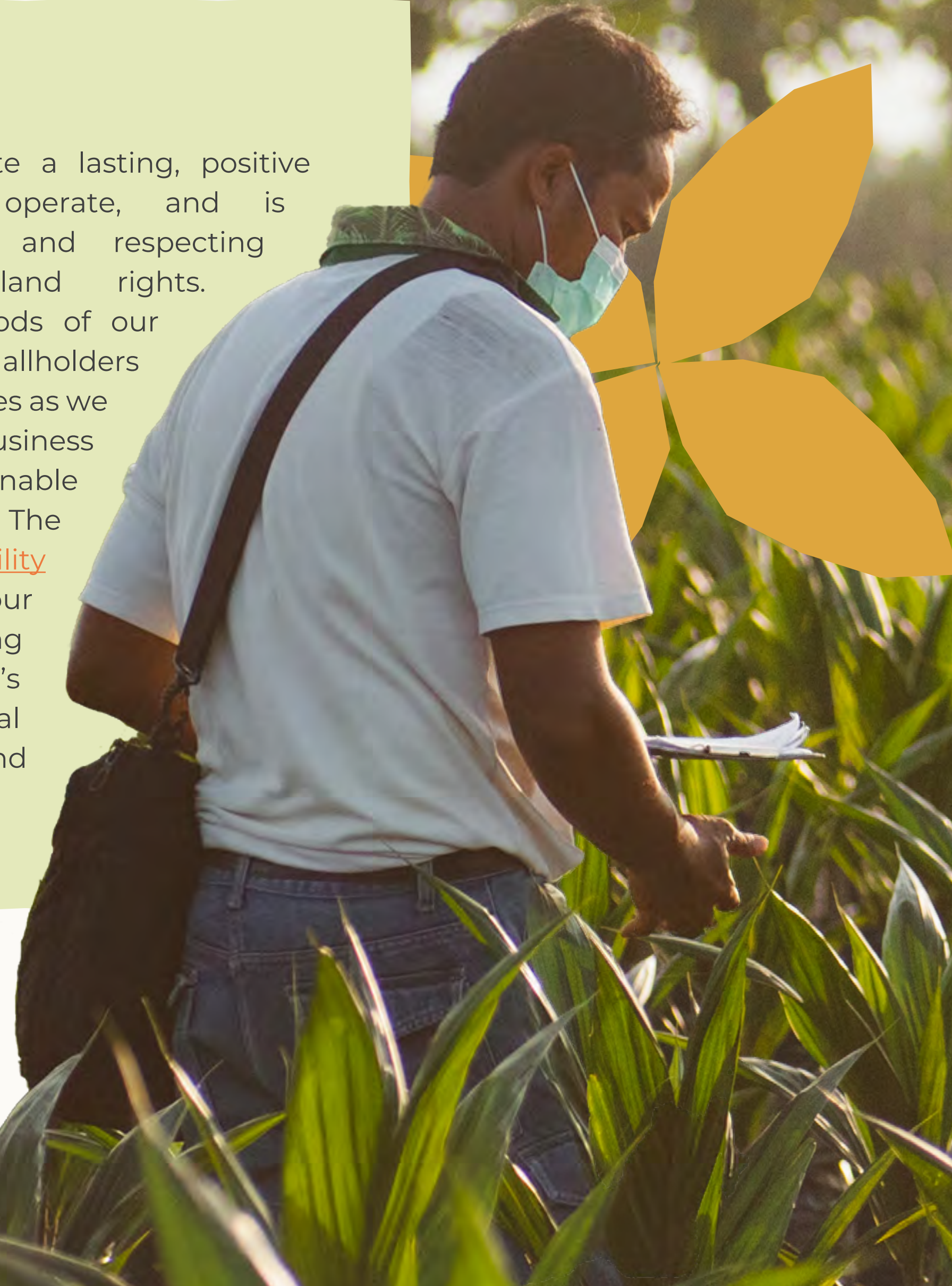
**PILLAR 1**

# Improve the Lives of Smallholders, Workers, and Communities



[GRI 2-24, 13.20.1]

Musim Mas strives to create a lasting, positive legacy everywhere we operate, and is committed to upholding and respecting human, labour, and land rights. The well-being and livelihoods of our workers, communities, and smallholders continue to be our top priorities as we pursue our strategic and business objectives on our sustainable development journey. The [addendum to our Sustainability Policy](#) further strengthens our commitment to protecting human and children's rights in line with national and international laws and conventions.

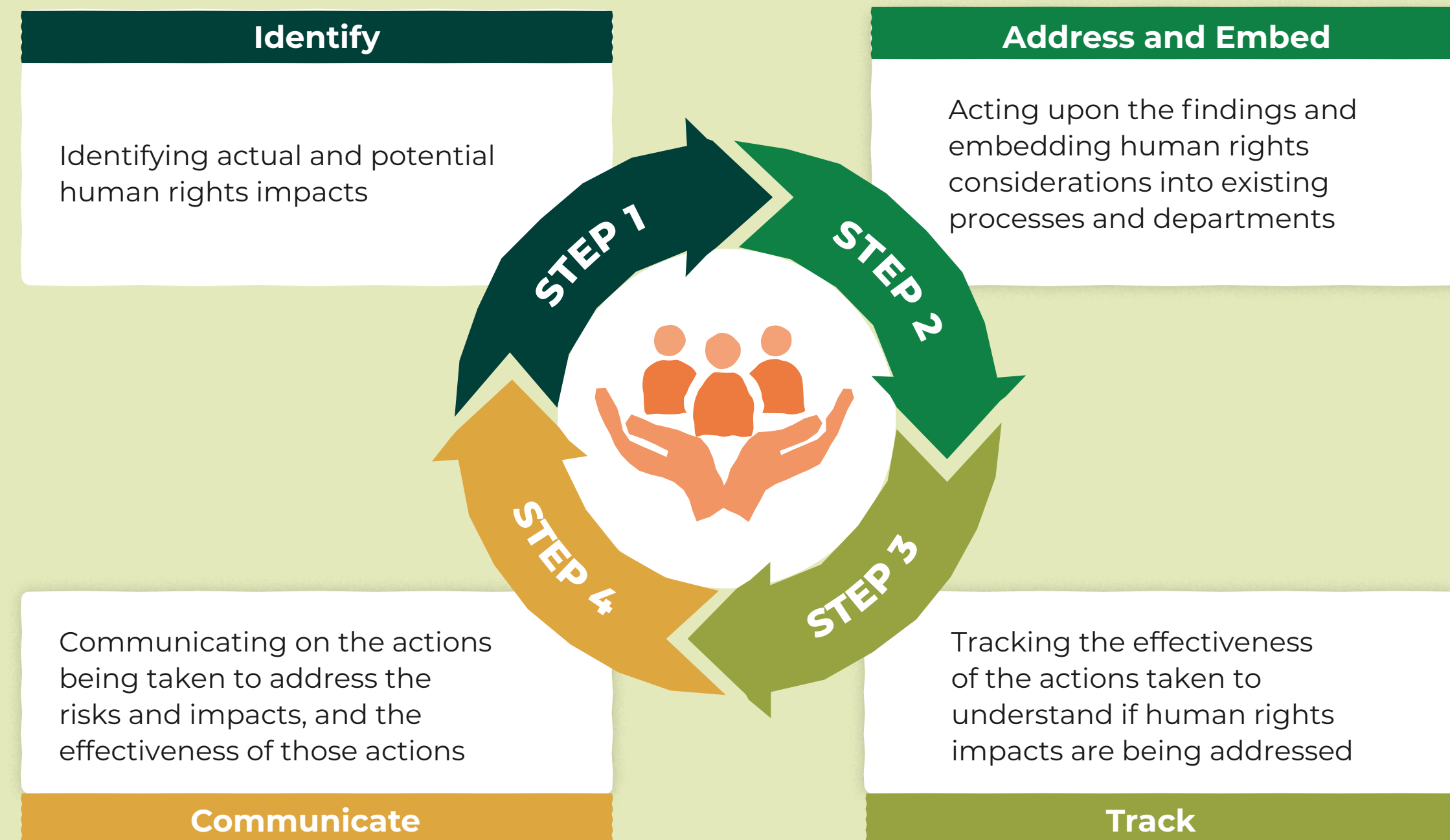




## Improving Our Labour and Human Rights Practices



Musim Mas recognizes the importance of managing human rights risks and has taken various measures to reduce or eliminate them, both within our own operations and throughout our supply chain. Our Human Rights Due Diligence (HRDD) process adheres to the United Nations Guiding Principles on Business and Human Rights, which consists of four steps:



We have consistently ensured that human rights risks are managed through past and ongoing programs and efforts. These include our proactive engagements with Dignity in Work for All (DIWA, formerly Verité Southeast Asia) in 2021 and 2016 to assess labour and human rights at our operations, our work with the Forest Peoples Programme (FPP) in 2022 to apply the High Carbon Stock Approach (HCSA) Social Requirement 13 (SR13), as well as our annual Roundtable on Sustainable Palm Oil (RSPO) audits.

As part of the outcomes and areas of improvement identified through these programs and efforts, we have implemented several initiatives in 2023. Specifically, these encompass:



### Child Protection and No Child Labour

- We developed a new procedure on "Remediation for child labour"

» [Ensuring No Child or Forced Labour](#)



### Freedom of Association and Grievance Mechanisms

- We ensure workers understand collective bargaining agreements (CBAs), and provide effective means to communicate the CBA
- Together with the labour union, we are conducting a review of workers knowledge of our grievance mechanism and its effectiveness
- We re-emphasized our grievance mechanism, specifically on the protection of anonymity

» [Freedom of Association](#)

» [Grievance Mechanisms](#)

» [Worker Access to Grievance Mechanisms](#)



### Working Conditions

- We refreshed our workers' understanding of overtime wages and rates
- We refreshed women workers' understanding of menstrual leave provision

» [Wages and Working Conditions](#)



### Women Empowerment and Gender Committees

- We are working with DIWA to develop a program to promote gender equality and human rights in the palm oil sector
- The program will also provide specific skillsets and knowledge so that our Gender Committees and relevant stakeholders can design and implement transformative interventions

» [Promoting Gender Equality at Plantations](#)

We strive for continuous improvement in our labour and human rights practices, and plan to incorporate these programs and initiatives into our upcoming HRDD strategy. More information will be shared in future reports.

# Our Workforce



## Employee Overview

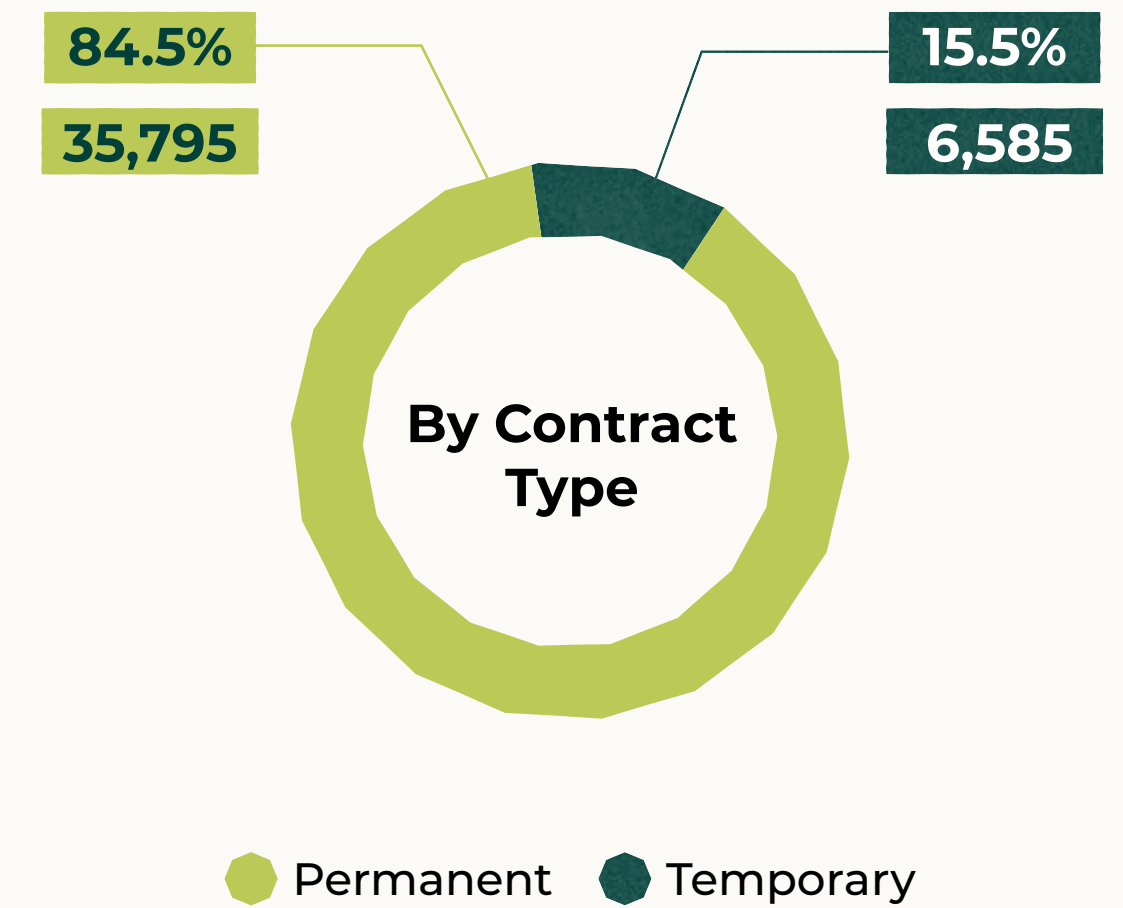
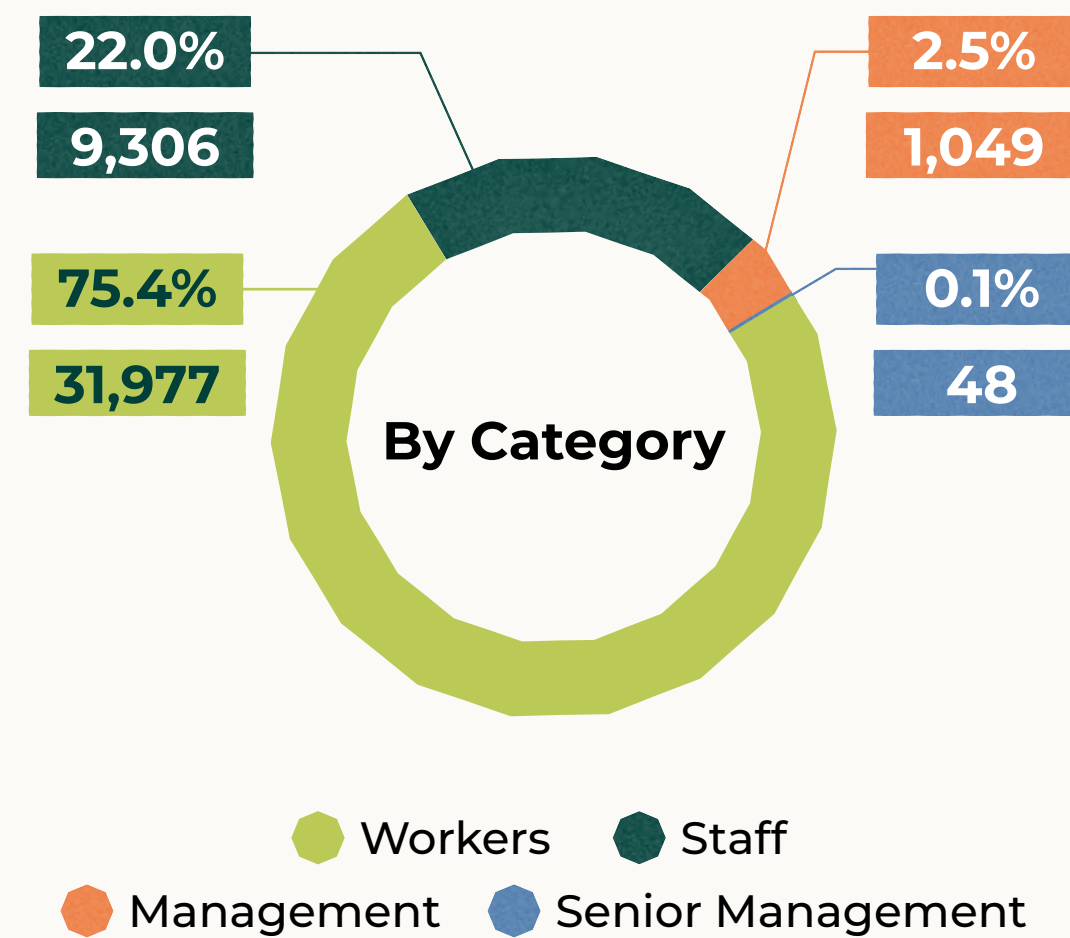
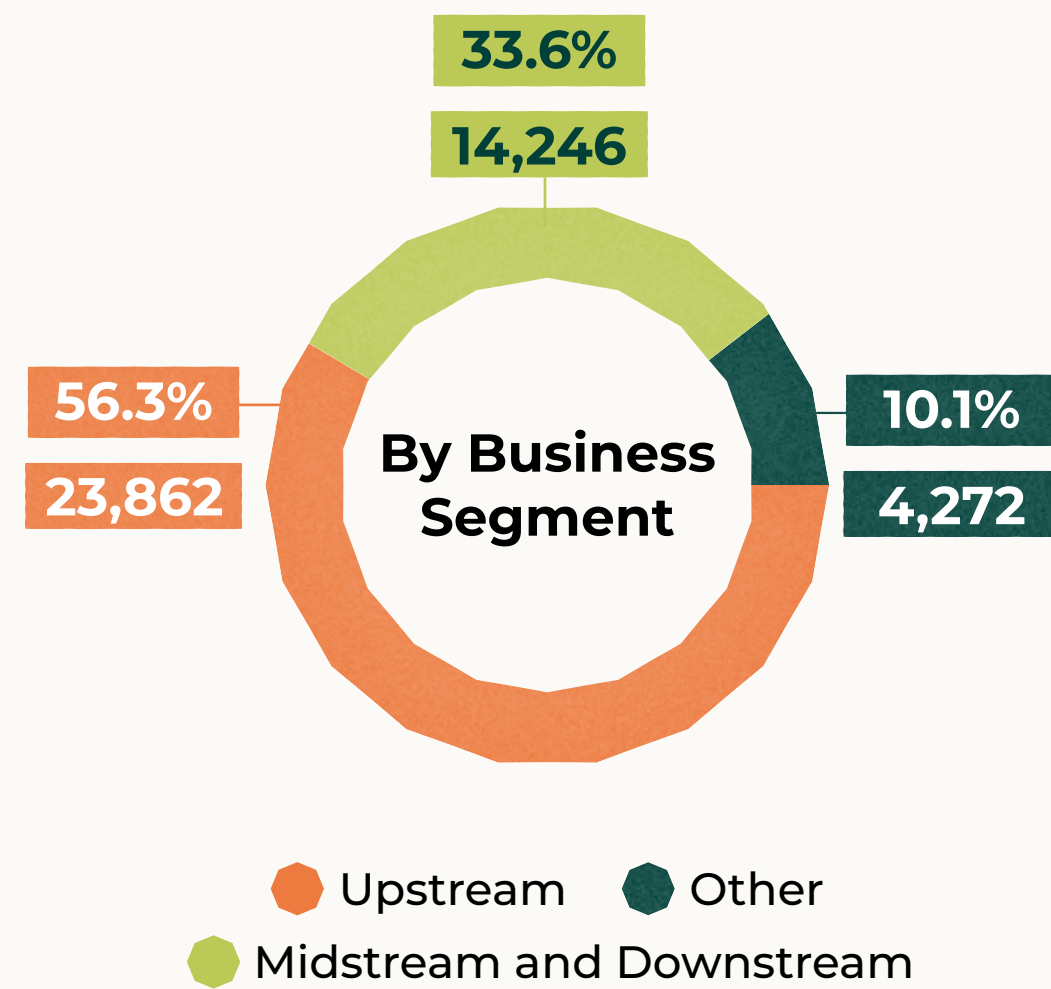
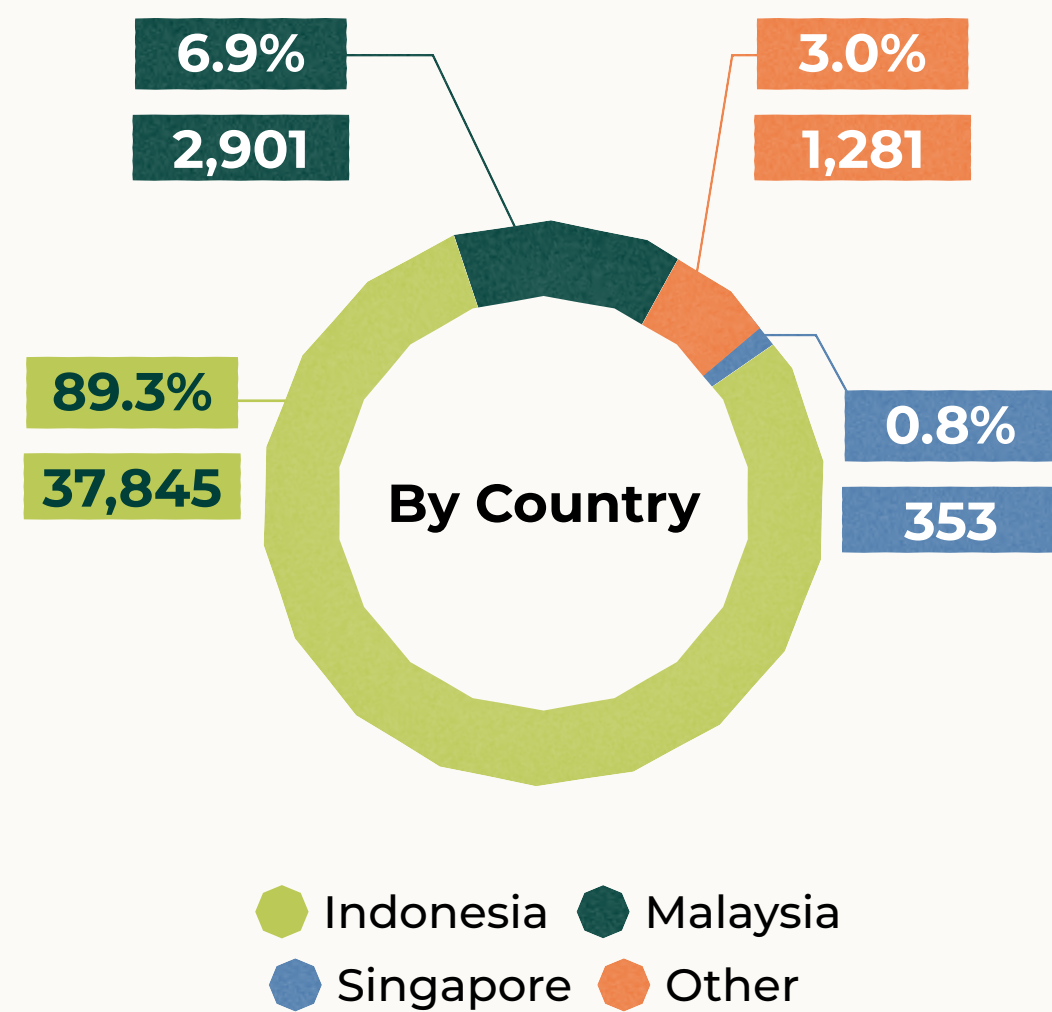
[GRI 2-7, 3-3]

Musim Mas' workforce is the backbone of our business. We employ 42,380 people worldwide, with 89.3% employed in our Indonesian operations. Of our total workforce, 56.3% are employed at our upstream operations in Sumatra and Kalimantan, while 33.6% work in our midstream and downstream facilities in Indonesia, Malaysia, and other countries. The remaining 10.1% work in our sales and satellite offices worldwide.

Workers constitute the majority of our workforce across our upstream, midstream, and downstream operations, representing 75.4% of our employees. The rest of our workforce consists of staff, management, and senior management.

Although most of our workers occupy permanent, full-time positions, we also employ temporary, short-term contract workers to support operational activities across our upstream, midstream, and downstream businesses during peak periods. In 2023, we engaged 6,585 temporary workers, comprising 15.5% of our workforce.

Employee Overview 2023 (% , No.) **Total** 42,380



**Note:** "Other" includes our logistics, marketing, sales, and satellite offices, which are outside the scope of this report.

# Wages and Working Conditions

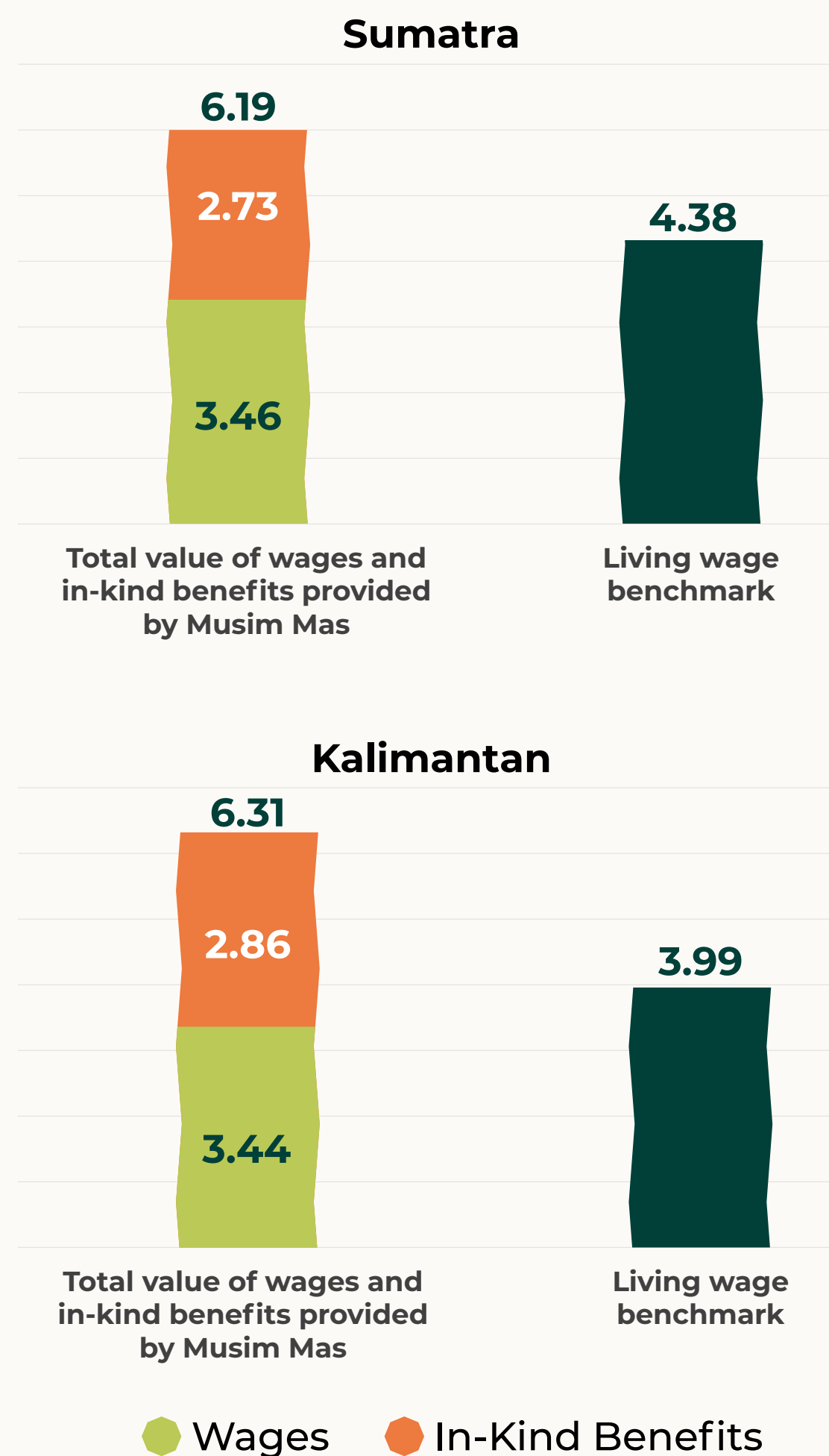
[GRI 3-3, 202-1, 401-2, 13.20.1, 13.21.1, 13.21.3]

All upstream employees in Indonesia, including temporary workers, are paid at least the minimum wage in their respective regions and their employment conditions comply with all local and national labour laws. They receive equal entry-level wages (ranging from IDR 2.7 million to almost IDR 3.6 million monthly in 2023, depending on the operating region) and comprehensive in-kind benefits regardless of gender.

In 2023, we refreshed our workers' understanding of overtime rates and wages. Additionally, we reiterated the women workers' understanding of menstrual leave provision, ensuring they are fully informed about their entitlements and the processes to access these benefits.

We annually assess living wages and ensure that our workers' wages and in-kind benefits align with the RSPO standards. The total value of wages and in-kind benefits for our upstream employees in Sumatra and Kalimantan is IDR 6.19 and 6.31 million per month, respectively. This is around 1.5 times higher than the calculated living wage benchmarks of IDR 4.38 for Sumatra and 3.99 million for Kalimantan.

Wages and In-Kind Benefits vs Living Wage Benchmark by Region 2023 (IDR million/month)



## Spotlight on how Musim Mas' Calculates Living Wage

The approach taken by Musim Mas to calculate living wage was featured in a 2023 Palm Oil Innovation Group (POIG) report showcasing how companies in different operational contexts can successfully implement living wages and provide better economic conditions for workers and their families.

[Read the POIG report here](#)



## Employee Benefits

For upstream employees, benefits include free healthcare, housing with electricity and clean water, transportation, childcare, and on-site education for school-age children. In 2023, Musim Mas provided:



Housing for **14,110** employees



**26** clinics and **2,691** first aid kit/posts in and around operation areas



**47** childcare centers, **11** YAK kindergartens, **11** YAK primary school and **3** YAK secondary school

**Notes :** The Anwar Karim Foundation (Yayasan Anwar Karim — YAK) is Musim Mas' long-standing community outreach initiative.

For midstream and downstream employees, the in-kind benefits we provide vary by region and comply with local and national laws.

### A Focus on Education



We recognize the importance of education in improving livelihoods and preventing child labour, especially for children of workers who live on our plantations. We encourage all parents to enroll their children and provide free transportation to our YAK schools and schools in neighboring communities. As of 2023, we have built and funded 47 childcare centers, 11 kindergartens, 11 primary schools and three secondary schools at our plantations in Riau, North Sumatra, West Sumatra, South Sumatra, Central Kalimantan, and West Kalimantan.

Our latest survey revealed that 12,220 children of mill and estate workers under the age of 18 live on our plantations. Out of the 10,722 children of school-going age, 98% attend our YAK schools or other nearby schools.

Our schools, kindergartens, and childcare centers benefit not only our own workers' children, but also children in surrounding communities, offering high-quality education and care while providing employment opportunities for local teachers. In 2023, 39 children from surrounding communities attended YAK schools.

#### School Attendance of Workers' Children 2023 (% , No.)

**Total 10,722**

#### Children Attending YAK Schools

**59% 6,346**



#### Children Attending Outside Schools

**39% 4,172**



#### School-Age Children Not in School

**2% 204**



**Note:** Many children who attend outside schools are from families of Musim Mas employees who do not live on our plantations. The gender balance at YAK schools is almost even.

### Family-Friendly Practices

In addition to providing on-site education for school-age children, we have adopted several family-friendly practices at our plantations and mills to support working parents, especially expectant and new mothers. We provide maternity leave, healthcare education, prenatal and postnatal healthcare services, and dedicated breastfeeding stations at our facilities. We have also established specific employment policies for women with infants.



*In 2023, Musim Mas and the YAK awarded scholarships to 93 high-achieving students.*





# Workforce Diversity

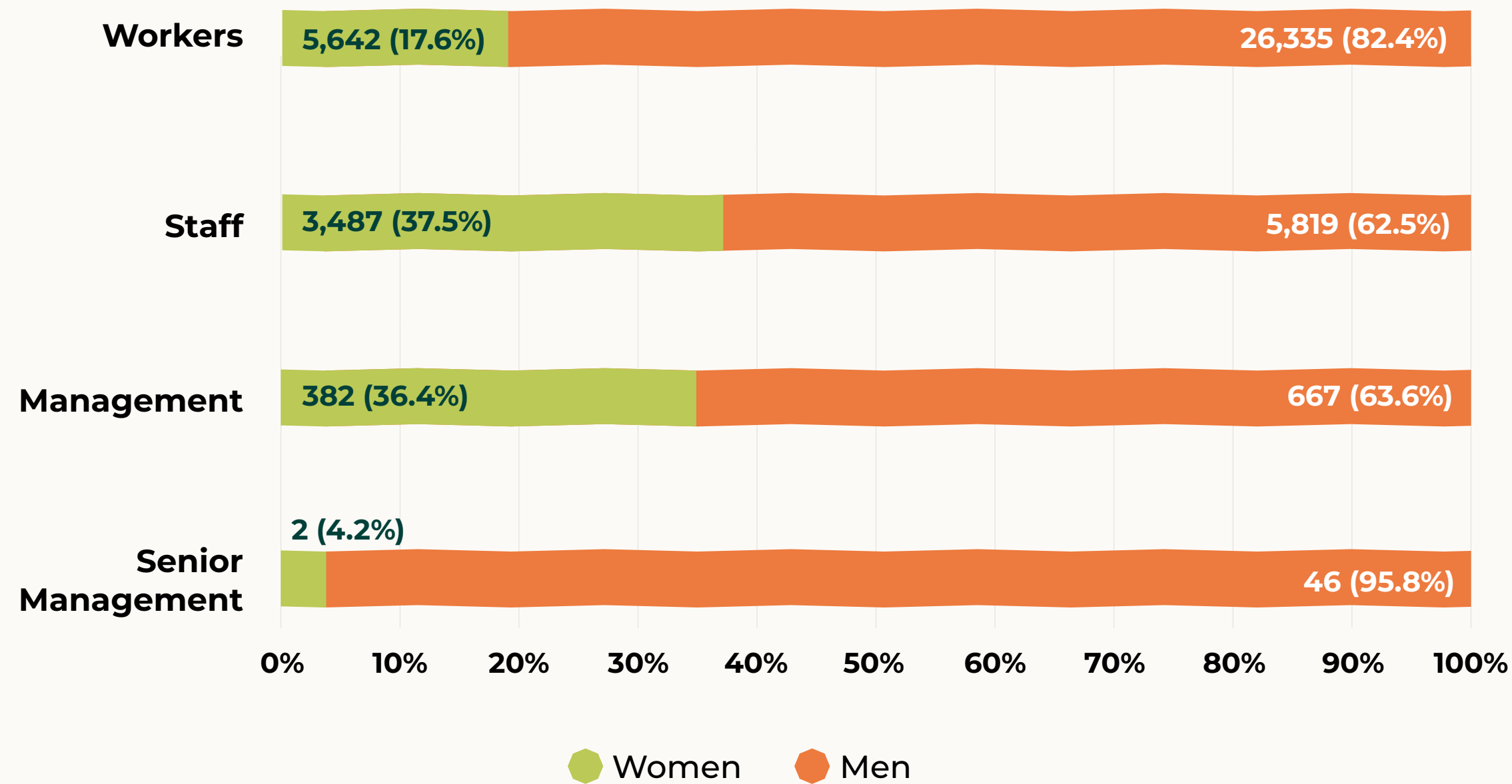


[GRI 3-3, 405-1, 405-2]

Musim Mas hires, promotes, and provides equal pay and opportunities to employees based on merit without any form of discrimination. We train all employees on our no-discrimination policies. No instances of discrimination were reported at our upstream operations in 2023.

Across the Group, we employ 9,513 women, comprising 22.4% of our global workforce. Women also comprise 36.4% of management, 37.5% of staff, and 17.6% of workers at our operations worldwide. In addition, two out of 48 members of senior management are women, and one of the four members of the Musim Mas Board is a woman.

Gender Diversity by Employee Category 2023 (No., %)



## Promoting Gender Equality at Plantations

We promote gender equality in our plantations, providing women employees with support services and facilities to help them balance their household responsibilities, childcare commitments, and family obligations with work. We promote awareness of gender-related issues through the following initiatives:



Establishing Gender Committees at every estate



Providing breastfeeding stations and childcare centers at our operations



Conducting workshops and knowledge-sharing sessions in collaboration with external entities, including provincial Women's Empowerment Offices

See our YouTube channel for a series of videos showcasing some of our outstanding women employees





## Enhancing Our Women's Empowerment Initiatives

In 2021, Musim Mas partnered with DIWA to conduct a comprehensive social assessment of our upstream palm oil operations in Indonesia. During this collaboration, DIWA acknowledged Musim Mas' steadfast commitment to upholding the rights of all workers, including women, highlighting the presence of established policies, written procedures, and implementation mechanisms. Both Musim Mas and DIWA also identified areas where further improvements could be made.

Based on DIWA's recommendations, Musim Mas proposed a concept for an internal capacity-building program. We then worked with DIWA to develop the program further, focusing on structural changes and addressing prevailing perceptions that impact workplace dynamics on-the-ground and within the wider worker community. Additionally, the program will focus on equipping the Gender Committee and relevant stakeholders with specialized knowledge and skills essential for developing and implementing transformative gender initiatives.

This dynamic, multi-phased program which includes piloting innovative strategies aims to improve gender equality and human rights practices within the palm oil sector. More information will be shared in future reports.

## Freedom of Association

[GRI 2-30, 3-3, 402-1, 407-1, 13.21.2]

Musim Mas employees are free to join a labour union of their choice and participate in union meetings. We maintain positive relationships between management and union representatives, regularly meeting to discuss wages, benefits, leave, and other employment issues. In Indonesia, we collect employee feedback regularly through bipartite cooperation committees or *Lembaga Kerja Sama (LKS) Bipartit*, comprising company representatives and workers. Currently, 31,118 employees (100% of our workers in Indonesia) belong to labour unions.

Musim Mas respects employees' right to enter into CBAs. **All Indonesian employees are covered by CBAs that comply with**

**government regulations** and include transparent provisions, such as minimum notice periods for operational changes. We communicate CBA terms and availability in union meetings and morning briefings, distribute them to field supervisors, and make them accessible at estate, mill, and union offices so workers can easily consult them.

In countries outside Indonesia, select Musim Mas employees are covered by CBAs or belong to unions, depending on local labour laws and regulations.



# Ensuring No Child or Forced Labour



[GRI 3-3, 408-1, 409-1, 13.20.1]

## \* No Child Labour

Musim Mas is committed to upholding children’s rights as outlined in our recent [addendum to our Sustainability Policy](#) and maintaining zero-tolerance towards child labour within our operations. Our recruitment policy strictly prohibits employing individuals below the legal age of 18, and is communicated to stakeholders through annual on-site meetings.

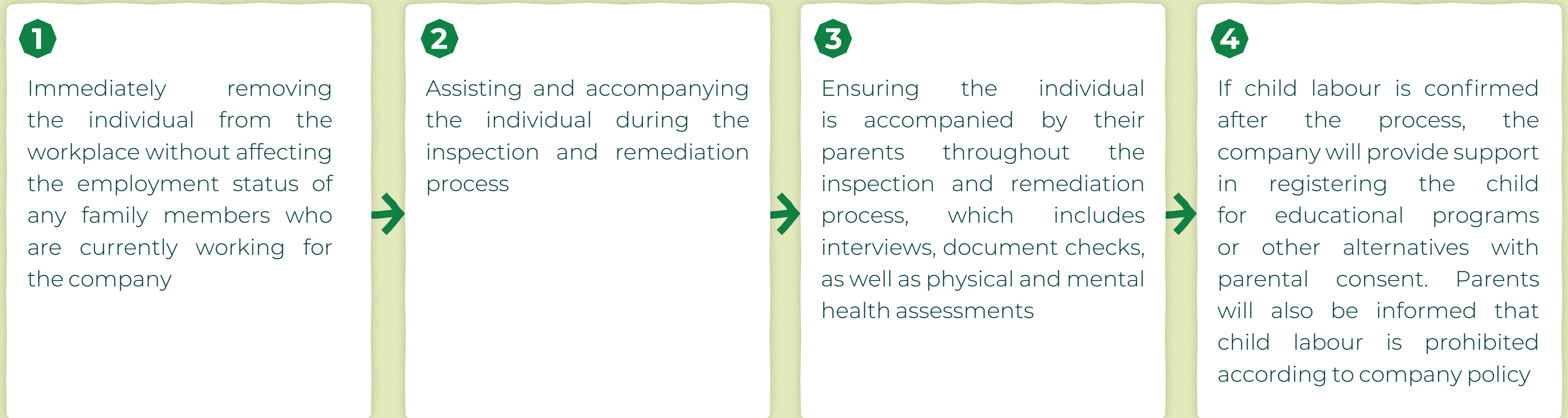
We screen all applicants to ensure they meet minimum age requirements and prevent those under 18 from joining our workforce. This process includes cross-referencing their date of birth and verifying family and identity cards using the E-DABU and SIPP online systems.<sup>10</sup>

We have established procedures at our upstream operations that outline the steps that will be taken if children are present at our worksites.



### New Procedure for Child Labour Remediation

In 2023, we developed procedures on remediation for child labour, detailing the actions to be taken by the company and our Gender Committees in the event that underage workers are identified. The actions include:



This procedure underlines our commitment to strengthen our practices to protecting and promoting children’s rights.

Our schools and childcare centers for the children of employees living in and around our plantations ensure that parents can work while their children’s safety and education are safeguarded (see also: [A Focus on Education](#)).

There were no reported incidents of child labour at our operations in 2023.

<sup>10</sup> E-DABU (*Elektronik Data Badan Usaha*) and SIPP (*Sistem Informasi Pelaporan Perusahaan*) are online platforms used by BPJS Kesehatan to manage company and employee data as well as employment and social security information.

### \* No Forced Labour

Musim Mas does not tolerate all forms of forced and trafficked labour. Our workers are free to move in and out of our estates. Our recruitment, selection, and hiring policies and procedures meet all legal standards and are subject to strict controls to prevent forced labour, debt bondage, and discrimination.

We do not employ foreign workers at our Indonesian estates, and seek to hire workers from local provinces where possible. When we employ workers from other provinces, we do not retain their identification and travel documents. We do not use third-party recruiters and labour agents or collect any fees from workers, and fully reimburse transportation fees incurred by prospective employees.

### Worker Access to Grievance Mechanism

[GRI 2-25, 2-26]

All employees can access our transparent and accountable grievance mechanism without fear of reprisal or dismissal. We ensure they are made fully aware of grievance-raising channels, train them on our internal grievance procedures, and post notices on bulletin boards at all our sites. Employees can submit complaints using suggestion boxes in and around our operations and grievance logbooks at our administrative offices. They can contact our Corporate Affairs Department (*Hubungan Masyarakat*) directly or file a grievance through their labour union.

We are conducting a review to assess our workers' knowledge of our grievance mechanism and its effectiveness at our upstream entities. We also re-emphasized our grievance mechanism to these workers, highlighting the protection of anonymity, ensuring that all employees are aware of their rights and the safeguards in place.



# Safety and Health



[GRI 3-3, 403-1, 403-7, 403-8, 403-9] [SASB FB-AG-320a.1]

Musim Mas places a high priority on employee safety and health. Our Occupational Safety and Health (OSH) policy and OSH management system covers all permanent and temporary employees. We ensure that all workers at plantations, mills, and factories are equipped with the necessary personal protective equipment (PPE) and receive training in safety and health issues relevant to their roles.

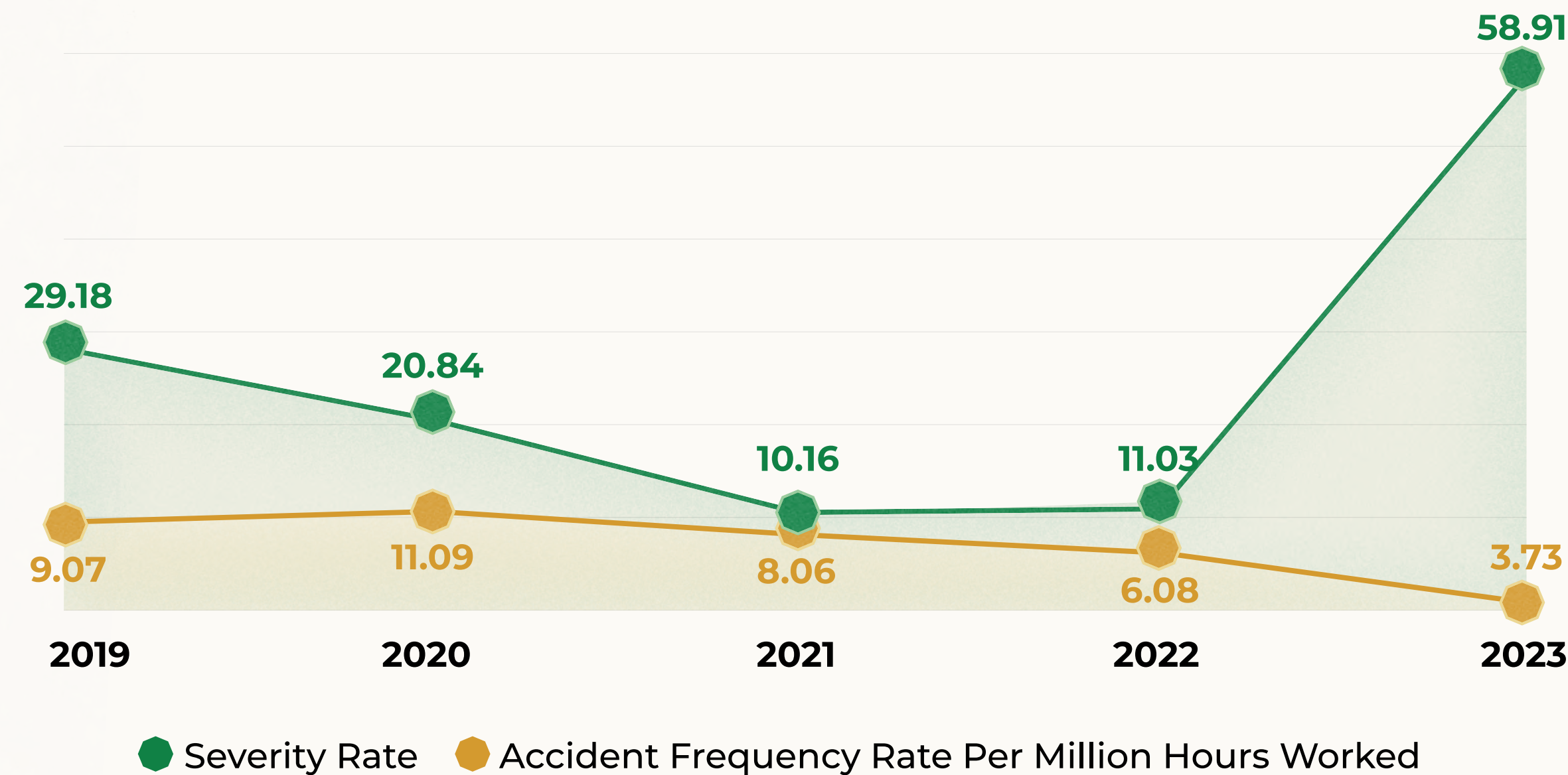


## Upstream Accidents

We are vigilant and apply strict health and safety measures to minimize accident rates at our upstream operations. Most work-related injuries are minor, such as cuts from handling oil palm fronds and thorns. Severe injuries typically result from mishandling work tools and motorcycle accidents, among others.

In 2023, our accident frequency rate was 3.73, a reduction by more than 58% since 2019. However, our severity rate was five times higher than in 2022 due to four serious incidents during the reporting year.

Accident Frequency and Severity Rates 2019-2023 • Upstream Operations



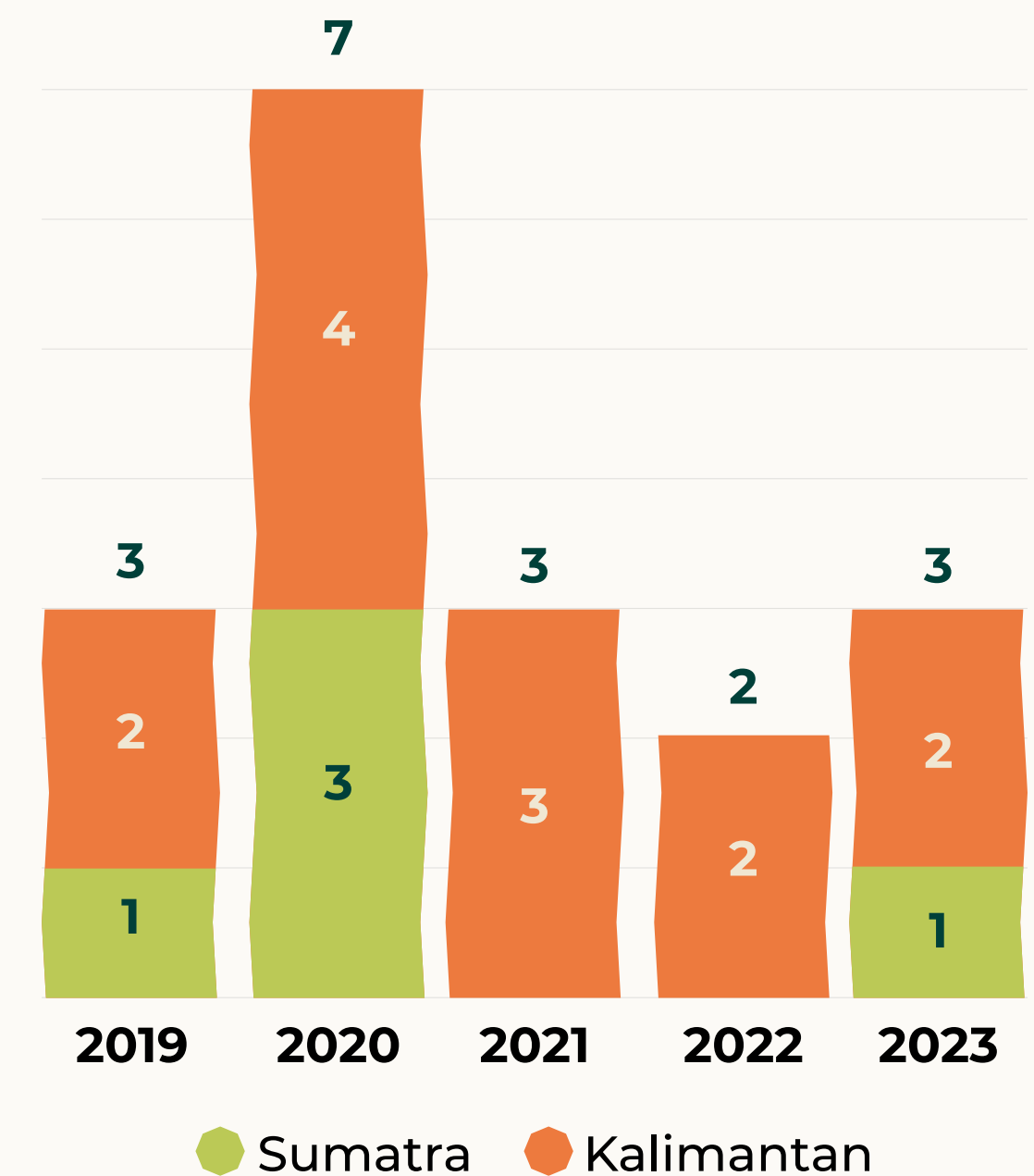
**Note:**

- The accident frequency rate measures lost productivity due to accidents. It is calculated as the number of accidents divided by the hours worked multiplied by one million.
- The severity rate is the number of days lost divided by the number of accidents.

## Upstream Fatalities

Despite our stringent health and safety measures, we deeply regret to report three fatalities at our upstream operations in 2023. Upon investigation, these incidents were due to working without following proper OSH procedures, adverse weather conditions, and road accidents. We take every fatality seriously and report our findings to the appropriate regional Manpower Office (*Dinas Tenaga Kerja*).

Fatalities by Region 2019-2023 (No.) • Upstream Operations



### \* Measures to Improve Safety and Health

We monitor OSH implementation at our work sites and execute programs such as OSH training and education to improve our accident, severity, and fatality rates. To minimize the risk of accidents recurring, we have implemented the following corrective actions:



Report work accidents to the Workers Social Security Agency (BPJS Ketenagakerjaan)



Conduct a Hazard Identification and Risk Assessment (HIRA) review



Provide education to all staff and employees on understanding work hazards and risks and the proper use of PPE



Provide training on the dangers and risks of maintenance work, conveyed by external technicians



Conduct HIRA and OSH training for all staff and employees on safe driving, including defensive driving, speed limits, and the proper use of helmets when riding motorcycles

### Employee Development and Talent Retention

[GRI 3-3]

We provide regular and relevant training to ensure our workers and employees can effectively carry out their roles and responsibilities. We also invest in capacity building and technical skills programs and provide professional development opportunities that enable employees to pursue their career goals while contributing to the overall advancement of the company. At our plantations, we conduct meetings and discussions with workers to establish harvesting targets during their performance assessments, thus fostering a performance-driven approach.

To support the development of green talent in Singapore, our Sustainability Communications team will host ten interns at our Headquarters from 2023 to 2027.



# Sustainability With Smallholders

[GRI 3-3, 203-1, 203-2, 413-1, 413-2, 13.23.4]

Smallholders in the Indonesian palm oil sector play a crucial role in agricultural production and are highly dependent on the commodity as a source of income.<sup>11</sup> However, they often encounter complex and interconnected challenges related to yields, efficient farming practices, land ownership, financial and market access, and economies of scale. The European Union Deforestation Regulation (EUDR) and increasingly stringent global regulatory landscape could further exacerbate these existing challenges, and may lead to the exclusion of smallholders from value chains.

Musim Mas has a plan to overcome these challenges and maintain smallholder inclusion. We recognize the increasing need for global players like us to engage with and support smallholders, and continue to implement our programs for **scheme smallholders** (where plantation companies operate nucleus estates that assist and support surrounding community plantations) and **independent smallholders** (farmers who are self-



financed, -managed, and -equipped). Over the years, our programs have received various accolades and recognition, and we continue to innovate and improve them while adapting to changing industry and regulatory requirements and standards.

» Meeting Increasing Regulatory Requirements

## Scheme Smallholders

We operate two programs for scheme smallholders – *Kredit Koperasi Primer Anggota* (KKPA) and the Village Development Program (VDP) or *Kebun Kas Desa*. As of December 2023, these programs comprise 43 local initiatives and cover 100% of our smallholders, who manage a combined 8,056 hectares of land area.<sup>12</sup>

<i>Kredit Koperasi Primer Anggota</i> (KKPA)		Combined hectarage <b>8,056 ha</b>	Village Development Program (VDP)/ <i>Kebun Kas Desa</i>	
A smallholder primary cooperative credit scheme, voluntarily initiated by Musim Mas in 1996. It provides smallholders with practical support to acquire the skills and technology needed to undertake palm oil cultivation				
Operating since <b>1996</b>	Number of programs: <b>11#</b> ⬆️ 1 in 2023		Operating since <b>2000</b>	Number of programs: <b>32#</b> ⬆️ 1 in 2023
Number of smallholders: <b>4,159#13</b> ⬆️ 15 in 2023	Total scheme smallholder hectarage <b>7,814 ha</b> ⬆️ 1,031 ha in 2023		Number of villages: <b>32#</b> ⬆️ 1 in 2023	Total scheme smallholder hectarage: <b>242 ha</b> ⬆️ 10 ha in 2023

# EY has performed limited assurance procedures on these figures.

<sup>11</sup> Smallholders are individuals with farms smaller than 20 hectares.

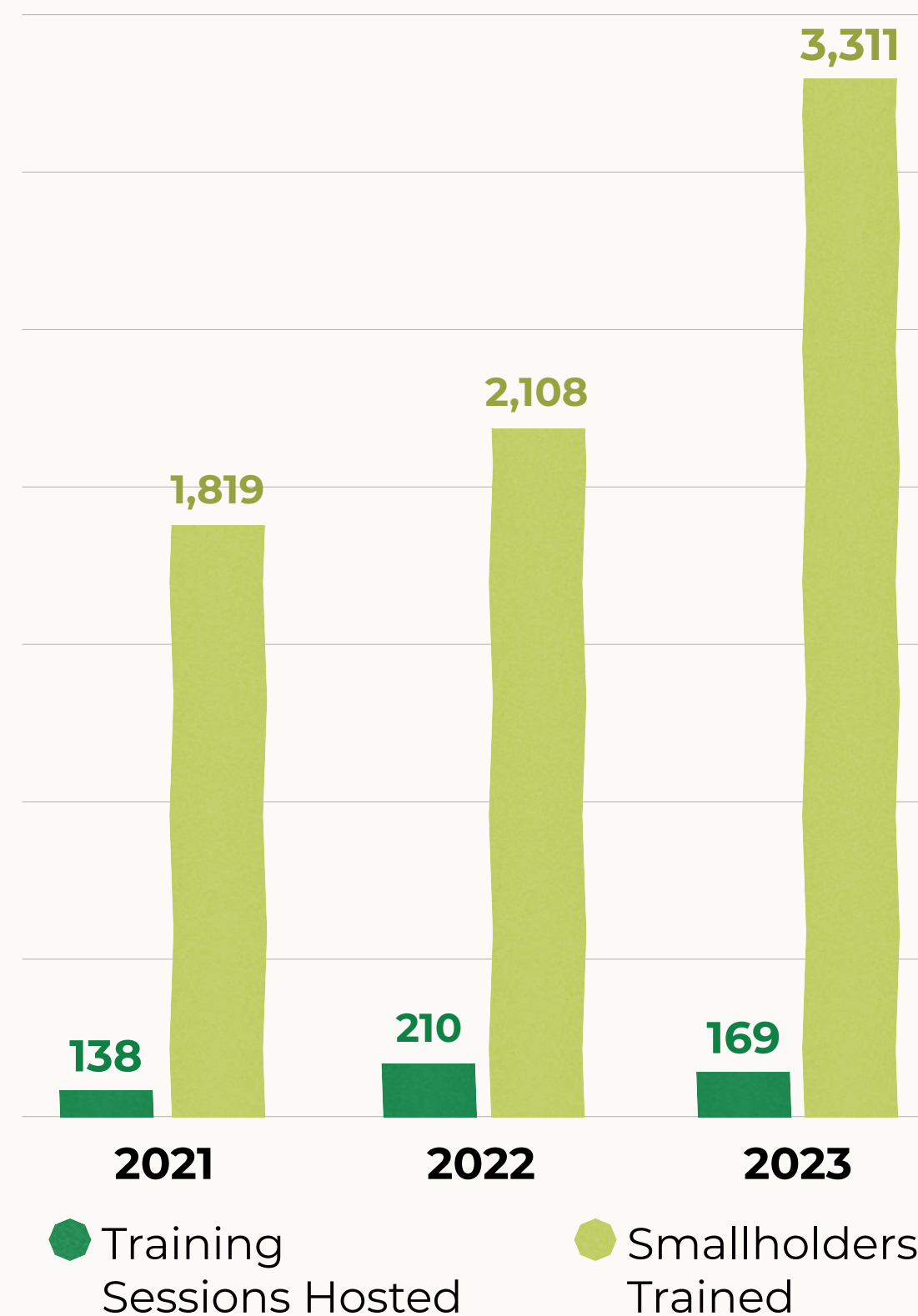
<sup>12</sup> We make all scheme smallholders and Musim Mas concession maps available to the RSPO.

<sup>13</sup> The 4,159 smallholders are from 10 KKPA programs. In 2023, we added a new program, bringing the total to 11. This has not yet increased the number of smallholders as the program is still in its early stages.

## Smallholder Training

We continue to conduct scheme smallholder training programs covering good agricultural practices (GAP), fire management, sustainability standards and certifications, safety and health, and other topics. **In 2023, we hosted 169 training sessions for KKPA and VDP smallholders, attended by 3,311 farmers.**

**Scheme Smallholder Training 2021-2023 (No.)**



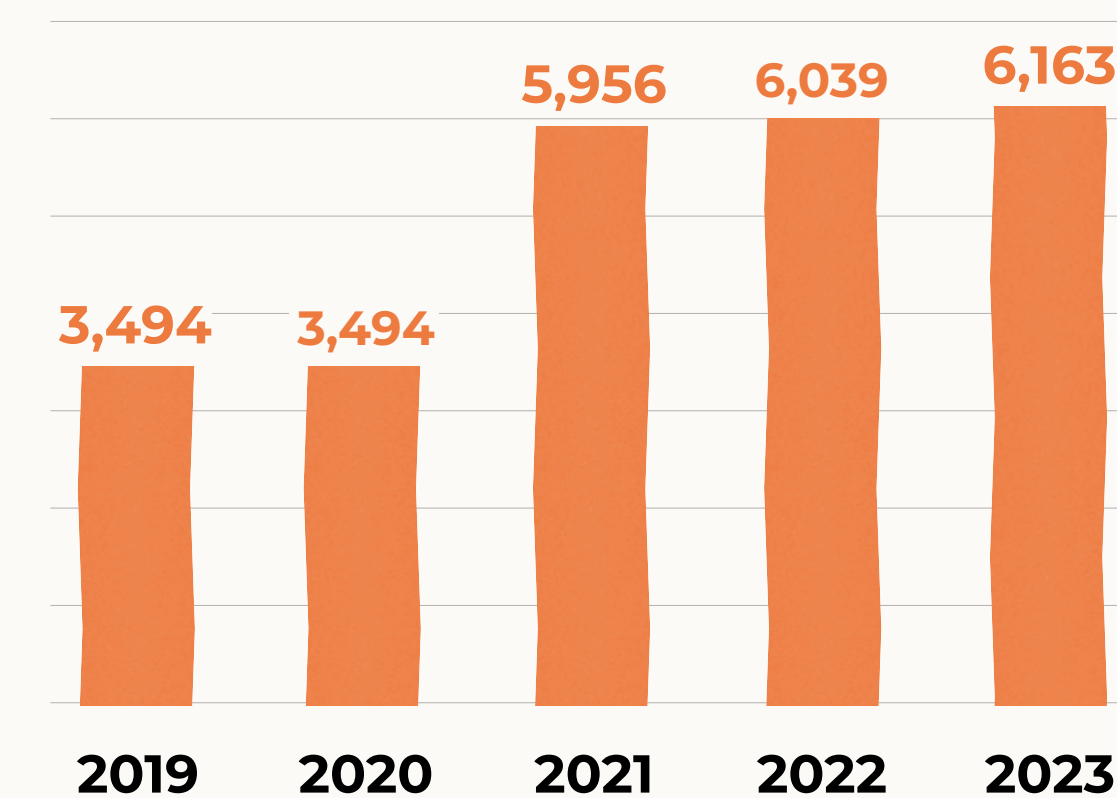
## Production and Income

**In 2023, our scheme smallholders produced 126,997 tonnes of fresh fruit bunches (FFB), sold for a combined gross income of IDR 300 billion (~USD 19.5 million).**

### Certified Smallholders

We work with our scheme smallholders to help them obtain sustainability certification. **As of December 2023, 77.54% of scheme smallholder-managed land,<sup>14</sup> representing 6,163 hectares, was RSPO-certified — 124 hectares more than in 2022.** Our certified scheme smallholders supplied Musim Mas mills with 115,695 tonnes of certified FFB, representing ~91% of all FFB sourced from scheme smallholders.

**RSPO-Certified Scheme Smallholder Area 2019-2023 (ha)**



## Independent Smallholders



Musim Mas has worked closely with independent smallholders since 2015, helping them align with sector standards and requirements, encouraging them to obtain certification, and integrating them into our supply chain. We engage with these smallholders on GAP and No Deforestation, No Peat, and No Exploitation (NDPE) commitments tailored to their capacity and resources, and partner with other actors and stakeholders in the local landscape to address barriers and maximize our long-term impact.

### Our two main programs are:

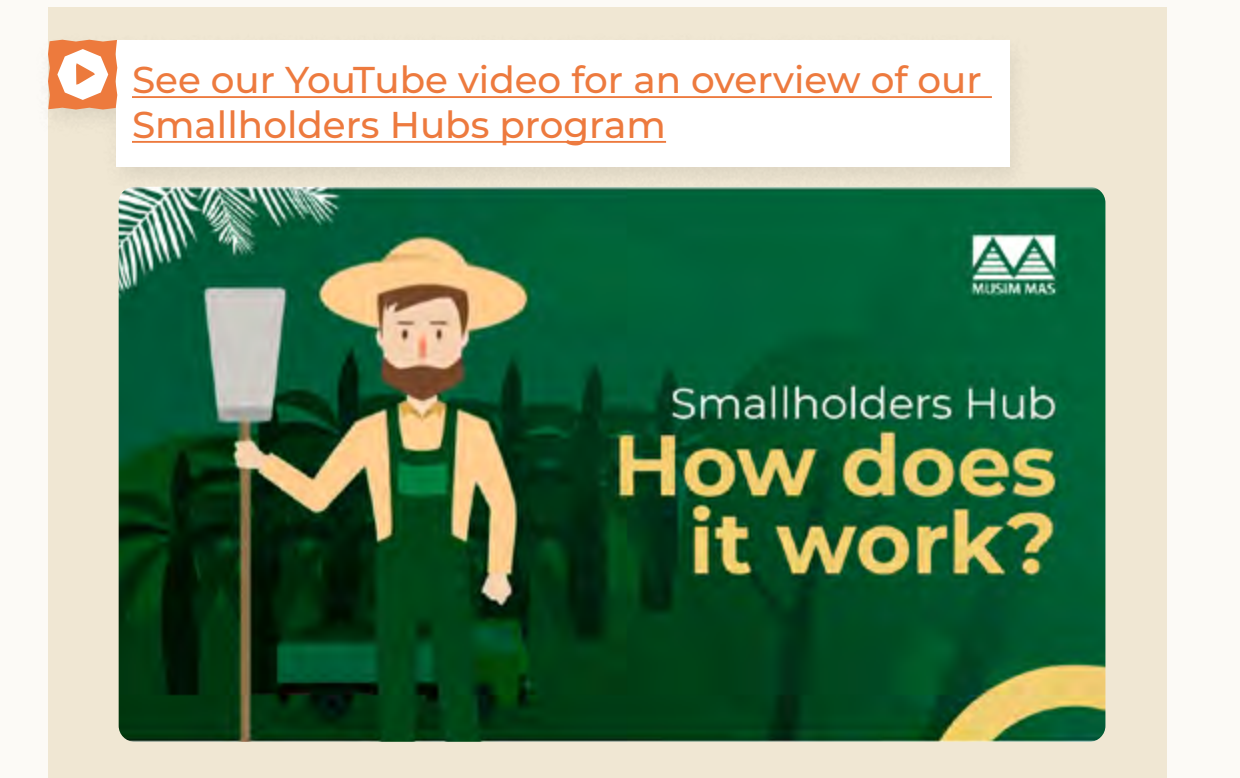
- 1. Training for smallholders:** directly training smallholders in the communities surrounding Musim Mas and third-party mills, including one-off collaborations.
- 2. Training for trainers through Smallholders Hubs:** indirectly providing extended coaching to independent smallholders by training local government agricultural officials (Village Extension Officers or VEOs) thereby expanding the scale and reach of the programs to benefit more smallholders.

Through our Smallholders Hubs, we collaborate with district authorities to better support independent smallholders within broader government initiatives,

contributing technical expertise to other stakeholders' jurisdictional and landscape initiatives.

Lessons learned from the various projects, such as knowledge and skills around composting and regenerative agriculture are shared with independent smallholders across our priority landscapes. We continue to identify opportunities to support independent smallholder livelihoods and expand our training modules while increasing the impact of our landscape initiatives.

Our collaborative, pre-competitive approach enables palm oil companies operating in the region to share knowledge, irrespective of a smallholder's buyer.



[See our YouTube video for an overview of our Smallholders Hubs program](#)

[Pillar 4: Drive Innovation in Sustainable Practices](#)

[See our webpage for more information: Independent Smallholders](#)

<sup>14</sup> The percentage is based on our RSPO Annual Communication of Progress (ACOP) submissions.





## Awards and Achievements

We are proud to announce that *Gabungan Asosiasi Pekebun Sawit Inisiasi Musim Mas (GAPSIMA)* received the **RSPO Excellence Award for Smallholder Impact in November 2023**.

GAPSIMA is Indonesia's largest RSPO-certified independent smallholders association, comprising nearly 4,586 farmers and managing a combined land area of 11,012 hectares. Its members have been receiving training and guidance from Musim Mas since 2015.

In 2023, Musim Mas also received the **Sawit Indonesia Award for the "Most Reputable Palm Oil Company Empowering Independent Smallholders"** from *Majalah Sawit Indonesia*.

[Musim Mas and GAPSIMA, the Largest RSPO-Certified Independent Smallholders Association Clinches the RSPO Excellence Award for Smallholder Impact](#)

[The Most Reputable Palm Oil Company on Empowering Independent Smallholder Award](#)

## Empowering Smallholders and Engaging Local Communities

Commentary by **Qayyum Amri**  
Chief Editor, *Majalah Sawit Indonesia*



Indonesian smallholders own 41% of the country's oil palm plantation areas, and the commodity contributes significantly to the livelihoods and development of local communities. However, palm oil standards, certifications, and regulatory requirements often present challenges for smallholder communities, which may lack the necessary resources to comply with their stringent demands.

Musim Mas was one of the first companies to achieve RSPO certification and has consistently demonstrated exceptional dedication to sustainable practices and supporting local communities. One of its standout initiatives is its Smallholders Hubs, which empower independent smallholders with the necessary knowledge and skills to cultivate sustainable palm oil in line with industry standards and best practices such as

NDPE. Musim Mas also collaborates with the Indonesian government through its Training for Trainers program, equipping government officials to train more smallholder farmers in agricultural best practices.

Another noteworthy aspect of Musim Mas' efforts is its focus on women smallholders. In an industry where women often remain in the background, Musim Mas pays equal attention to women farmers, supporting their livelihoods by equipping them with the knowledge and skills to cultivate palm oil safely and efficiently.

Palm oil is produced by local communities in Indonesia. To change negative perceptions about the commodity, palm oil companies must develop more programs to engage with smallholders and local populations. Musim Mas' industry-leading smallholder programs have set an excellent example, and I hope other plantation companies in Indonesia and elsewhere will follow suit.

*Majalah Sawit Indonesia is a leading media publisher focusing on palm oil industry products and technologies. Qayyum Amri is its Chief Editor, overseeing the publication's editorial content and strategic direction. Majalah Sawit Indonesia recognized Musim Mas as the "Most Reputable Palm Oil Company Empowering Independent Smallholders" in 2023.*

## Reach of Smallholder Programs

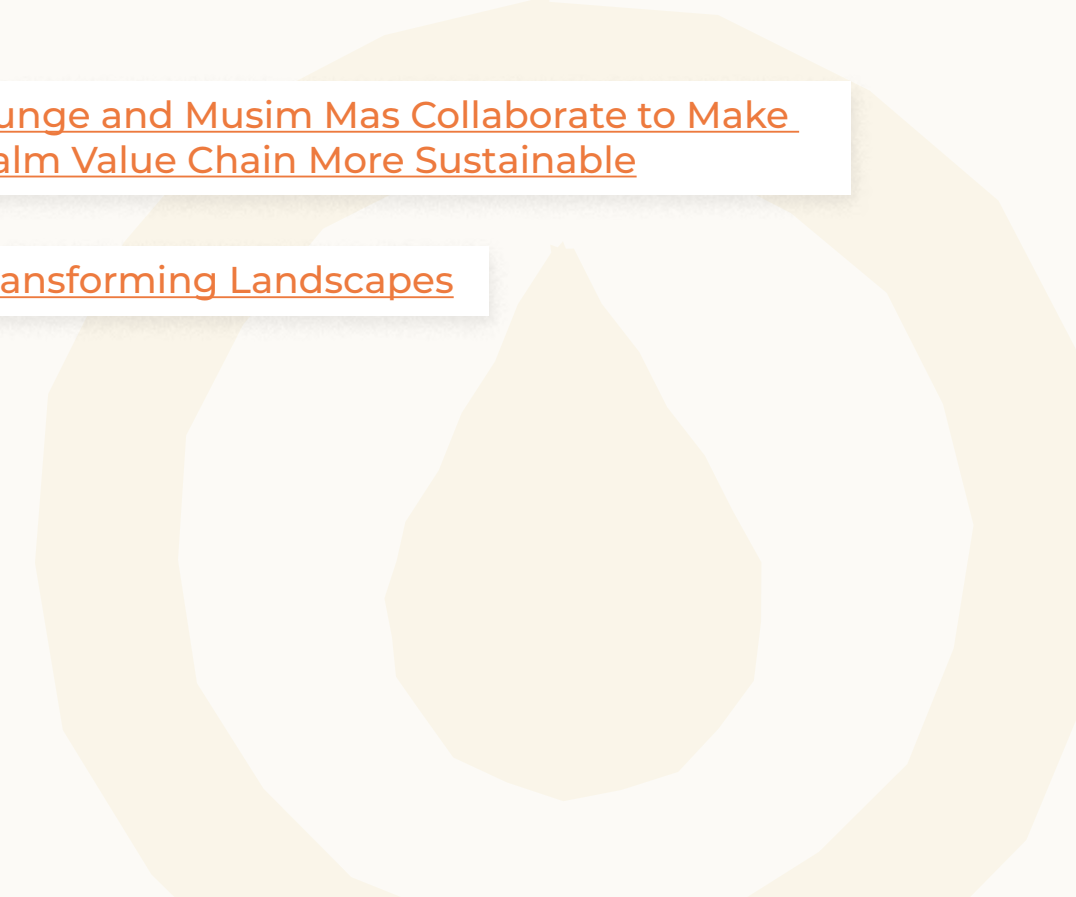
As of December 2023, 36,751 independent smallholders have been trained through Training for Smallholders program, and 460 VEOs and 6,723 independent smallholders have been trained through our Training for Trainers program through our Smallholders Hubs.

In November 2023, we partnered with Bunge through our Smallholders Hub in Sambas, West Kalimantan, with an aim to train more than 1,000 independent smallholders in sustainable palm oil production by 2025. This initiative, funded by Bunge, is aligned with the Tropical Forest Alliance's (TFA) [Agriculture Sector Roadmap to 1.5°C](#).

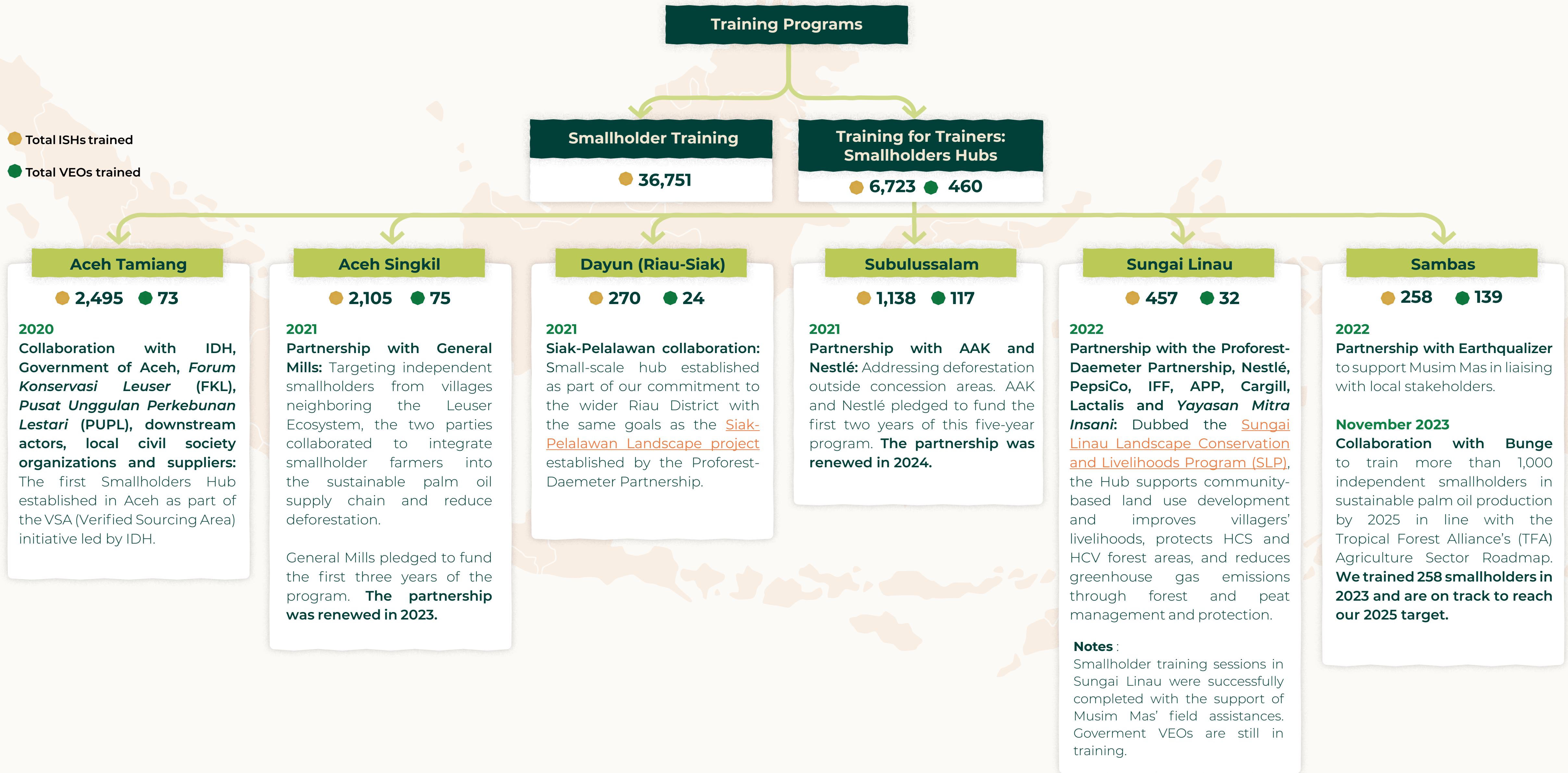
We also renewed our partnership with General Mills through our Smallholders Hub in Aceh Singkil, and our partnership with AAK and Nestlé through our Smallholders Hub in Subulussalam for a third year.

[Bunge and Musim Mas Collaborate to Make Palm Value Chain More Sustainable](#)

[Transforming Landscapes](#)



# Total Independent Smallholders Engaged in Programs: ● 43,474



## Increasing Training for Independent Smallholders Through Smallholders Hubs

We continue to grow our smallholder outreach programs and training for trainers through our Smallholders Hubs in priority regions. **In 2023, we trained 113 VEOs, increasing their number across all hubs from 347 in 2022 to 460. Subsequently, the number of smallholders trained by VEOs increased by almost 50%, from 4,529 in 2022 to 6,723 in 2023.** As of June 2024, 460 VEOs and 7,361 smallholders have been trained.

We surpassed our targets for smallholder training at all hubs ahead of schedule, except for Subulussalam and Sambas, which remain on track to achieve their goals.



VEOs and Independent Smallholders Trained by Hubs 2021-2023 (No.)

Area	VEOs				Independent Smallholders			
	2021	2022	2023	2025 target	2021	2022	2023	2025 target
Aceh Tamiang	73	73	73	40	495	2,489	2,495	1,500
Aceh Singkil	75	75	75	60	400	892	2,105	1,750*
Riau-Siak, Dayun	1	1	24	20	156	269	270	250
Subulussalam	28	117	117	60	-	476	1,138	1,500*
Sungai Linau	-	-	32	20	-	367	457	300
Sambas	-	81	139	30*	-	36	258	1,000*
<b>Total</b>	<b>177</b>	<b>347</b>	<b>460</b>	<b>-</b>	<b>1,051</b>	<b>4,529</b>	<b>6,723</b>	<b>-</b>

Notes :  
 1. VEO data in orange is the maximum number to be trained. We continue to increase smallholder engagement through the trained VEOs.  
 2. Targets marked with \* have been adjusted to account for previous COVID-19 movement restrictions and/or to align with contracts.

## Smallholders Program Partnerships



Our Smallholders Hubs leverage collaborative partnerships to achieve common goals and have a greater impact. Recently, we concluded our financial literacy workshops with MUFG Bank and PT. Bank Danamon Indonesia Tbk (Danamon) using the AgriON digital finance and financial learning platform.

We continuously seek new opportunities for collaboration while nurturing existing partnerships to ensure long-term progress. Our programs aim to support smallholders on the ground. These include:



### Women Smallholders Program

Women are pivotal to the stability and well-being of their families. They are often responsible for the bulk of household duties, including child rearing, financial management, and ensuring proper nutrition for their children and spouses.

In 2023, we launched the Women Smallholders Program, a collaboration with academic experts from the *Universitas Sumatra Utara* (USU). This program engaged woman smallholders and smallholders' wives in three Riau regencies. **Between May and December 2023, Musim Mas conducted training sessions for 1,206 smallholders, comprising 757 women and 449 men, as part of the first phase of the program.** It provided voluntary training on health and nutrition to improve their knowledge and help them make informed decisions about their individual and family well-being.

As a continuation of our health and nutrition training, in January 2024, we conducted a Training for Trainers program for 30 women. They have since delivered training on health and nutrition to the community.

Engaging men in this program is also paramount, as they are vital allies in promoting a positive perspective and fostering a supportive environment for women's empowerment. This holistic approach is critical for the program's sustainability and long-term impact.

We will expand the program in 2024 to include financial literacy and entrepreneurship training for home businesses. We are eager to explore new collaborations during the next phase of the program, ensuring its continued growth and ongoing impact in empowering women within smallholder communities.

[See our YouTube video for an overview of our Women Smallholders Program](#)



[Musim Mas Launched Women Smallholders Training Program](#)



### Developing the Next Generation of Farmers

We are launching an innovative program to inspire the next generation to pursue careers in agriculture, addressing the declining interest that could lead to a shortage of farmers and, ultimately, threaten global food security.

Our program focuses on agricultural students from vocational schools, many of whom are children of independent smallholders. Through career talks, lectures, and interactive sharing sessions, we raise awareness of the palm oil industry, its sustainability challenges, and the critical role of sustainable palm oil in the global market. Additionally, we share basic training in leadership, communication, and social media. Our ultimate goal is to cultivate a new generation of farmers, ensuring a sustainable and resilient agricultural sector for the future.



### Biodiverse & Inclusive Palm Oil Supply Chain (BIPOSC)

Since 2021, Musim Mas has partnered with the Livelihoods Funds for Family Farming (L3F), SNV, World Agroforestry (ICRAF), Danone, L'Oréal, and Mars Incorporated for the BIPOSC project – a collaborative effort to promote regenerative agriculture among independent palm oil smallholders in Labuhanbatu, near our PT Siringo-Ringo mill in North Sumatra.

The project encompassed group trainings and individual coaching sessions on regenerative agricultural practices, including how to

improve soil conditions, minimize soil erosion, reduce greenhouse gas emissions, support farm functional biodiversity and diversification of crops. Demonstration plots which also served as learning sites for smallholders, were established to showcase the benefits and impact of oil palm regenerative agriculture. Additionally, nurseries were set up to facilitate crop diversification at smallholder farms. The project also includes the formation of cooperatives to support smallholder businesses and other income-generating activities, as well as associations to assist smallholders in achieving RSPO and Indonesian Sustainable Palm Oil (ISPO) certification.

**As of June 2024, 891 independent smallholders have been trained in oil palm regenerative agriculture practices, agroforestry, and institutional business development.** Seven demonstration plots have been established for oil palm regenerative agriculture, 20 hectares of demonstration plots for agroforestry, and six nurseries for crop diversification. **Notably, a smallholder cooperative has been established to set up a composting unit with a self-sustaining business model that produces affordable organic fertilizer from our mill's by-products, with a monthly production capacity of 100 to 150 tonnes.** This cooperative also provides loans to smallholders for purchasing fertilizer.

The BIPOSC project will continue until 2031, with ongoing efforts focused on enhancing smallholder livelihoods, reducing pressure on forest ecosystems, and advancing sustainable palm oil cultivation.



### Collaborative Research for Smallholder Inclusion in Sustainable Palm Oil

We continue to collaborate on a joint research project with *Eidgenössische Technische Hochschule Zurich* (ETH Zurich), the University of Cambridge, and Indonesia's *Institut Pertanian Bogor* (IPB University) at our Smallholders Hub in Aceh Singkil to investigate the conditions under which supply chain sustainability initiatives can reduce deforestation in the Indonesian palm oil sector while safeguarding producer inclusion.

Employing a norm-based intervention approach, the research project trains and empowers smallholders on sustainable practices. Since March 2023, we have trained farmers on GAP, NDPE principles, and financial literacy, with support from the local government and Earthqualizer. The project is scheduled to conclude in June 2028, culminating in an impact report detailing the effects of these trainings on farmer behavior.

[See also: Page 6 of our Projects in the Aceh Landscape Report 2022/23](#)



### Sharing Expertise

Musim Mas has been recognized by the United States Agency for International Development (USAID) for our dedicated efforts and expertise in sustainable agriculture. **In September 2023, we were invited to assist USAID in delivering GAP training to 120 smallholders through its Sustainable Environmental Governance Across Regions (SEGAR) program.**

While this collaboration is informal and the smallholders trained may not necessarily supply to us, it aligns with Musim Mas' commitment towards sustainable palm oil production. We continue to engage with USAID and will assist the organization with SEGAR training sessions two to three times a year.

[See also: Page 5 of our Projects in the Aceh Landscape Report 2022/23](#)

### Collaborating for Shared Success

*Commentary by*  
**Diana Chalil**  
 Head of Magister of Agribusiness, Faculty of Agriculture, *Universitas Sumatra Utara (USU)*; Founder and Leader, Consortium Studies on Smallholders in Palm Oil



Palm oil is one of Indonesia's most important commodities and a significant driver of economic growth. International stakeholders continue to demand sustainable palm oil. However, the focus of their concerns has shifted from its environmental impact to its social impact, specifically on the livelihoods of smallholders.

Sustainability requires a long-term commitment to impactful programs. Musim Mas' smallholder initiatives have succeeded because the company operates an integrated supply chain that allows it to

communicate and amplify its social efforts and impact, connecting smallholders in Indonesia with consumers worldwide. The company is an industry leader because it willingly collaborates with industry peers, civil society organizations, and governments to find workable solutions to pressing sustainability issues.

While maintaining a competitive market is essential, prioritizing sustainability should be the overarching goal for the industry. Other companies can learn from Musim Mas and adopt similar collaborative approaches to accelerate progress, expand their impact, and positively influence evolving industry standards for sustainable palm oil.

*Diana is a researcher and lecturer at USU and the co-founder of the Consortium Studies on Smallholders in Palm Oil. USU has worked with Musim Mas on sustainable palm oil research since 2016. USU and CIRAD have partnered with Musim Mas, inviting the company to participate in workshops and conferences and deliver talks and presentations as part of the university's summer program on Inclusive and Sustainable Palm Oil.<sup>15</sup>*

<sup>15</sup> The French Agricultural Research Centre for International Development [*Centre de coopération internationale en recherche agronomique pour le développement (CIRAD)*] is a government agency working for the sustainable development of tropical and Mediterranean regions, with regional offices worldwide.

## Supporting Independent Smallholder Certification

Musim Mas, along with our industry and civil society partners, continues to support independent smallholders in achieving RSPO and ISPO certification.

### RSPO

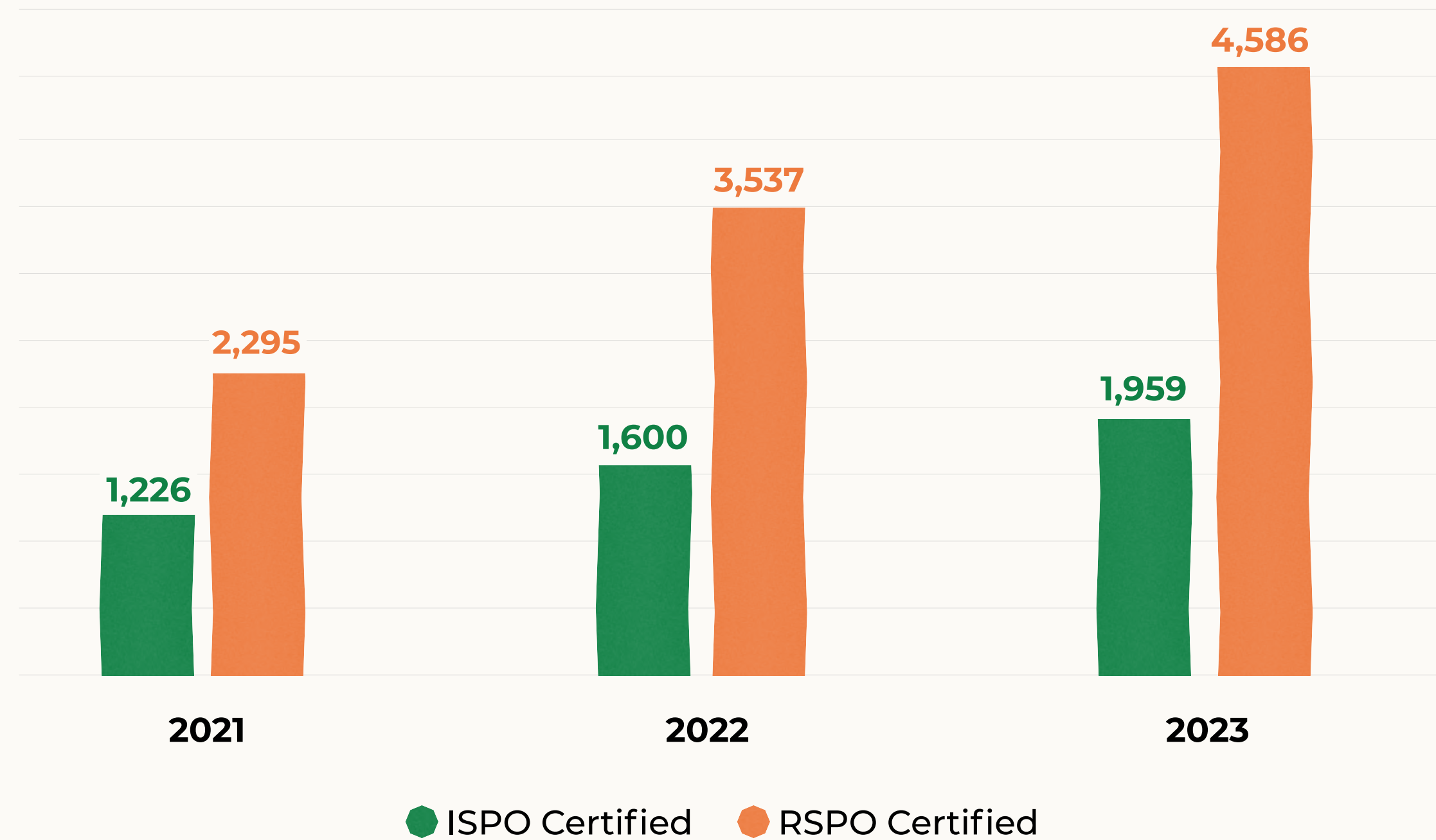
In 2023, we supported 4,586 smallholder farmers in achieving RSPO certification, 3,126 of whom supplied to Musim Mas. Together, they manage a total of 11,012 hectares of plantations.

Our independent smallholder certification program has given smallholders and farmers' associations direct access to the sustainable palm oil market. These smallholders have sold RSPO Independent Smallholder Credits to consumer goods companies Unilever, PepsiCo, and Nestlé, earning premiums of nearly USD 2.6 million as of December 2023.

### ISPO

We also helped 1,959 independent smallholders who manage a combined 4,496 hectares of plantations achieve the mandatory ISPO Ministry of Agriculture Decree No.38 of 2020 (ISPO 38/2020) certification. These smallholders supply to us.

Independent Smallholders Certified to the RSPO and ISPO Standards 2021-2023 (No.)



## Addressing Challenges

We make every effort to train and educate smallholders, but it can be challenging to ensure that independent smallholders adhere to GAPs, particularly the standard operating procedures (SOPs) and 4R principles for pesticide and fertilizer application.<sup>16</sup>

We are currently trialing a composting project that is part of the wider BIPOSC Project under the North Sumatra Livelihood Funds (L3F) program. If successful, we will scale the project and incorporate the compost across our independent smallholder programs.

Smallholders Program Partnerships



<sup>16</sup> The 4R principles for fertilizer application refer to: right type, right amount, right time and right place.

# Community Rights and Support

[GRI 3-3, 203-1, 203-2, 413-1, 413-2, 13.14.1, 13.14.4]

Musim Mas is committed to supporting the welfare and livelihoods of populations in our surrounding communities, especially in rural areas. We address challenges to residents' well-being and provide essential amenities like education and healthcare services through long-term partnerships with community leaders and civil society organizations.

## Upholding Land and Community Rights

Musim Mas respects and upholds the rights of communities to cultivate the land for their own use and livelihoods. We obtain the Free, Prior and Informed Consent (FPIC) of all community members before initiating any new developments or expanding our operations on community land. We rigorously review all new developments against the RSPO New Planting Procedure and its requirements. As detailed in our [HCSA](#) assessment reports, our dedicated teams adopt a comprehensive consultative approach based on FPIC principles,

engaging with local communities in participatory mapping exercises. We negotiate compensation for lost benefits and relinquished rights voluntarily and in agreement with the impacted communities. We strive to address all issues and provide appropriate remedies through our dispute resolution mechanism.

This approach reduces the risk of disagreements and conflicts, allowing us to map village boundaries, customary communal and private land, and infrastructure. It also provides valuable insight into sociocultural, traditional, and religious values, livelihoods, and land use habits, increasing our understanding of local communities' concerns, needs, and aspirations. Additionally, this information helps us formulate our land use, development, monitoring, and management plans, which we align with existing community programs for greater synergy.

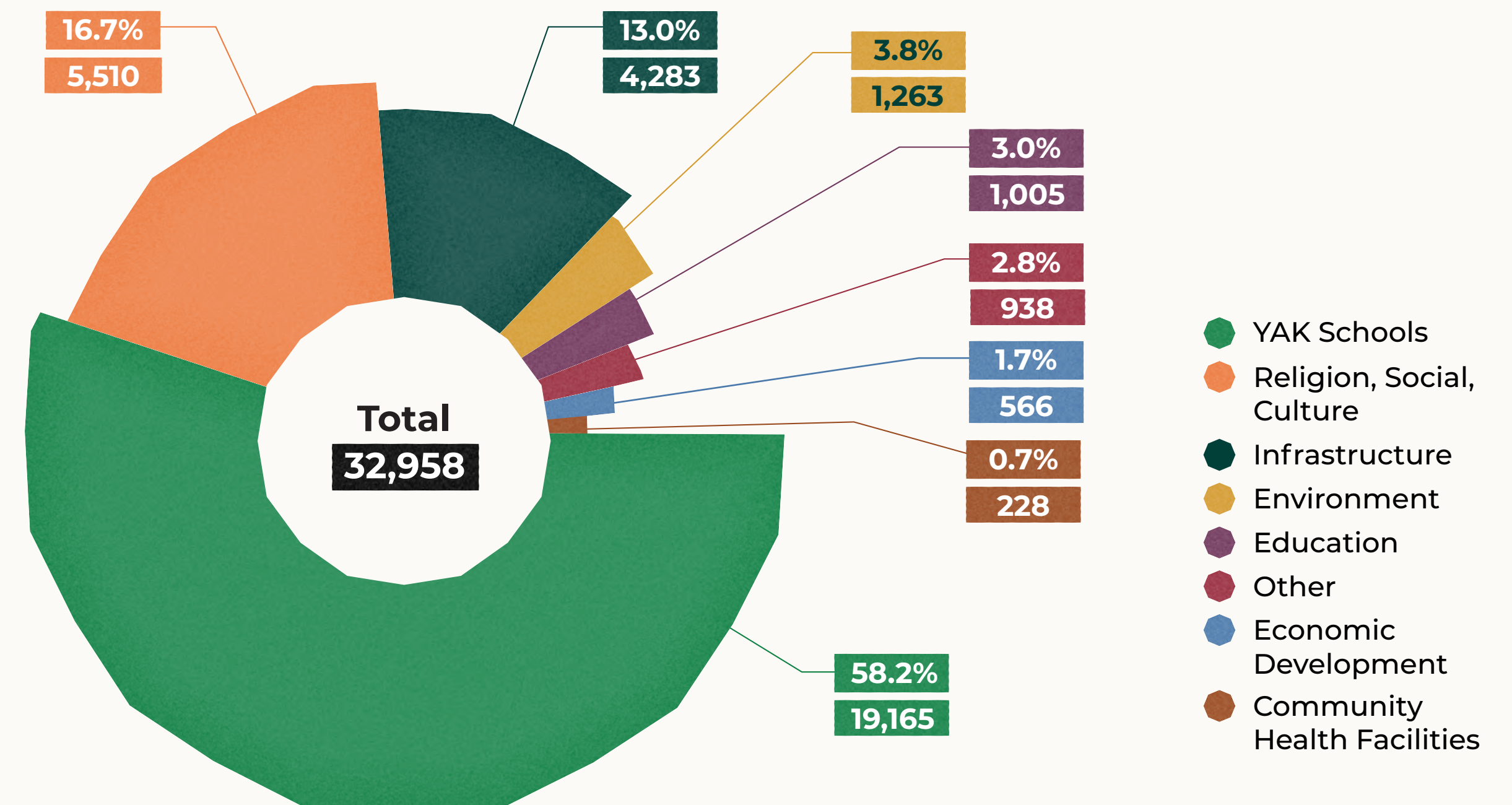
[Grievance Mechanism: Dispute Flowchart](#)

## The Anwar Karim Foundation

Musim Mas operates a long-standing outreach initiative through the Anwar Karim Foundation (*Yayasan Anwar Karim – YAK*), which organizes and supports various programs that improve the well-being of our employees and surrounding communities. **In 2023, our monetary contributions exceeded IDR 32.9 billion**

(~USD 2.1 million). The largest proportion (about 58%) was allocated to YAK schools, including kindergartens and childcare centers, followed by sociocultural activities, infrastructure improvements, environmental initiatives, local economic development, and public health.

CSR Contributions 2023 (% , Million IDR)



## Community Support



We hold regular meetings with community members and local representatives, including village heads, to inform them of any relevant infrastructure developments that may affect them. We engage in ongoing dialogue and consult with them as needed to ensure that the developments meet their specific needs.

Every year, villages neighboring our operations are invited to submit proposals on how to best use our infrastructure development budget. Over the years, Musim Mas initiatives have helped enhance these communities' access to essential services, including clean water and sanitation, and public facilities, such as mosques and libraries, to promote their well-being.

### \* CSR Initiatives in 2023

#### Classroom Renovations at Universitas Indonesia

As part of our commitment to supporting education, we funded the renovation of four classrooms at the Faculty of Economics and Business, *Universitas Indonesia* (UI), to help create a more conducive learning environment.

[Renovation at Universitas Indonesia](#)

#### Road Repairs Between Pelalawan District Villages

We repaired a 5-meter-wide road between Talau Village and Tanjung Beringin Village in the Pelalawan District, distributing 300 tons of stones and deploying heavy equipment. This project helped improve the safety and comfort of community members commuting between the two villages.

[CSR Program at Pelalawan District](#)

#### Donations to Singapore Charities

We donated SGD 5 million (~USD 3.7 million) to six charities in Singapore,<sup>17</sup> bringing our total philanthropic donations to over SGD 10 million (~USD 7.5 million) since 2019.

[Musim Mas Pledges SGD 5 million to Charitable Causes](#)

## Advancing Sustainability Knowledge

In Indonesia and Singapore, we regularly engage with academic institutions at various levels to share and exchange our knowledge on sustainability, especially within the palm oil sector. We employ a multi-pronged approach to increase awareness of Musim Mas' and the broader industry's sustainable palm oil initiatives and support the education and development of eco-conscious talent. Some of our engagements include:

#### Universitas Sumatra Utara (USU), Indonesia

We are an annual guest speaker at USU's summer school, sharing best practices and lessons learned about smallholders in our supply chain. Topics include helping smallholders meet on-the-ground challenges and including them in global supply chains.

#### Singapore Institute of Technology (SIT), Singapore

In February 2024, Musim Mas presented a case study on the palm oil industry and sustainable palm oil to students at SIT. During our presentation, we discussed the industry's overall efforts, progress, and challenges, providing insights into the complexities of sustainable practices in the sector.

#### Nanyang Technological University (NTU) Nanyang Business School (NBS), Singapore

Starting two years ago, Musim Mas has actively participated as a guest speaker in NTU NBS Sustainability Metrics and Decision-Making module, presenting case studies on our sustainability efforts and initiatives.

#### Peiyang Primary School, Singapore

In October 2023, Musim Mas took part in knowledge-sharing sessions with primary school children, introducing them to sustainable palm oil and the palm oil industry in general while educating them on how their choices can make a difference.

<sup>17</sup> Musim Mas donated to six organizations: The Majority Trust, Singapore General Hospital, Community Chest, The Straits Times School Pocket Money Fund, Metta Welfare Association, and VIVA Foundation for Children with Cancer.



# Business Ethics

[GRI 3-3, 205-2]

Musim Mas is committed to conducting business fairly and ethically, prohibiting corruption or bribery. We are guided by our Code of Business Conduct and an internal Anti-corruption Policy, which we communicate to all employees. In 2023, more than 28,000 employees, including all plantation and mill workers, received training on our anti-corruption policies and procedures.

All stakeholders, including employees, can file complaints confidentially and report issues through our whistleblowing mechanism without fear of retaliation or dismissal.

» [Corporate and Sustainability Governance](#)

» [Pillar 3: Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders](#)

## \* Progress of Legal Proceedings Against a Musim Mas Executive

In 2022, a legal case was initiated against a Musim Mas executive for allegedly obtaining export permits improperly during the 2022 Domestic Market Obligation (DMO) program. The case remains ongoing at the time of this report's publication. In 2023, the office of the Attorney General of Indonesia announced that it was expanding its investigation to Musim Mas Group.

Administrative Court (PTUN), about the DMO regulations. On 5 March 2024, the State Administrative Court ruled that there was maladministration and ordered the Ministry of Trade to reformulate the regulations.

Musim Mas remains confident in the judicial process, knowing that it complied with the prevailing laws and regulations at the time of the DMO program and fully supported its implementation.

In July 2023, Musim Mas filed a lawsuit against the Ministry of Trade of the Republic of Indonesia through the State





**PILLAR 2**

**Deliver Positive Environmental Impacts**

Musim Mas strives to minimize the potential negative impacts of our operations on the environment and surrounding communities, and is committed to addressing the climate crisis. We are minimizing greenhouse gas (GHG) emissions, upholding No Deforestation and No Peat principles at our operations and in our supply chain, and implementing various supplier and smallholder programs to address climate-related risks. Our [Biodiversity and Climate Resiliency Action Plan 2022](#) further details our commitment to biodiversity conservation and environmental stewardship.

At the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) in Egypt, Musim Mas committed to sector-wide targets as a signatory to the [Agriculture Sector Roadmap to 1.5°C](#) facilitated by the Tropical Forest Alliance (TFA).

In 2024, we committed to the [Science Based Targets Initiative \(SBTi\)](#) for our emission reduction targets. We will update our progress towards these targets in our annual sustainability reports.

» [Targets and Progress](#)



## Achieving Sector-Wide Goals

Commentary by  
the Tropical Forest Alliance (TFA)



Leading companies in the palm oil sector, like Musim Mas, have made significant progress in meeting their No Deforestation, No Peat, and No Exploitation (NDPE) commitments and are nearing 80% satellite monitoring coverage. However, the palm oil sector continues to grapple with the challenges of a leakage market and negative consumer perception. Our broader challenge remains engaging with the entire industry, particularly companies that have yet to embrace the NDPE agenda. Furthermore, the sector needs to catch up with other industries in measuring and accounting for its Scope 3 emissions and setting ambitious SBTi targets.

To achieve sector-wide goals, companies must look beyond their individual responsibilities and engage with other supply chain actors, including palm oil demand-side markets in India and China to focus on physical volumes. Companies can embrace new roles and engage in corporate-led sustainability advocacy to share lessons learned and drive the industry forward, as Musim Mas is already doing. Stepping outside their traditional roles, palm oil companies can call attention to positive progress and multi-stakeholder efforts on the ground and counteract negative perceptions about the sector.

*The Tropical Forest Alliance (TFA) is a global public-private partnership platform hosted by the World Economic Forum comprising 170 partners, including Musim Mas. The TFA facilitated the development of the Agriculture Sector Roadmap to 1.5°C. It is also a strategic partner of the Consumer Goods Forum Forest Positive Coalition of Action and helped develop that organization's 2021 Strategy for Collective Action in Production Landscapes.*

» [See also: TFA's commentary on The Importance of Landscape Approaches](#)

# Climate Action

[GRI 3-3]

Climate change is a critical global issue with far-reaching impacts on ecosystems, human health, and economies. This year alone, we have seen the rise in severe and frequent climate-related events across the globe, such as heatwaves, floods, and wildfires.

As one of the largest players in the palm oil industry, Musim Mas recognizes that climate change may pose a significant risk to both our direct operations and across our value chain. At the same time, we also believe that the transition to a low carbon future brings about new opportunities such as the growth of biofuels and development of climate-resilient palm variants.

***In 2023, Musim Mas earned a double 'A' score on the CDP Forests and Water Security Assessments, securing a place on the CDP 'A List,' an honor accorded to a handful of the 21,000 companies that submitted assessments. We maintained our 'B' score on the Climate Change Assessment and are exploring ways to improve our score.***



[Musim Mas Inaugural Inclusion in CDP's Prestigious 'A-List,' Recognized with a Double 'A' Score for Transparency on Forests and Water Security](#)

## Understanding Our Climate-Related Risks and Opportunities

[GRI 201-2] [SASB FB-AG-110a.2, FB-AG-440a.1]

As a private company, we are not required by law to report against the Taskforce on Climate-related Financial Disclosures (TCFD) recommendations. However, we recognize it as a valuable framework and exercise to help us gain insights into the potential financial impacts of climate-related risks and opportunities on our business and assess our resilience. Aligning with the TCFD will also allow us to communicate more effectively with our stakeholders and prepare us for compliance with Singapore's new mandate for climate reporting using the International Sustainability Standards Board (ISSB) standards, which will be compulsory for all large non-listed companies incorporated in Singapore by 2028, as well as the European Union's Corporate Sustainability Reporting Directive (CSRD).

In early 2023, we conducted a preliminary in-house climate risk assessment to identify and evaluate potential climate-related impacts and mitigation measures at our operations. This proactive exercise

enhanced our understanding of how climate change may affect our operations and laid the foundation for climate-resilient business practices and strategies.

Following this preliminary assessment, we engaged an independent consultant to help assess our readiness for TCFD reporting. This second assessment revealed that we were well prepared, thanks to our ongoing CDP submissions. In 2024, we conducted an internal climate risk scenario analysis with the consultant to map our climate risk impact pathways and to further align with the TCFD recommendations, which have been grouped into four key thematic areas that are essential to organizational operations: **governance** (see also section on [Corporate and Sustainability Governance](#)), **strategy, risk management**, and **metrics and targets**.

» [For more information, see: Aligning with the Recommendations from the Taskforce on Climate-related Financial Disclosures \(TCFD\)](#)

## ✦ Climate Scenario Analysis

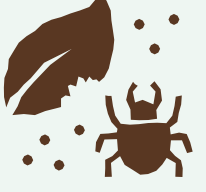



Our inaugural climate risk scenario analysis conducted in 2024 evaluated the medium-term (2030) and long-term (2050) impacts of global temperature increases, including climate-related physical and transitional risks on our business. Climate-related physical risks, such as increased temperatures, altered precipitation patterns, and extreme weather events, can adversely impact our crop yields and disrupt our operations leading to higher costs and reduced revenues. Transitional risks, including regulatory changes, shifts in market preferences, and evolving sustainability standards, may also lead to higher operational costs and an increased demand for sustainable practices.

Our analysis was limited in scope to our upstream and downstream activities in Sumatra, including a selection of our plantations, mills and a complex comprising a refinery, oleochemicals plant and specialty fats plant. Using 2023 as a baseline, we assessed

climate impacts against a range of science-based scenarios. These included Paris-aligned scenarios that project a global temperature increase of up to 1.5°C and business-as-usual (BAU) scenarios that project increases of over 3°C.<sup>18</sup>




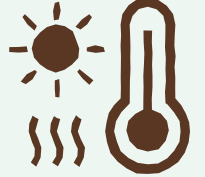
In collaboration with our consultant, we conducted interviews with key internal stakeholders, and referenced market research, internal studies and academic publications from credible third-party sources such as the Intergovernmental Panel on Climate Change (IPCC) to identify a selection of climate-related physical and transitional risks and opportunities that may impact our business. We qualitatively assessed their significance based on their severity and likelihood, as well as our operations' exposure and vulnerability to them. The outcomes are summarized in the tables below.

### Climate-Related Physical Risks

Physical Risks	Risk Description	Risk Category	Implications for Musim Mas	Time Horizons	Mitigation Measures
 <p><b>Pest and Diseases</b></p>	Temperature and precipitation changes may affect the spread of fungal diseases (e.g., basal stem rot) that may impact oil palm yields.	<b>Chronic</b>	<ul style="list-style-type: none"> <li>Increased pest management costs</li> <li>Fungal diseases decrease overall yields, resulting in lost profits</li> </ul>	 <p><b>Long Term</b></p>	<p>Musim Mas plantations has been implementing early detection, regular monitoring, and prompt treatments that effectively detect potential pest and diseases outbreaks.</p> <p>For more information, see <a href="#">Reducing Pesticide Use</a>.</p>
 <p><b>Storms</b></p>	Climate change may increase the severity and frequency of extreme tropical cyclones, creating strong winds and heavy rainfall inland.	<b>Acute</b>	<ul style="list-style-type: none"> <li>Tropical cyclones can cause floods that disrupt operations and increase costs (e.g., by disrupting the fertilizer application schedule)</li> <li>Increased disruption of operations and potential loss of revenue</li> <li>Increased worker safety risks</li> </ul>	 <p><b>Long Term</b></p>	<p>Musim Mas has already implemented forecasting measures to monitor tropical storms and monsoons impacting our plantation operations and the shipment of goods. At the same time, we constructed gray infrastructure, including embankments, to help mitigate damage from cyclones.</p> <p>Musim Mas has formed an Emergency Response Team to mitigate and minimize worker safety risks. Musim Mas conducts annual trainings on Best Management Practices and Safety for all workers to raise awareness of potential risks.</p>











<sup>18</sup> Paris-aligned scenarios are projections that are consistent with the Paris Agreement's goals, which aim to restrict global warming to well below 2°C through efforts to limit it to 1.5°C above pre-industrial levels. Our analysis used the following Paris-aligned scenarios: the International Energy Agency's (IEA) Net Zero Emissions by 2050 scenario and the Representative Concentration Pathway (RCP) 2.6. The BAU scenarios used were the International Energy Agency's (IEA) Stated Policies Scenario (STEPS) and RCP 8.5.

Climate Action Positive Environmental Impacts



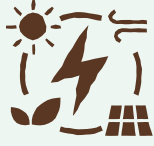





Physical Risks	Risk Description	Risk Category	Implications for Musim Mas	Time Horizons	Mitigation Measures
 <p><b>Floods</b></p>	Heavy rains may lead to rivers overflowing and flash flooding that disrupt fresh fruit bunches (FFB) collection and damage infrastructure.	<b>Acute</b>	<ul style="list-style-type: none"> <li>Increased repair and maintenance costs</li> <li>Capital costs from flood mitigation and adaptation efforts (e.g., floods may disrupt FFB transportation routes)</li> <li>Increased climate-related insurance costs</li> </ul>	<p>■■■■</p> <p><b>Medium to Long Term</b></p>	Musim Mas has implemented flood mitigation and adaptation measures, including building bund embankments with flap-gates along riparian zones and installing water pumps.
 <p><b>Fires</b></p>	Rising average temperatures and longer drought seasons increase the risk of fires that may damage oil palm plantations.	<b>Acute</b>	<ul style="list-style-type: none"> <li>Loss of revenue from the destruction of oil palms and increased replanting costs</li> <li>Lower yields</li> <li>Increased worker health and safety risks.</li> <li>Negative health impacts on surrounding communities</li> </ul>	<p>■■■■</p> <p><b>Medium to Long Term</b></p>	<p>Musim Mas has implemented community engagement programs (e.g., the Fire Free Village Program) and mitigation measures (e.g., building water ponds and fire breaks, monitoring satellite data, and installing fire watch towers) to prevent wildfires in concession areas.</p> <p>For more information, see <a href="#">Monitoring and Managing Fires</a>.</p>
 <p><b>Droughts</b></p>	Droughts are expected to increase in frequency and intensity, including droughts caused by El Niño events, impacting FFB yields.	<b>Acute</b>	<ul style="list-style-type: none"> <li>Decrease in revenues due to lower production capacity caused by water scarcity</li> <li>Decrease in revenues from lower FFB yields</li> </ul>	<p>■■■■</p> <p><b>Medium to Long Term</b></p>	We have adopted comprehensive measures to preserve surface water and groundwater quality. We monitor water-related risks through the World Resources Institute's Aqueduct tool and are mindful to not locate our upstream operations in water-stressed areas.
 <p><b>Rising temperatures &amp; heatwaves</b></p>	Projected rises in average temperatures and heatwave frequency can pose health risks to plantation workers, reducing labour efficiency and increasing the risk of heat-related illnesses.	<b>Chronic</b>	<ul style="list-style-type: none"> <li>Increased operating costs (energy and labour)</li> </ul>	<p>■■■■</p> <p><b>Long Term</b></p>	We have implemented a range of OSH measures to protect workers from heat-related illness and injuries by mandating breaks during periods of high temperatures.

Climate Action Positive Environmental Impacts

Climate-Related Transition Risks

Transition Risks	Risk Description	Risk Category	Potential Impacts	Time Horizons	Mitigation Measures
 <p><b>Climate or Forestry Regulation</b></p>	Climate-related regulations such as the EU Deforestation Regulation (EUDR) will require palm oil companies to supply deforestation-free products and ensure supply chain traceability. Specifically, the EUDR requires companies to comply with local environmental, human rights, land use, and labour laws. Sanctions include fines and the confiscation of products found to have breached EUDR requirements.	<b>Regulatory</b>	<ul style="list-style-type: none"> <li>Increased compliance and legal costs</li> <li>Potential revenue loss from instances of non-compliance</li> </ul>	 <p><b>Medium Term</b></p>	<p>We implemented our Sustainability Policy in 2014 and have launched EUDR compliance initiatives. For example, our NDPE and sustainability policies include commitments to No Deforestation and traceability to plantation, among others. We have achieved 98% traceability to plantation, as independently verified by Control Union.</p> <p>For more information, see <a href="#">Meeting Increasing Regulatory Requirements</a>.</p>
 <p><b>Carbon Pricing Mechanisms</b></p>	Countries where we operate already have or are planning to implement carbon pricing mechanisms. These include Indonesia's recently introduced carbon offsetting and cap and trade measures.	<b>Regulatory</b>	<ul style="list-style-type: none"> <li>Increased operating and procurement costs due to upstream power suppliers passing on carbon costs</li> </ul>	 <p><b>Medium to Long Term</b></p>	<p>We are committed to reducing our GHG emissions by setting ambitious targets aligned with the SBTi. We have installed methane capture facilities for the treatment of palm oil mill effluent, significantly reducing our dependence on external electricity at our upstream operations. We are exploring renewable energy alternatives for our midstream and downstream operations.</p> <p>For more information, see <a href="#">Group Emissions</a> and <a href="#">Upstream Emissions</a>.</p>
 <p><b>Shift in Customer Preferences Towards Palm Alternatives</b></p>	Consumer scrutiny of the potentially negative impacts of palm oil cultivation may lead to a shift towards palm oil substitutes and alternatives.	<b>Market</b>	<ul style="list-style-type: none"> <li>Reduced revenues from traditional palm oil products</li> </ul>	 <p><b>Long Term</b></p>	<p>While the risk of palm oil alternatives to our business remains low, we recognize the increasing preference of Western consumers for sustainable palm oil. As a result, Musim Mas was the first Indonesian company to join the Roundtable on Sustainable Palm Oil (RSPO) when it was established. As of December 2023, more than 85% of our total managed area are RSPO-certified, and all our upstream entities have achieved Indonesian Sustainable Palm Oil (ISPO) certification since August 2023.</p> <p>For more information, see <a href="#">Certification and Compliance</a>.</p>
 <p><b>Development of Lab-Grown Palm Alternatives</b></p>	Development of lab-grown palm oil, including through precision fermentation, may become an alternative to traditional palm oil. However, developments are still limited.	<b>Technology</b>	<ul style="list-style-type: none"> <li>Decreased operating revenue due to loss in market share</li> </ul>	 <p><b>Long Term</b></p>	<p>For more information, see <a href="#">Certification and Compliance</a>.</p>
 <p><b>Long-Term Peatland Use</b></p>	Increasing stakeholder pressure to rehabilitate used peatlands may result in additional costs.	<b>Policy</b>	<ul style="list-style-type: none"> <li>Increased compliance and rehabilitation costs</li> </ul>	 <p><b>Medium Term</b></p>	<p>Musim Mas employs best practices that align with RSPO guidelines and local regulations for managing peatlands and fragile soils.</p> <p>For more information, see <a href="#">Conservation and Restoration</a>.</p>

### Climate-Related Transition Opportunities

Transition Opportunities	Opportunity Description	Opportunity Category	Potential Impacts	Time Horizons
 <p><b>Increased Use of Precision Agriculture</b></p>	Precision agriculture can reduce excess waste and fuel use while maximizing crop yields.	<b>Technology</b>	<ul style="list-style-type: none"> <li>Increased revenues and material output due to improved agricultural productivity</li> <li>Reduced soil degradation</li> </ul>	 <p><b>Medium to Long Term</b></p>
 <p><b>Increased Use of Renewable Energy</b></p>	Using renewable energy sources, including on-site solar and biomass, as well as renewable energy credits (RECs), as fossil fuel substitutes.	<b>Technology</b>	<ul style="list-style-type: none"> <li>Decreased carbon-related costs, when regulatory pricing is in place</li> </ul>	 <p><b>Long Term</b></p>
 <p><b>Use of Technology-Assisted Production Tools</b></p>	Increased use of automation and technology-assisted tools, including AI, to help improve agricultural productivity and efficiency.	<b>Technology</b>	<ul style="list-style-type: none"> <li>Increased revenues and material output from higher agricultural productivity and efficiency</li> </ul>	 <p><b>Medium to Long Term</b></p>
 <p><b>Development of Climate-Resilient Palm Variants</b></p>	The recent release of the Musim Mas GS Series oil palm seed varieties highlights the potential for higher FFB yields against the backdrop of rising temperatures and harsher growing conditions.	<b>Technology</b>	<ul style="list-style-type: none"> <li>Reduced environmental impacts of climate-related events on plantations</li> <li>Increased revenues from higher FFB yields</li> <li>New revenue streams from the sale of climate-resilient variants</li> </ul>	 <p><b>Medium Term</b></p>

The scenario analysis has been invaluable in helping us identify climate risks and opportunities both in our direct operations and across our value chain. In the near future, we will refine our analysis methodology to better understand the scale and financial implications of key climate-related risks and opportunities across all our operations.



## Group Emissions

[GRI 305-1, 305-2, 305-3, 305-5, 406-1]

[SASB FB-AG-110a.1]



### Setting Science-Based Targets for Emissions Reduction

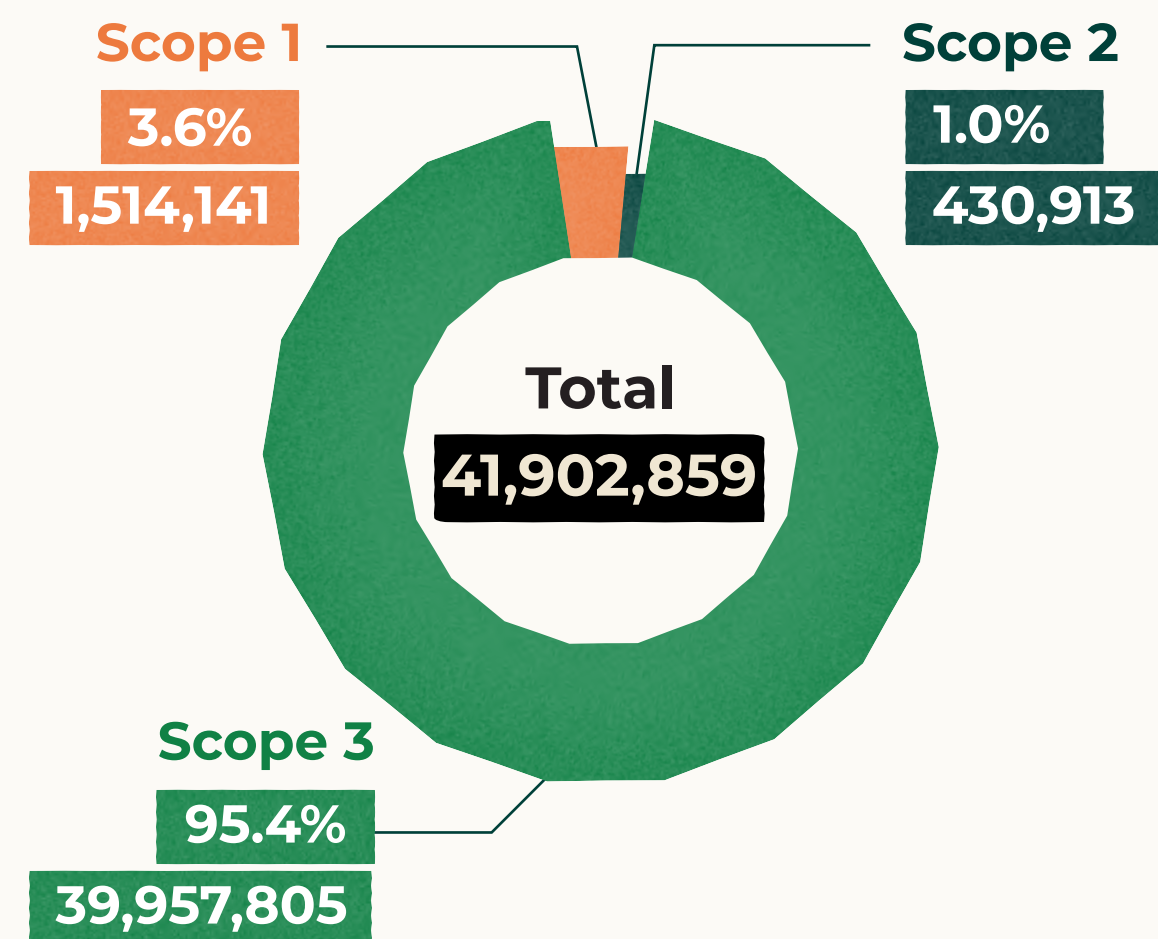
In January 2024, Musim Mas announced our commitment to the SBTi, which has been acknowledged by SBTi. This marks a major milestone in our ongoing journey and builds upon the groundwork we have diligently laid in the previous years. Currently, our near- and long-term emission reduction targets are undergoing validation by SBTi. The development of an emissions reduction roadmap will follow these targets, and we anticipate providing updates in future reports.

[Musim Mas Commits to Setting Science-Based Targets For GHG Reductions](#)

In 2023, our total GHG emissions were 41,902,859 tonnes of carbon dioxide equivalent (MT CO<sub>2</sub>e). Scope 1 and Scope 2 emissions combined amounted to 4.6% of the total emissions (1,945,054 MT CO<sub>2</sub>e), while Scope 3 emissions were 95.4% (39,957,805 MT CO<sub>2</sub>e). Our Scope 1 and 3 emissions disclosures also include land-use change emissions from our own operations and supply chain.

We are aware of the dynamic nature in the GHG calculations guideline. We will anticipate the finalization of the GHG Protocol Land Sector and Removals Guidance in 2025.

Group 2023 GHG Emissions by Scope (% , MT CO<sub>2</sub>e)



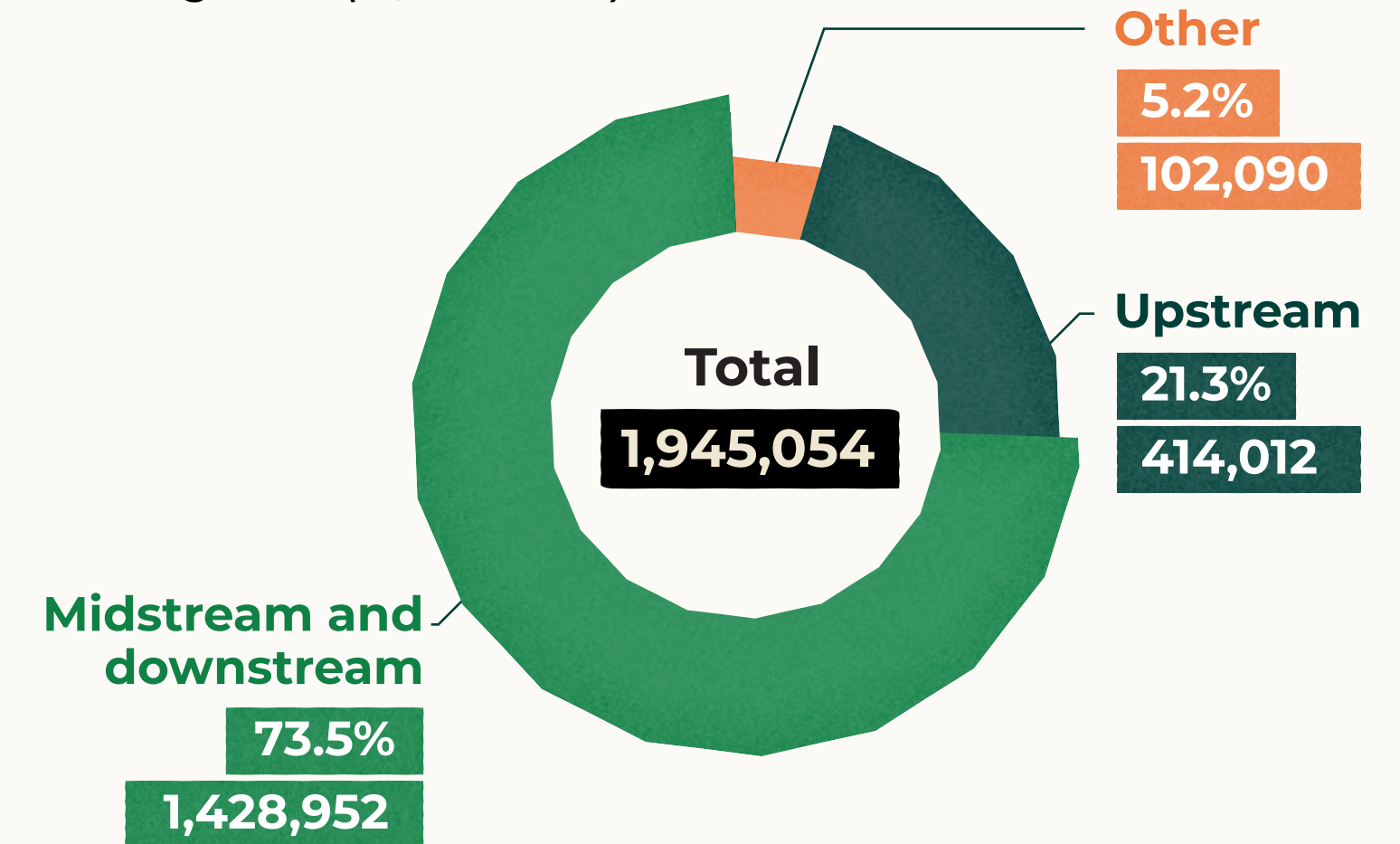
[Demystifying Scopes 1, 2, And 3 Emissions in the Palm Oil Industry](#)

Musim Mas has consistently measured and reported on our Scope 1 and Scope 2 emissions in line with the GHG Protocol. In 2022, we expanded our efforts to cover the full scope of our carbon footprint and completed a Scope 3 emissions analysis. This is the first time we are reporting on our Scope 3 emissions data for the entire Group.

## Scope 1 and Scope 2

Of our Group's total Scope 1 and Scope 2 emissions, midstream and downstream operations contributed 73.5%, while upstream operations (plantations and mills) accounted for 21.3%. The remaining 5.2% of emissions stem from other operations, including warehouses, logistics, and satellite offices.

Scope 1 and 2 GHG Emissions by Business Segment (% , MT CO<sub>2</sub>e)



Scope 1 and 2 Emissions per Business Segment (MT CO<sub>2</sub>e)

Scope	Upstream		Midstream and Downstream	Others	Total
	Oil Palm Plantations	Palm Oil Mills			
<b>Scope 1</b> Direct emissions from owned or controlled sources	366,703	47,309	999,383	100,746	<b>1,514,141</b>
<b>Scope 2</b> Indirect emissions from the generation of purchased energy	0	0	429,569	1,344	<b>430,913</b>
<b>Total</b>	<b>366,703</b>	<b>47,309</b>	<b>1,428,952</b>	<b>102,090</b>	<b>1,945,054</b>

**Notes:**

- Others include warehouses, logistics, and satellite offices.
- Scope 1 and Scope 2 emissions are defined according to the [GHG Protocol](#).
- Data reported is according to [our CDP Climate Change 2023 submission](#), which covers our previous reporting cycle (2022 financial year).

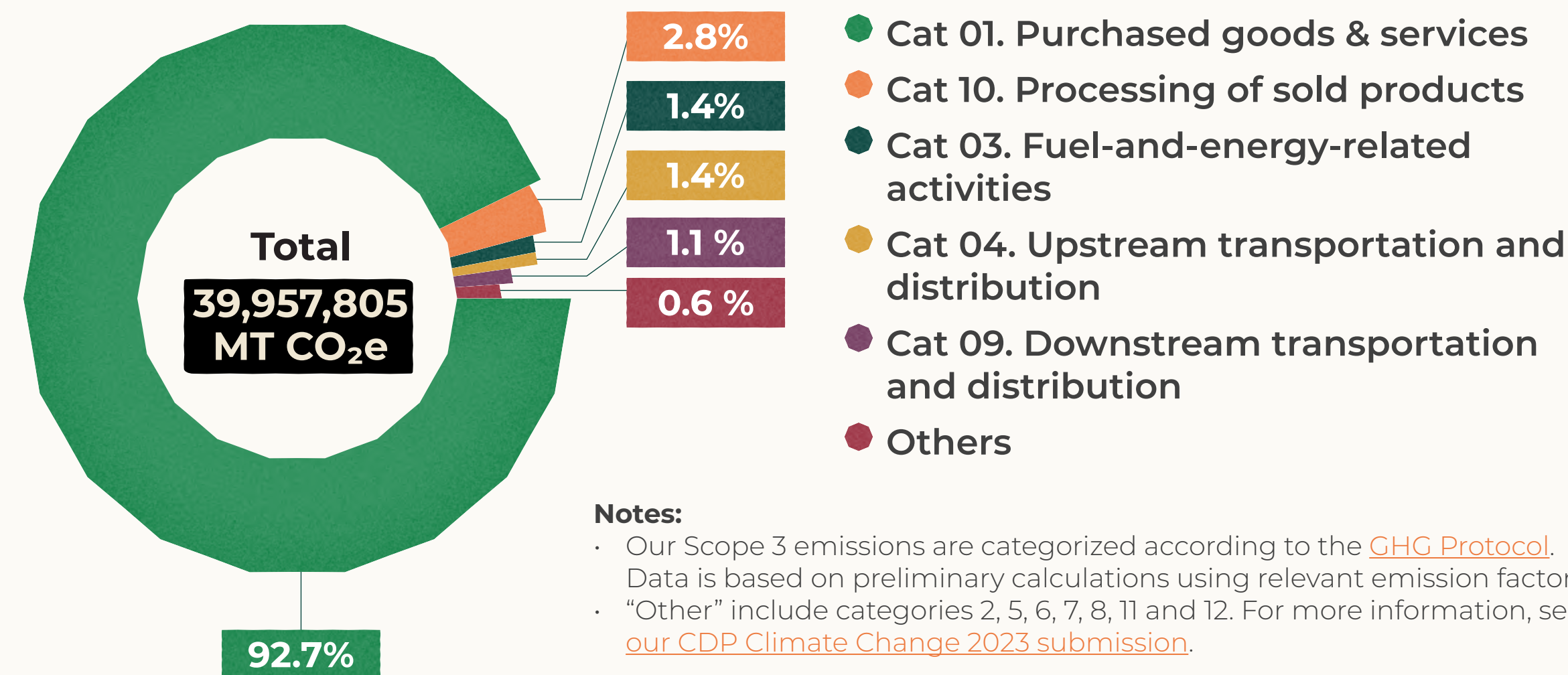
### \* Scope 3

Scope 3 emissions represent indirect emissions outside of direct operational control and arising from activities within a company's value chain (e.g., emissions from suppliers), and make up the bulk of a company's emissions across many industries.

Of our total Group Scope 3 emissions, 92.7% came from purchased goods and services (predominantly crude palm oil – CPO, palm kernel – PK or crude palm kernel oil – CPKO). All other categories of Scope 3 emissions make up less than 8%.

Musim Mas recognizes that while we have limited influence over the management of Scope 3 emissions, it is important to understand and account for them so that we can engage with supply chain partners to implement effective reduction strategies crucial for driving sector-wide change.

■ Scope 3 GHG Emissions by Category 2023 (% of Total)



### Life Cycle Assessment (LCA)

Musim Mas first embarked on Life Cycle Assessments for our upstream products in 2019. This initiative was initially driven by the new LCA requirements of Indonesia's Ministry of Environment and Forestry's PROPER (Public Disclosure Program for Environmental Compliance), aimed at improving environmental performance among companies.

As global efforts towards decarbonization gained momentum, there was a growing demand from customers for LCAs and Product Carbon Footprint (PCF) evaluations to better understand and mitigate indirect (Scope 3) emissions within their supply chains.<sup>19</sup> Recognizing our role in supporting these needs, Musim Mas engaged a registered independent LCA consultant in 2022 to conduct LCAs adhering to the ISO 14040:2006 and ISO 14044:2006 international frameworks for selected downstream products. This comprehensive assessment covered the entire production system, from the cultivation of raw materials—specifically FFB at the plantation—to the final product (cradle-to-gate).

The LCA project has allowed us to enhance the existing LCA model we had in place since 2019, by taking the learnings and integrating the updated LCA model with our existing in-house system. The updated LCA model now complements our PCF calculations across our wide range of palm oil derivative products, ensuring we effectively meet the increasing demands of our customers while upholding our sustainability commitments.

<sup>19</sup> An LCA evaluates various environmental impact categories associated with our upstream products, such as eutrophication, acidification, and ozone depletion. It also evaluates the product carbon footprint (PCF), which addresses global warming potential (GWP) or potential environmental impact related to climate change.

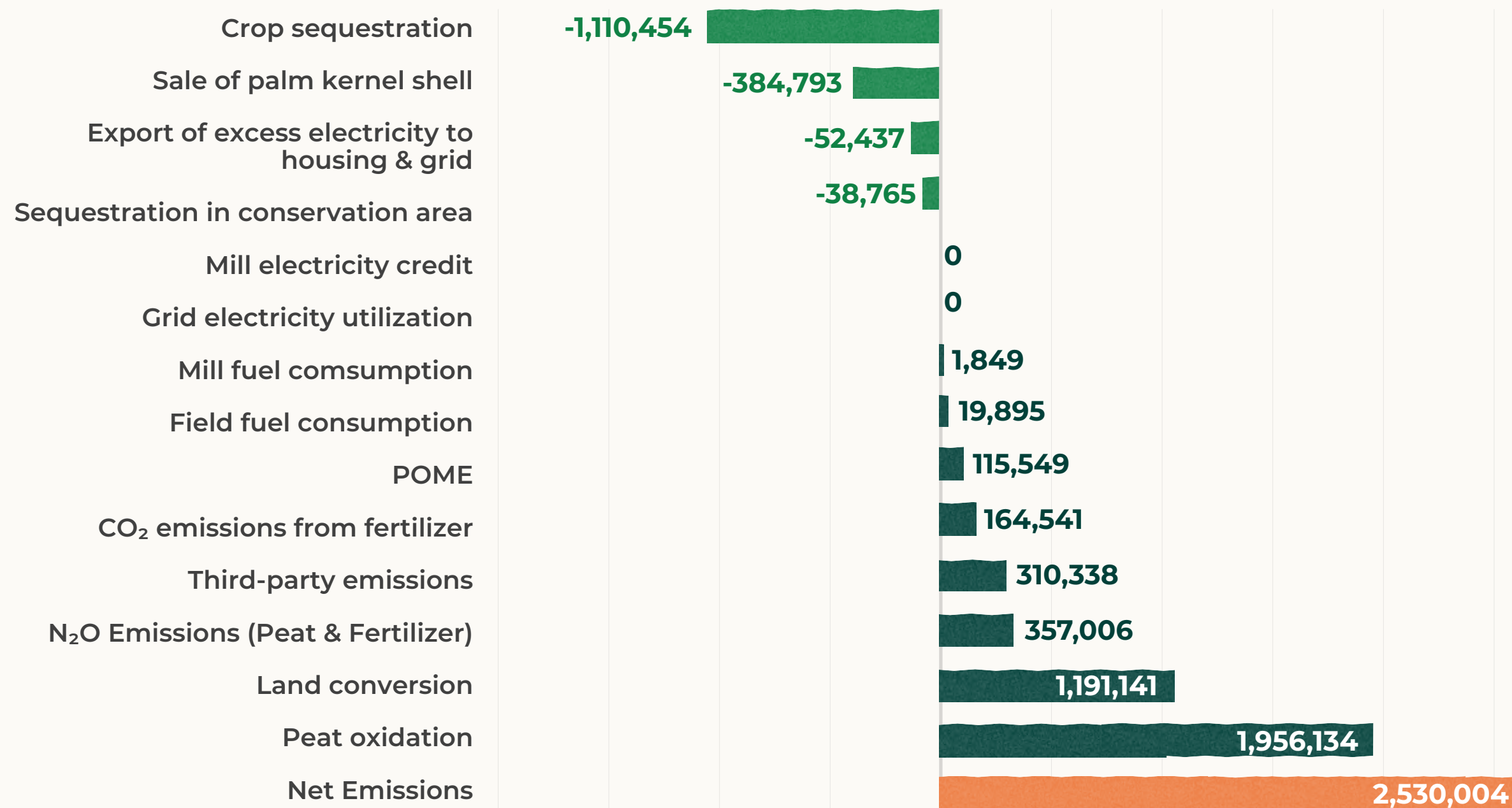
## Upstream Emissions

### Net Emissions

[GRI 305-1, 305-2, 305-4, 13.1.2]

In addition to utilizing the GHG Protocol to calculate emissions for our global operations, we use the RSPO PalmGHG v4 calculator to calculate emissions across our RSPO-certified upstream operations. This covers all our 15 RSPO-certified integrated mills, which source from all Musim Mas plantations.<sup>20</sup>

Upstream Emissions Sources and Sinks 2023 (MT CO<sub>2</sub>e) • RSPO Certified Operations



Our primary emissions are from land-use change combining land conversion and peat oxidation. The total land-use change emissions were 3,147,275 MT CO<sub>2</sub>e in 2023, accounting for 76.5% of our gross upstream emissions using the RSPO PalmGHG v4 calculator. Combined with other emissions sources and offsets, our net emissions amounted to about 2.5 million MT CO<sub>2</sub>e.

<sup>#</sup> EY has performed limited assurance procedures on these figures.

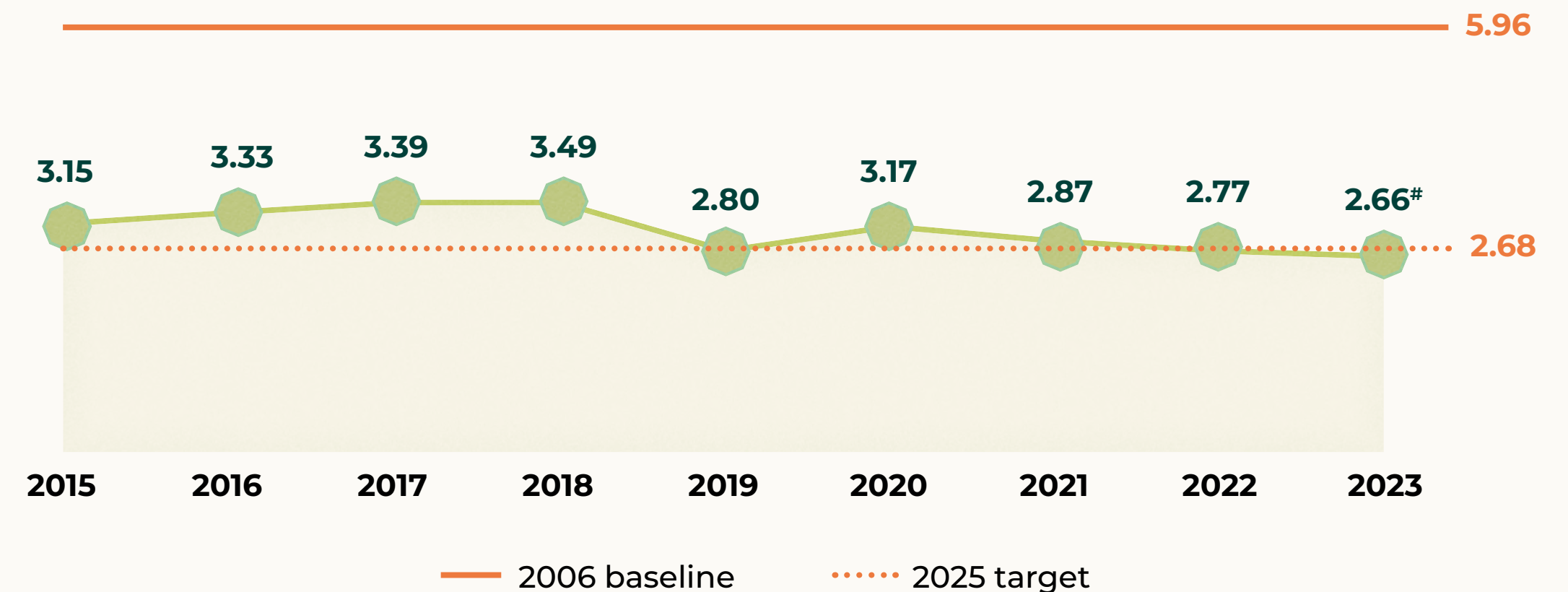
<sup>20</sup> Three of our remaining mills are independent mills without plantations.

### GHG Emission Intensity

In 2023, we achieved and surpassed our target of reducing upstream GHG emission intensity by 55% against our 2006 baseline two years ahead of schedule, arriving at 2.66<sup>#</sup> MT CO<sub>2</sub>e per tonne of CPO produced (MT CO<sub>2</sub>e/MT CPO). In addition to the methane capture facilities installed at 17 of our mills, this accomplishment is attributable to increased FFB and CPO production in the previous year. Moving forward, our focus will be on our Group emissions reduction target.

For more information, see: [Setting Science-Based Targets for Emissions Reduction](#)

Upstream GHG Emission Intensity 2015-2023 (MT CO<sub>2</sub>e/MT CPO) • RSPO Certified Operations



Note: GHG emissions data is based on the 2023 RSPO audit reports, which encompass 2022 data.

### Progress on Methane Captures

Methane capture facilities remain a key approach to reducing our upstream emissions. These facilities prevent the release into the atmosphere of methane biogas generated by the treatment of palm oil mill effluent (POME) and convert it into electricity that powers our mills, estates, and workers' housing. In 2023, our 17 methane capture facilities resulted in 539,225 MT CO<sub>2</sub>e of avoided emissions.

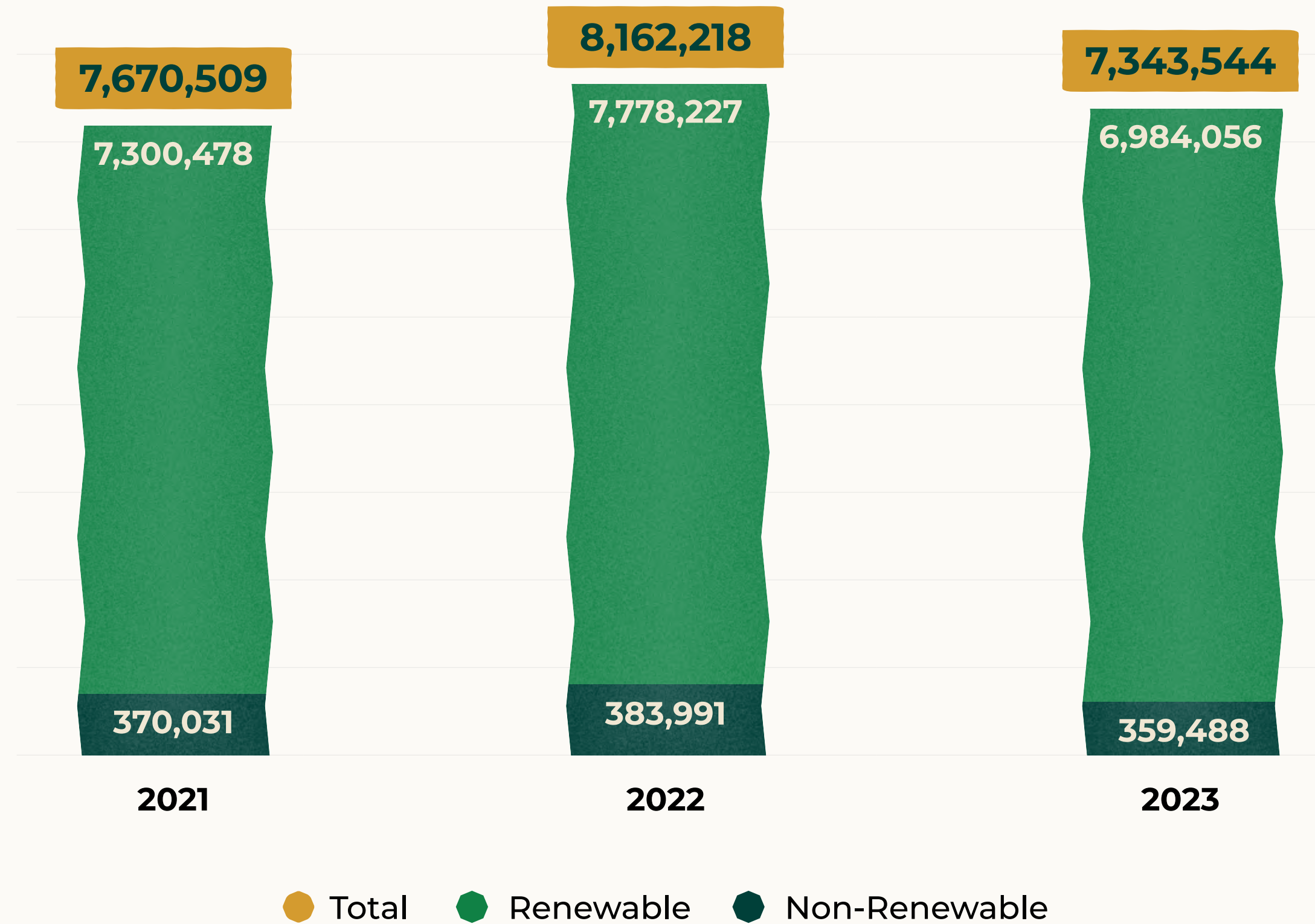
# Energy Management

[GRI 3-3, 302-1, 302-3, 302-4] [SASB FB-AG-130a.1]

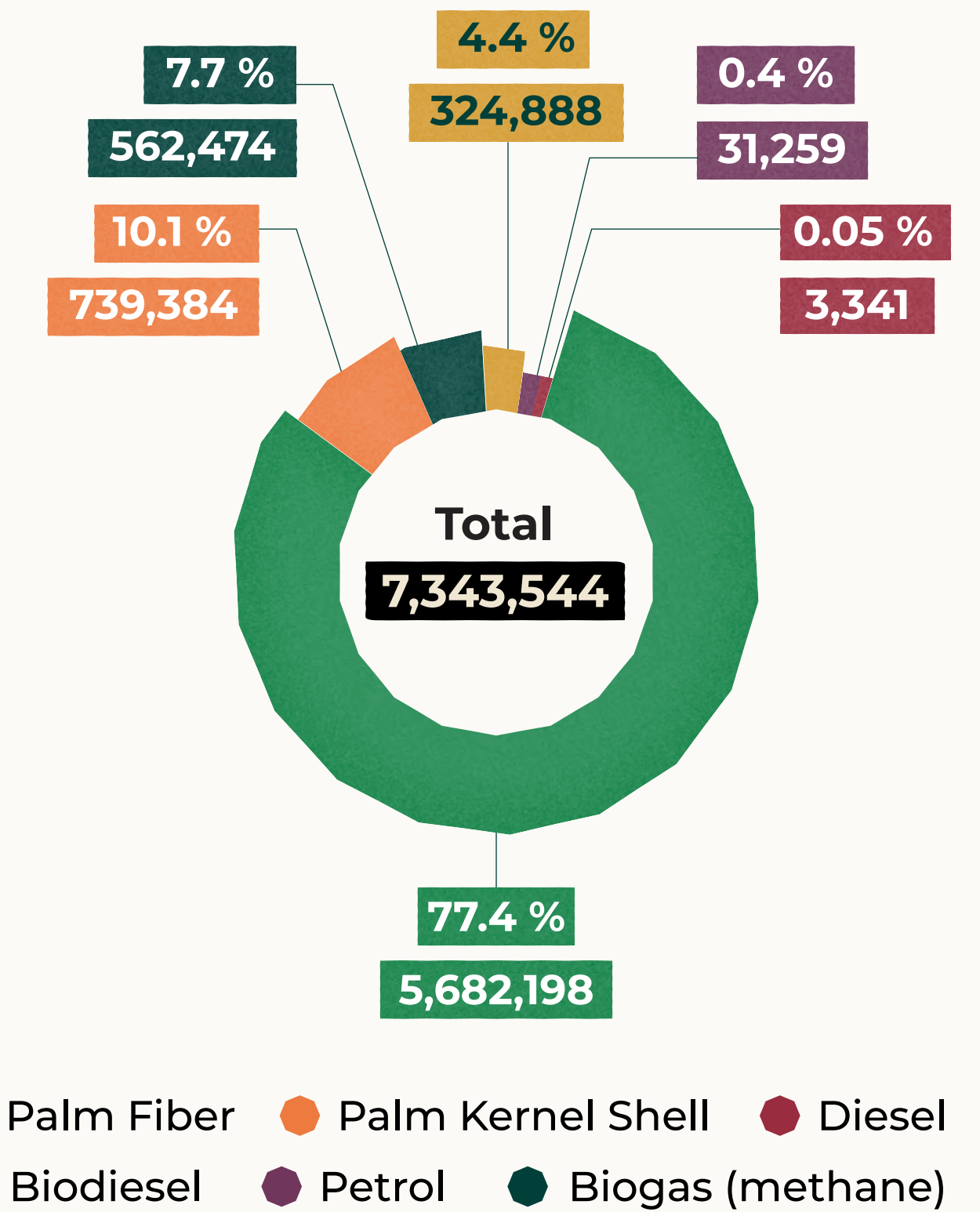
Musim Mas continues to promote the use of renewable energy and improve efficiencies across our upstream operations to minimize our overall energy consumption. **More than 95% of our upstream energy is derived from renewable sources**, primarily milling process by-products comprising of palm fiber (from empty fruit bunches and fruitlet fibers) and palm kernel shell used as boiler fuel at our mills, as well as methane gas from POME converted into electricity by our methane capture facilities. Biodiesel makes up 4.4% of our total energy consumed, while other non-renewable sources such as diesel and petrol contribute less than 1%.

**We export surplus renewable electricity generated by our methane capture facilities to the national grid, totaling 25.2 million kilowatt hours (kWh) in 2023.**

Energy Consumption 2021-2023 (GJ) • Upstream Operations



Energy Consumption 2023 (% GJ) • Upstream Operations



In 2023, our total upstream energy consumption was more than 7.3 million GJ, a decrease from 8.1 million GJ in 2022. Despite this, our energy intensity increased to 7.70 GJ per tonne of CPO/PK produced, compared to 7.49 GJ per tonne of CPO/PK produced in 2022. This is due to the lower volume of FFB processed by our mills in 2023.

We have embarked on efforts to adopt solar energy to power one of our facilities since December 2023. The first stage of the solar panel installation has been completed, and we hope to complete the second stage by August 2024. We will provide more information on our downstream energy use and efficiency initiatives in future reports.



# Positive Environmental Impacts



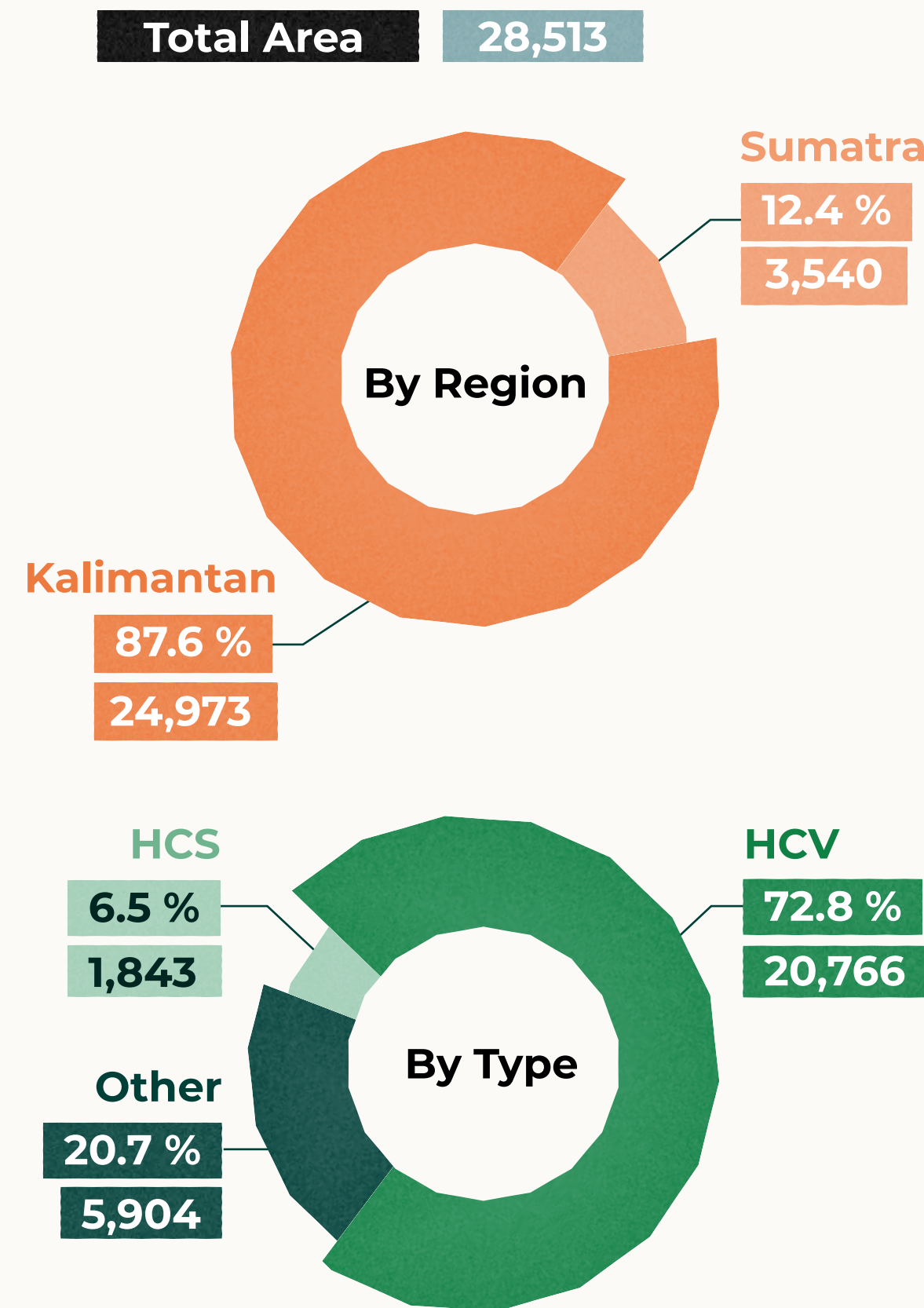
[GRI 3-3, 304-3]

## Conservation and Restoration

Musim Mas complies with all relevant national and international standards, requirements on new development, and the expansion of plantation areas. We are guided by our [NDPE Roadmap](#) and [Biodiversity and Climate Resiliency Action Plan 2022](#), and are committed to zero conversion of natural ecosystems within our operations, particularly in areas of high conservation value (HCV), high carbon stock (HCS), and peatland. We have also maintained zero deforestation at our operations per our 31 December 2015 NDPE cut-off date.

As of December 2023, we manage **28,513 hectares of conservation area – representing more than 14% of our titled land**. Approximately 87.6% of our total conservation area is in Kalimantan, while 12.4% is in Sumatra. As of July 2024, our conservation area has increased to 29,189 hectares following the completion of a new HCV-HCS assessment of our expanded plantation in Kalimantan.

Conservation Area 2023 (% , ha)

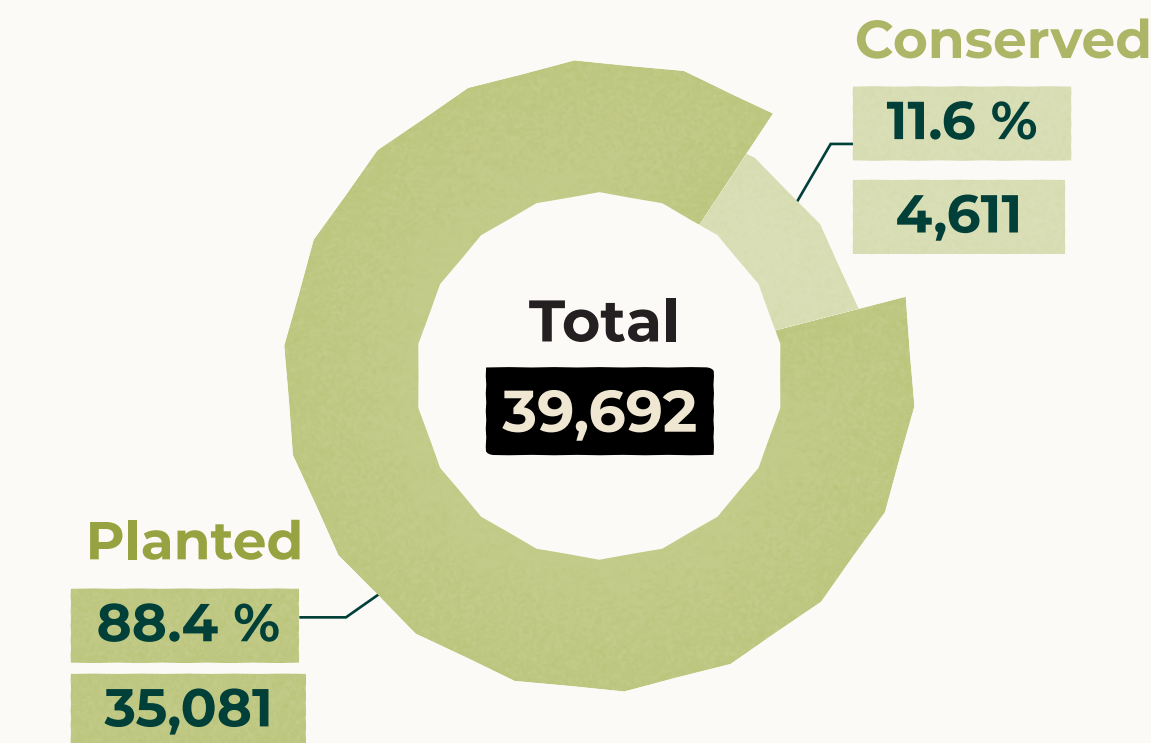


**Notes:**

- Overlapping HCV and HCS areas are reflected in HCV figures.
- “Other” includes steep areas, wildlife corridors, and riparian buffer zones not identified by HCV and HCSA assessments.

We also manage 4,611 hectares of conserved peat area and 35,081 hectares of planted peat area.

Managed Peat Planted and Conserved 2023 (% , ha)



**Note:** The managed and conserved peat area data is externally verified. See examples of our RSPO reports at two locations - PT Musim Mas, [Pangkalan Lesung RSPO Report 2023](#) and PT Musim Mas, [Batang Kulim RSPO Report 2023](#).

We have implemented dedicated strategies to manage, protect, and monitor conservation areas at our plantations and HCV/HCS areas in surrounding landscapes, as appropriate. We operate regular ground controls to discourage hunting and use

satellites to monitor encroachment, fires, and land clearing. We are also working to restore natural ecosystems<sup>21</sup> in our management areas affected by fire, deforestation, conversion, and non-compliance, per our NDPE cut-off date.

We continue to optimize our HCV/HCS monitoring methods and employ best practices in line with RSPO and legal requirements in managing peatlands and fragile soils, seeking expert advice when required.

At the end of 2023, Musim Mas officially withdrew our membership from the High Carbon Stock Approach (HCSA). Nevertheless, we continue to uphold its best practices to maintain and conserve HCV and HCS areas following its guidance and lessons learned. This include consulting and engaging with local communities to develop and implement conservation management plans.

» See also: [Upholding Land and Community Rights](#)

<sup>21</sup> Natural ecosystems can include HCV/HCS areas.

## Protecting Biodiversity

Since the conclusion of the South East Asia Rainforest Research Partnership (SEARRP)'s independent biodiversity assessment of our operations, Musim Mas shared the findings and insights with the RSPO to help inform industry best practices for biodiversity conservation. Per the commitments in our Biodiversity and Climate Resiliency Action Plan, we are ramping up efforts to protect biodiversity, particularly rare, threatened, and endangered (RTE) species within our concession areas and in the broader landscape (See our [2019–2023 Sustainability Performance Data](#) for the list of species identified at our operations that are on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species).

Our activities include restoring and rehabilitating riparian areas along nearby rivers and water bodies and co-managing HCV areas that are beyond our immediate management and control with local rights-owners since 2008. These areas serve as important wildlife corridors that enhance connectivity for biodiversity.

Musim Mas was featured as a case study in the RSPO Manual on Best Management Practices (BMPs) for the Management and Rehabilitation of Riparian Reserves. See the case study [here](#).

In 2023, we embarked on a one-year collaboration with a local university on a project called *Taman Kehati*, focusing on research for the development of a biodiversity park and wildlife conservation efforts within our estate's conservation area. The project aims to strengthen our efforts in education, research, and community service. We will share more information and developments in future reports.

[12 Years of Biodiversity Data In Musim Mas' Plantations: An Analysis By SEARRP](#)



### Reducing Human-Elephant Conflicts in Tesso Nilo

Since 2006, Musim Mas has collaborated with the Tesso Nilo National Park Foundation (YTNTN), the Riau government, the Indonesian Nature Conservation Agency [*Balai Konservasi Sumber Daya Alam (BKSDA)*], and local communities to address human-elephant conflicts and support elephant conservation efforts in the Tesso Nilo landscape.

We sponsor and support a patrol program covering a vast 150,000-hectare area within the national park, which includes a 'Flying Squad' consisting of seven local people or mahouts and three trained elephants dedicated to mitigating conflicts with wild elephants that encroach onto community agricultural areas. The work also includes engaging and educating communities on elephant behavior and effective conflict mitigation strategies. Our squad is supported by ongoing training provided by the BKSDA, enhancing the team's expertise in elephant management and response.

The BKSDA operates a call center serving as an early warning system for elephant-human conflicts. Complaints from the community regarding such conflicts are swiftly processed, analyzed, and addressed in collaboration with the Flying Squad to prevent escalation. Local-level mitigation teams have also been established in four

villages, empowering communities to take part and implement proactive measures like setting up blockades and guiding elephants to neutral zones.

Musim Mas also supports wildlife monitoring efforts using advanced technologies such as drones, GPS collars, and camera traps to track elephant movement and behaviors, including around community plantations. For instance, our trials showed that orange plants are effective elephant deterrents and helpful in reducing human-elephant conflicts while providing a source of income for the local community. Other activities, such as planting food for elephants and producing compost from elephant waste also provided sources of income.

We have renewed our contract with YTNTN for an additional three years, covering the period from 2024 to 2026. As part of this renewal, we are introducing a new program in collaboration with women in the local community to plant crops that either attract or deter elephants. This is to manage their movement better and guide them effectively back to their natural habitat.

[Watch our new YouTube video: Our Flying Squad: Sharing Space with Elephants](#)

[Mitigating Human-Wildlife Conflict with Tesso Nilo National Park Foundation](#)

## Deforestation-Free Operations

There has been no deforestation on land managed by Musim Mas since the RSPO cut-off date of 31 December 2015. All forest areas are protected through ongoing monitoring efforts. We conduct patrols and use satellite data to detect any encroachment on conservation areas and facilitate prompt interventions.

To ensure that our supply chain remains deforestation-free, we track and trace all sourced FFB to plantation, and engage with our suppliers on our No Deforestation and No Peat commitments. As an additional safeguard, we employ third-party monitoring services in forest areas within or near our suppliers' concessions.

We have also committed to sourcing coconut from deforestation-free areas in line with our Sustainable Coconut Sourcing Strategy.

» See: [The Musim Mas Supply Chain](#)



## Monitoring and Managing Fires

[GRI 3-3]

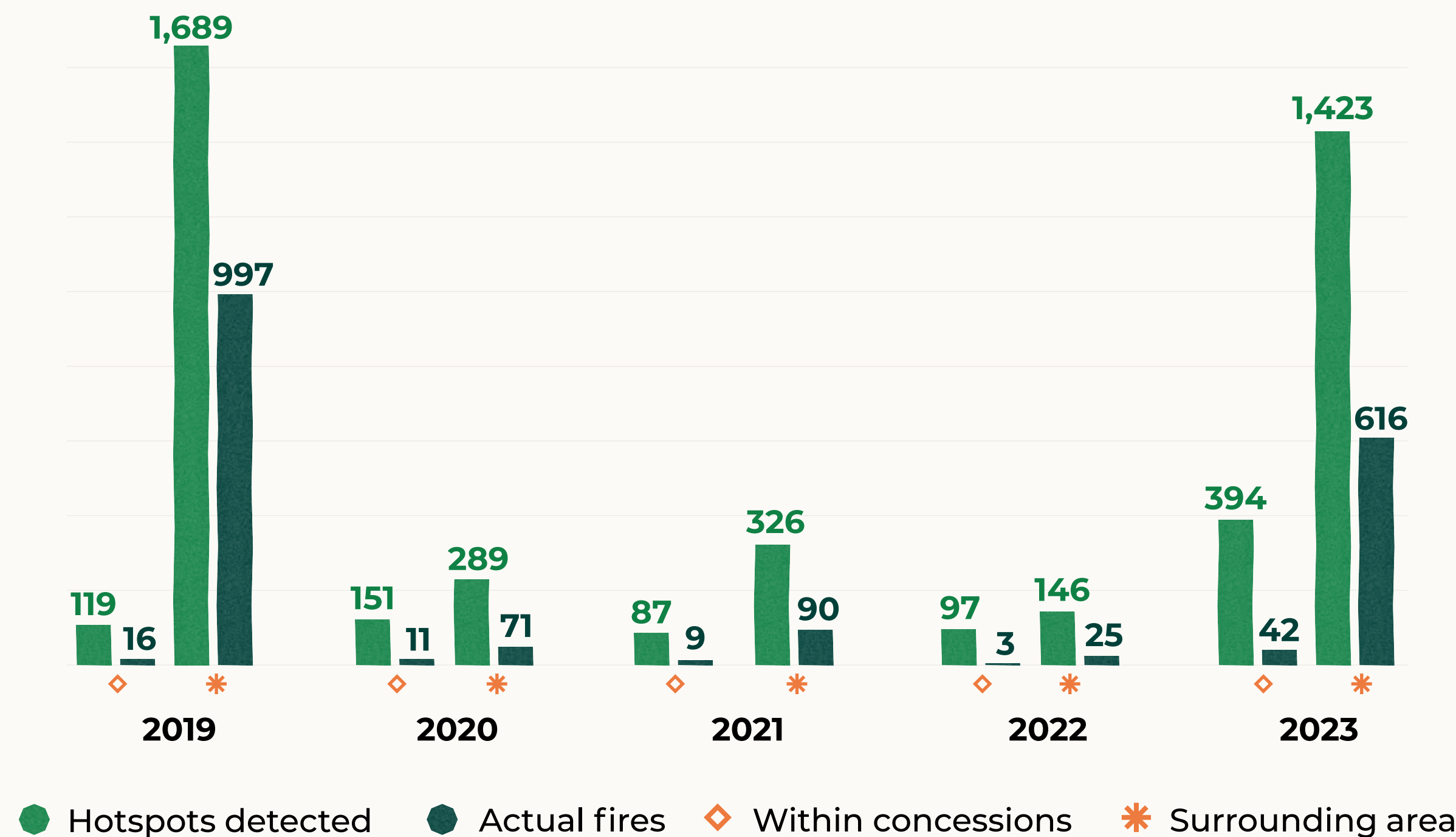
Musim Mas upholds a zero-burning policy and prohibits the use of fire within both our operations and those of our suppliers. We employ fire-monitoring towers and satellite surveillance to regularly monitor forests for potential fires and hotspots in our concessions and surrounding areas, and adopt precautionary measures in response to weather forecasts. Our efforts include raising awareness among employees, workers, and community members; building water ponds and fire breaks at strategic locations to serve as barriers that contain fires; and assigning dedicated teams at regional head offices to monitor satellite data and promptly respond to detected hotspots in and around our operations. We extend aid beyond our concessions to support broader community efforts in fire prevention and control.

In 2023, we identified 394 hotspots within our concessions, of which 42 were confirmed to be fires affecting 40 unplanted hectares in Sumatra and Kalimantan. We detected a further 1,423 hotspots in the areas surrounding our estates, of which 616 were confirmed to be fires affecting approximately

1,235 hectares of land. This significant increase in fires and hotspots was due to the El Niño event<sup>22</sup> that raised global temperatures between July and October 2023. Hotspots were more prevalent in Kalimantan due to the greater number of days without rain compared to Sumatra.



Hotspots vs. Fires Within Concessions and Surrounding Areas 2019-2023 (no.)



We actively encourage the involvement of communities through our Fire Free Village Program (FFVP) (*Masyarakat Bebas Api – MBA*), raising awareness about fire risks and encouraging the adoption of alternative, fire-free land-clearing techniques. Through the FFVP, we provide educational resources, agricultural equipment, and incentives to communities that abstain from using fire, including enhancements to infrastructure and services. **Since its inception, we have launched the program in 75 villages, spanning over 457,000 hectares of land. In 2023, we conducted 150 training sessions and rewarded 35 villages for remaining fire-free.** Given the effects of a strong El Niño, fewer villages were able to maintain a fire-free status, compared to 46 in 2022.

See our video: [Our Fire Prevention and Management Efforts: Small Actions, Big Impact](#)

[Fire Prevention in the Era of “Global Boiling”](#)

<sup>22</sup> Indonesian Fires Return in 2023. (2023, October 2). NASA Earth Observatory. Retrieved on June 2nd, 2024 from this [link](#).



# Pesticides and Fertilizers

[GRI 3-3, 13.5.1, 13.6.1, 13.6.2]

## \* Reducing Pesticide Use

At our plantations, we implement Integrated Pest Management (IPM) best practices supported by our extensive long-term research and development (R&D) efforts to manage pest populations. IPM involves a combination of cultural, physical, mechanical, biological, and chemical methods. Our IPM practices include:

### Cultivating Beneficial Plants to Combat Leaf-Eating Caterpillars

Leaf-eating caterpillars (LEC) like nettle caterpillars and bagworms can severely damage oil palm fronds, leading to reduced yields if not properly controlled. To manage these pests, we plant and maintain beneficial plants-*Cassia cobanensis*, *Antigonon leptopus*, *Turnera subulata*, and *Euphorbia heterophylla*. These plants attract natural enemies of LECs like *Cantheconidae furcellata* and *Spinaria spinator* which help keep LEC populations in check.

[See Flower Power: Using Beneficial Plants to Combat Pests](#)

### Supporting Barn Owl Populations for Effective Rat Control in Plantations

Rats pose a threat to oil palm yields by consuming both ripe and unripe fruits. To combat this, we utilize barn owls as a natural method of pest control, reducing the reliance on rodenticides. To support barn owl populations, we have installed at least 1,300 nest boxes throughout our plantations. These barn owls serve as natural predators, effectively managing rat populations.

[See Barn Owls Pest Control: Combat Rats in Plantation](#)

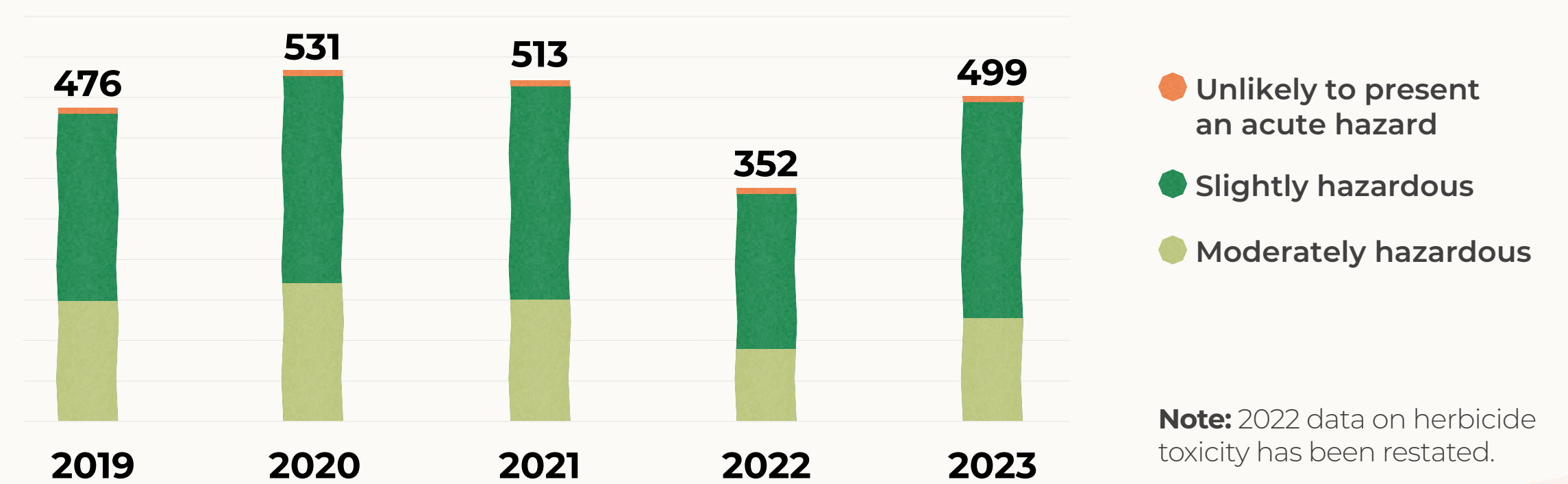
We only use highly hazardous or extremely hazardous pesticides in emergencies and under exceptional circumstances when other methods are not viable.<sup>23</sup> As the Palm Oil Innovation Group (POIG) Charter and its initiatives have concluded, we no longer report on our progress in phasing out pesticides. Nevertheless, we remain committed to implementing IPM best practices in our upstream operations, using pesticides judiciously and not indiscriminately.

[See: Integrated Pest Management \(IPM\) for Sustainable Palm Oil Production](#)

## Herbicides

We track and monitor the toxicity levels of herbicides at our estates in line with palm oil industry best practices. Over the past five years, we have maintained an average herbicide toxicity rate of ~474 units/ha, and strive to reduce our reliance by optimizing their use. We do not use herbicides classified as highly hazardous or extremely hazardous at our operations.<sup>24</sup>

■ ■ Toxicity Rate of Herbicides 2019-2023 (Toxicity Units/ha)



## \* Fertilizers

In 2023, we used 1.42 and 2.42 tonnes of fertilizer per mature hectare (MT/ha) in Sumatra and Kalimantan, respectively.<sup>25</sup> We follow agronomic recommendations for fertilizer application, including conducting soil and leaf analyses, to maximize utility and minimize leaching or loss. We use dried decanter solids instead of potassium on sandy soil whenever possible to increase moisture retention and enhance its physical and chemical properties. We also apply operational waste, including boiler ash from our mills, as fertilizer in selected areas to maintain pH levels.

[Waste Management](#)

<sup>23/24</sup> Pesticides are classified according to the [WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification](#).

<sup>25</sup> Fertilizer data includes organic and inorganic fertilizers.

# Water Management



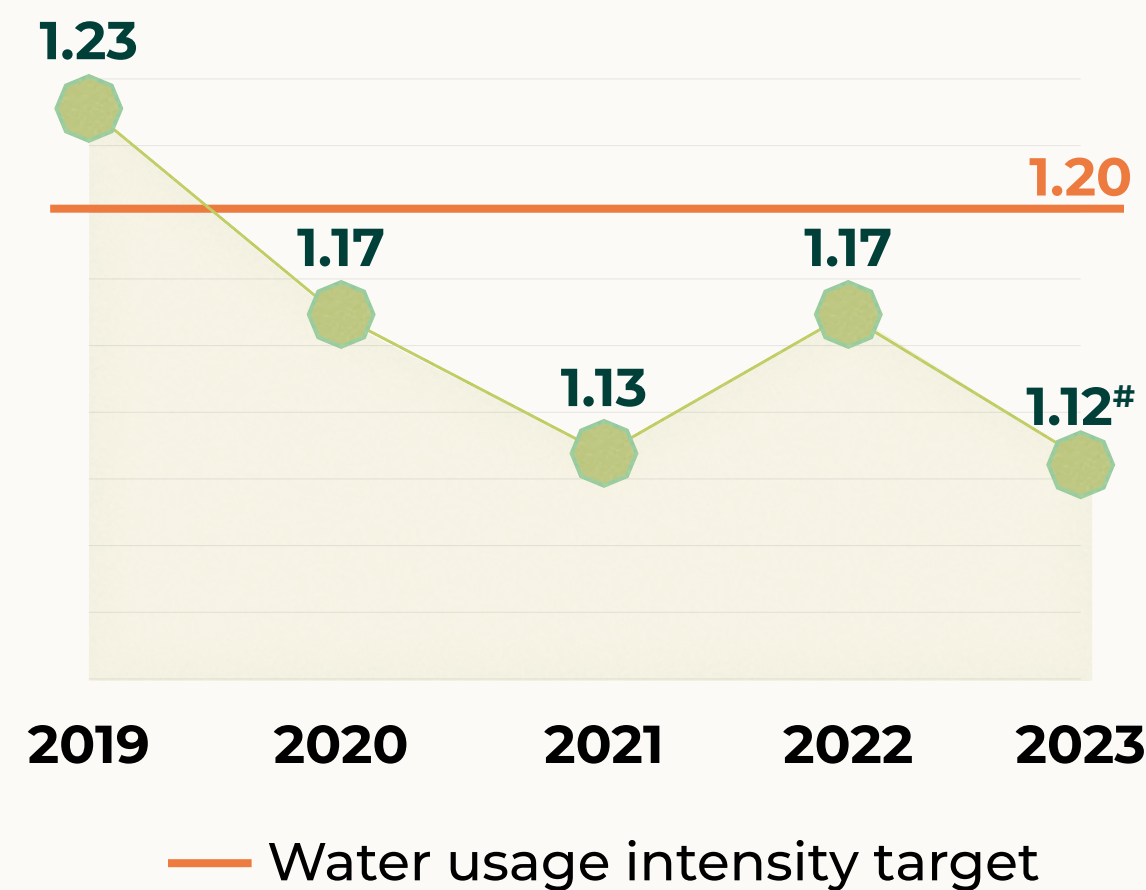
[GRI 3-3, 303-1, 303-2, 303-3, 303-4, 303-5] [SASB FB-AG-140a.1, FB-AG-140a.2, FB-AG-140a.3]

Musim Mas recognizes that water is a finite resource and has adopted comprehensive measures to preserve the quality and availability of surface water and groundwater for our business and surrounding communities.

We draw surface water and groundwater for upstream operational processes, including steam generation, pesticide mixing, seedling irrigation, and domestic purposes, such as cleaning and cooking. We ensure that our upstream operations are not located in water-stressed areas, assessing water-related risks using the World Resources Institute's [Aqueduct](#) tool.

**In 2023, water usage intensity at our RSPO-certified mills was 1.12# cubic meters per tonne of FFB processed (m<sup>3</sup>/MT FFB), matching 2021 levels and meeting our annual target of keeping water usage intensity at or below 1.20 m<sup>3</sup>/MT FFB.**

**Average Mill Water Usage Intensity 2019-2023 (m<sup>3</sup>/MT FFB) • RSPO-Certified Mills**

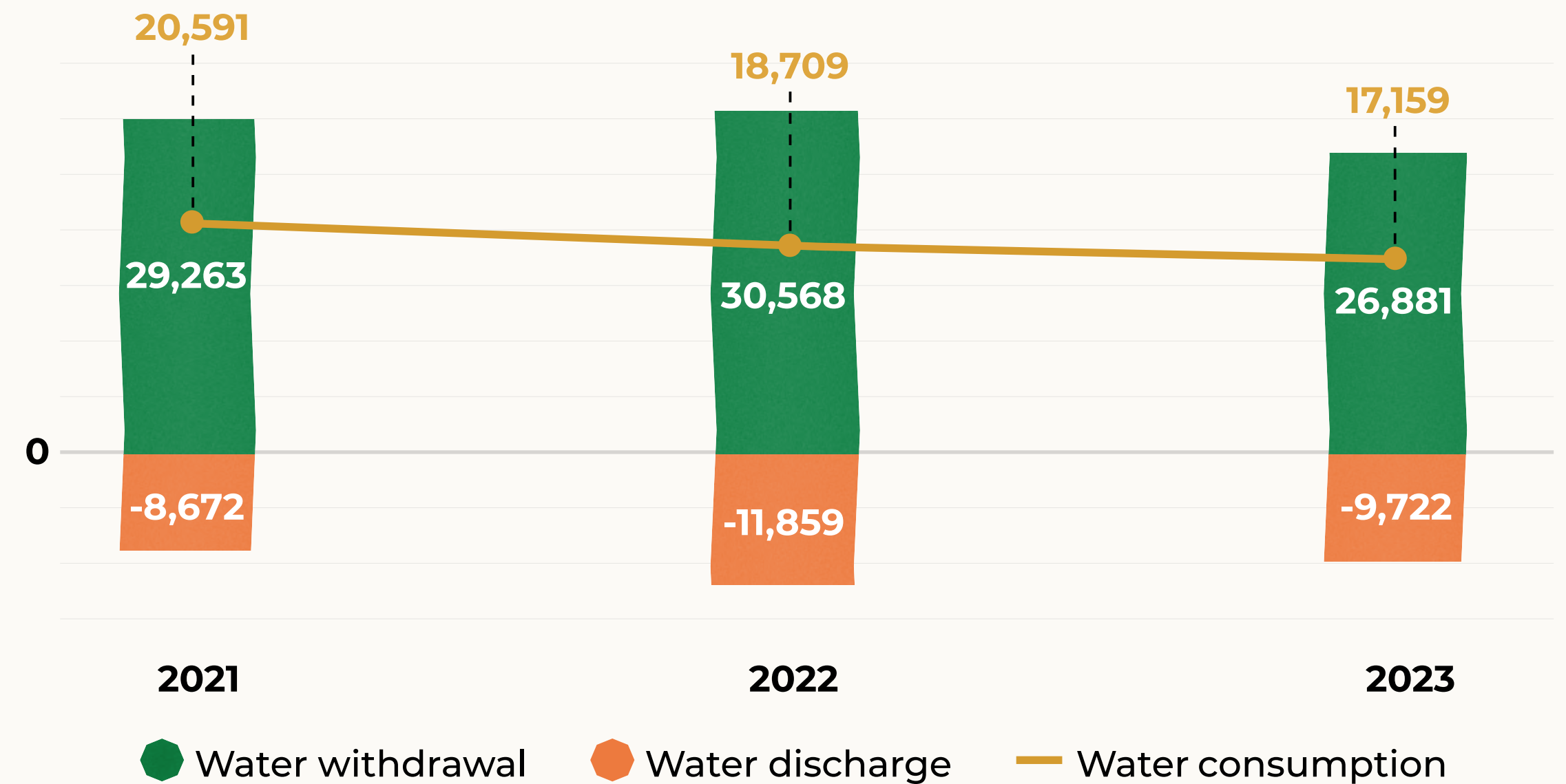


We will no longer report on our water footprint using the Water Footprint Network's methodology as the POIG Charter and its initiatives have concluded. Nevertheless, we will continue implementing responsible water management practices at our upstream operations following the knowledge acquired and lessons learned through POIG membership. Furthermore, we continue to disclose our water-related sustainability practice through the CDP Water Security assessment.

## Group Water Consumption

In addition to our upstream operations, we also monitor water consumption at our midstream and downstream operations Group-wide and report on our management approaches to CDP's Water Security assessment. In 2023, the Group consumed 17,159 megaliters (ML) of water and our Group-level water use intensity was 0.9 m<sup>3</sup> per tonne of product produced.<sup>26</sup>

**Group Water Withdrawal and Discharge 2021-2023 (ML)**



We recognize our factories and refineries are water intensive, and will report on our water use and management initiatives at these facilities in the future.

[For more information, see our 2023 CDP Water Security Assessment](#)

# EY has performed limited assurance procedures on these figures.

<sup>26</sup> Group-level water data presented in this report is preliminary as we are still fine-tuning our data collection and methodology. Water consumed is calculated by subtracting the water discharged from water withdrawn.

## ✦ Maintaining Water Quality

To avoid impacting groundwater and nearby water sources, we treat POME and palm oil refinery effluent (PORE) before discharging it. We monitor phosphorus and nitrogen levels at inlet and outlet points upstream and downstream of rivers that cross our concessions. We also monitor and strictly manage biological oxygen demand (BOD) and chemical oxygen demand (COD) levels to ensure they are below national regulatory thresholds.<sup>27</sup>

See: [SR2023 Sustainability Performance Data for BOD and COD levels](#)

[Zero-Waste Mills at Musim Mas](#)

In 2023, we externally verified the COD levels of treated PORE discharged to sea by our refinery, PT Musim Mas Belawan. The average COD levels were 104.18<sup>#</sup> milligrams per liter (mg/L) and 84.77<sup>#</sup> mg/L at two discharge points respectively, below the regulatory threshold of 145 mg/L. There were no instances of non-compliance in 2023.

[Treatment of PORE](#)



## Waste Management

[GRI 3-3, 306-1, 306-2, 306-3, 306-4, 306-5]

We recycle and reuse all non-hazardous waste produced by our upstream processes. We identify all waste produced at our operations as liquid, solid, or gas, and manage it according to our standard operating procedures (SOPs). At our plantations, we leave oil palm trunks and fronds that remain after replanting and pruning in the soil, repurposing them as organic fertilizer. We reuse waste from our mills, including palm kernel shells (PKS), palm fiber, and empty fruit bunches (EFB), to fuel our boilers. We recycle decanter solids and boiler ash as organic fertilizer at our plantations. Finally, we direct liquid waste – POME from our mills, to our methane capture facilities to generate electricity (see [Energy Management](#)) before it is channeled to our treatment ponds and processed into treated wastewater for irrigation.

In 2023, we reused 87,924 tonnes of organic waste, including EFB, decanter solids, boiler ash, and more than 2.2 million m<sup>3</sup> of POME.

To minimize the pollution risks associated with hazardous waste at our upstream operations, such as used lubricants, batteries, containers, and drums, we have established waste management protocols for their proper handling and disposal. All hazardous waste is disposed of by government-licensed vendors. We also provide regular education and training to our workers to ensure proper waste handling and segregation.

We will provide information on our waste management initiatives at our midstream and downstream operations in future reports.

<sup>#</sup> EY has performed limited assurance procedures on these figures.

<sup>27</sup> The regulatory thresholds are 5,000 parts per million (ppm) for BOD in land applications, 100 ppm for BOD in waterways, and 350 ppm for COD in waterways.



**PILLAR 3**

**Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders**



As the industry faces increasingly stringent regulations, Musim Mas remains committed to sector-wide collaboration to effect meaningful change and tackle common challenges, including deforestation and labour abuses. Our policies and commitments extend to our third-party suppliers across all our operations, and we continue to assess and monitor our operations and supply chain for No Deforestation and No Peat (NDP) risks per our [NDP Risk Management Framework](#).

We collaborated with other palm oil supply chain actors to set sector-wide targets in the [Agriculture Sector Roadmap to 1.5°C](#) and are committed to this initiative that minimizes the industry's carbon footprint and drives sectoral transformation. We have made significant progress on coconut traceability since launching our [Sustainable Coconut Sourcing Strategy](#).



# The Musim Mas Supply Chain



[GRI 2-6, 3-3, 204-1, 13.4.1]

## Overview

### \* Palm Oil Supply Chain

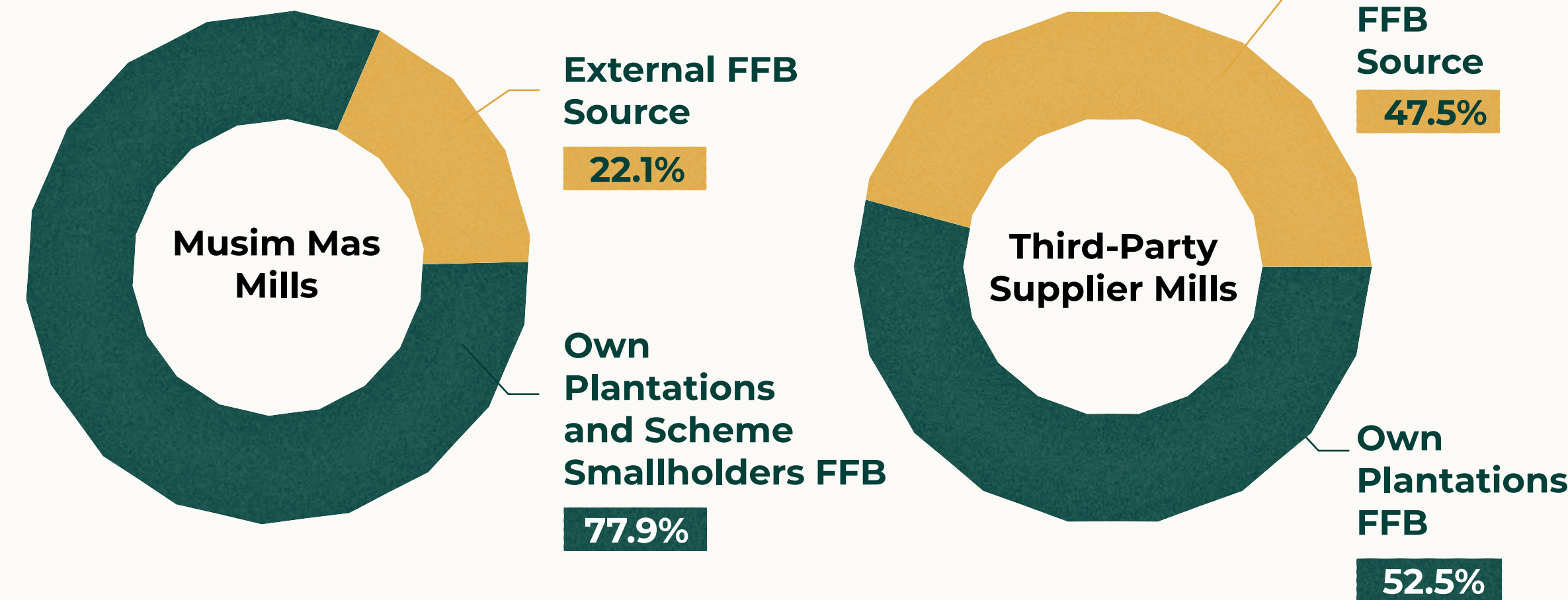
Our palm oil operations comprise a complex supply chain with multiple players contributing large- and small-scale volumes.

We exclusively source fresh fruit bunches (FFB) locally in Indonesia: 77.9% from our plantations and scheme smallholders, and 22.1% from FFB dealers and smallholders.

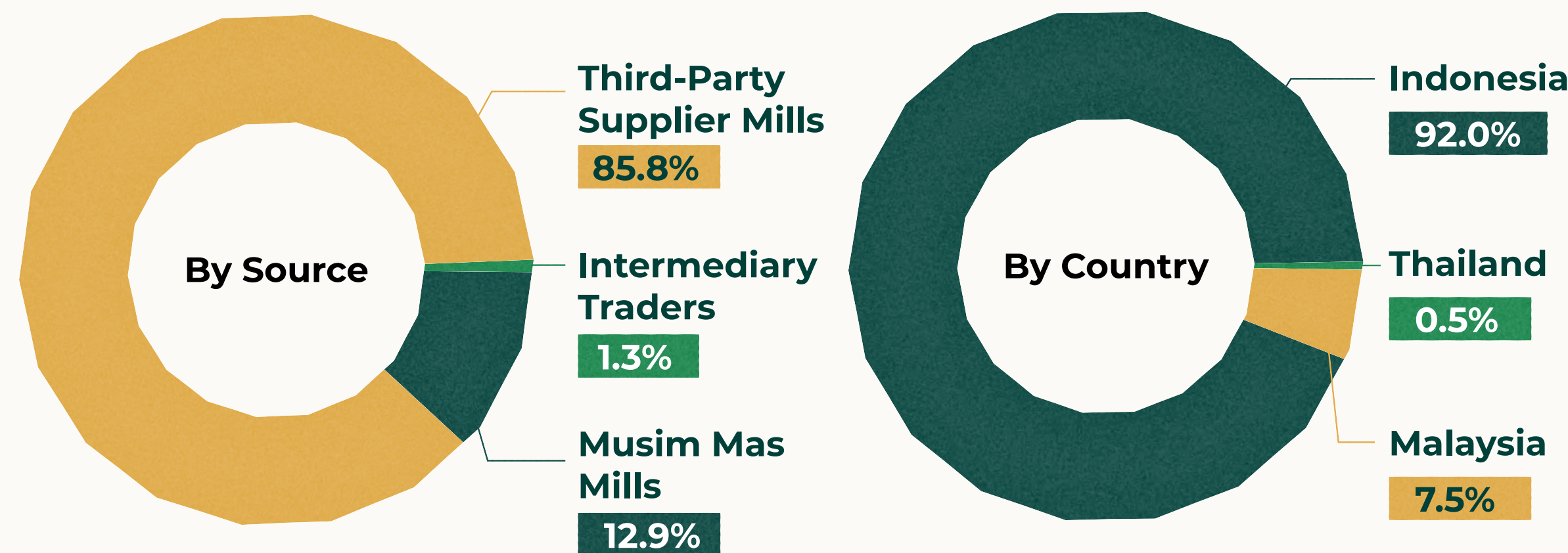
We source 85.8% of our crude palm oil (CPO) from third-party supplier mills, where we actively engage suppliers and have established landscape initiatives. Our mills supply 12.9% of our CPO, while the remainder (1.3%) is sourced from third-party intermediary traders.

Our CPO primarily originates from Indonesia (92.0%), with a small proportion from Malaysia (7.5%) and Thailand (0.5%).

FFB Sourced by Origin 2023 (% of Total Volume)



CPO Supply Bases 2023 (% of Total Volume)



FFB Supply to Musim Mas and Third-Party Supplier Mills by Origin 2023 (No.)

Origin	No.
<b>Musim Mas Mills</b>	<b>18</b>
Musim Mas plantations and scheme smallholders only	10
Musim Mas plantations and external sources	5
External sources only	3
<b>Third-Party Supplier Mills</b>	<b>547</b>
Own plantations only	61
Own plantations and external sources	375
External sources only	111
<b>Total</b>	<b>565</b>

### \* Coconut Supply Chain



Our coconut operations source the bulk of our copra from independent smallholders in Indonesia through a network of copra dealers. Our refinery also sources a small amount of coconut oil from third-party producers.

# Traceability

[GRI 13.23.1, 13.23.2]

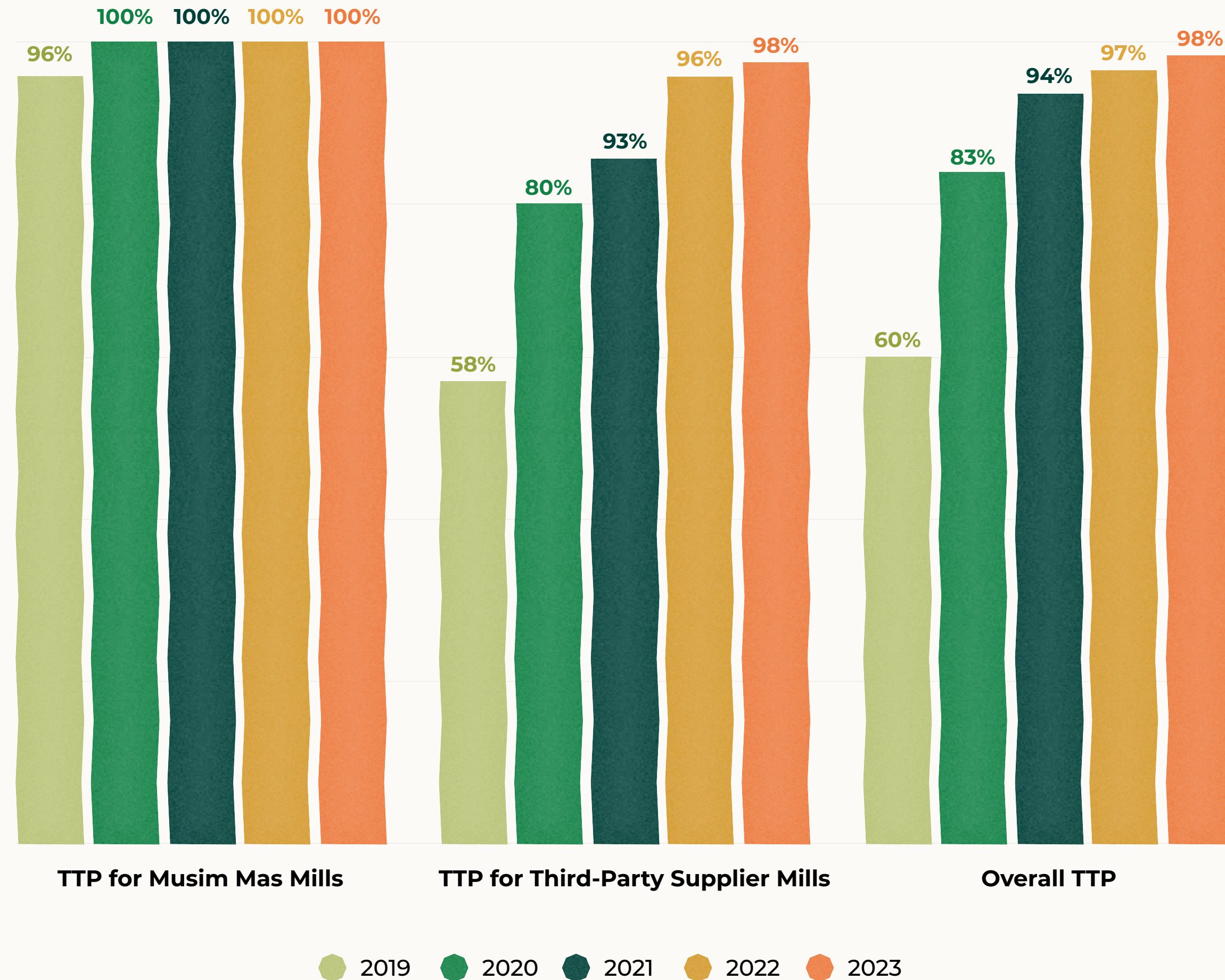
## ✿ Palm Oil Traceability

Managing and addressing potential deforestation and peat development risks requires detailed knowledge of the supply sheds of the mills we source from. **Since 2015, we have achieved 100%\* overall traceability to mill (TTM). We also achieved 100% traceability to plantation (TTP)<sup>28</sup> for Musim Mas-owned mills' FFB supply base since 2020.**

We are pursuing our goal of 100% TTP across our entire supply chain, including third-party CPO and palm kernel (PK) supplying mills. Although CPO and PK sources from Roundtable on Sustainable Palm Oil (RSPO)-certified supply chains are traceable, collecting and validating traceability data from non-certified suppliers remains challenging due to changing market factors and the dynamic nature of FFB supplied by dealers and independent smallholders. Despite these challenges, Musim Mas continues to make progress. **We achieved 98%\* TTP for third-party supplier mills and our overall TTP in 2023, and are on track to reach 100% TTP by 2025.**

✿ For an overview of our traceability approaches, see our [website](#)

Traceability to Plantation 2019-2023 (%)



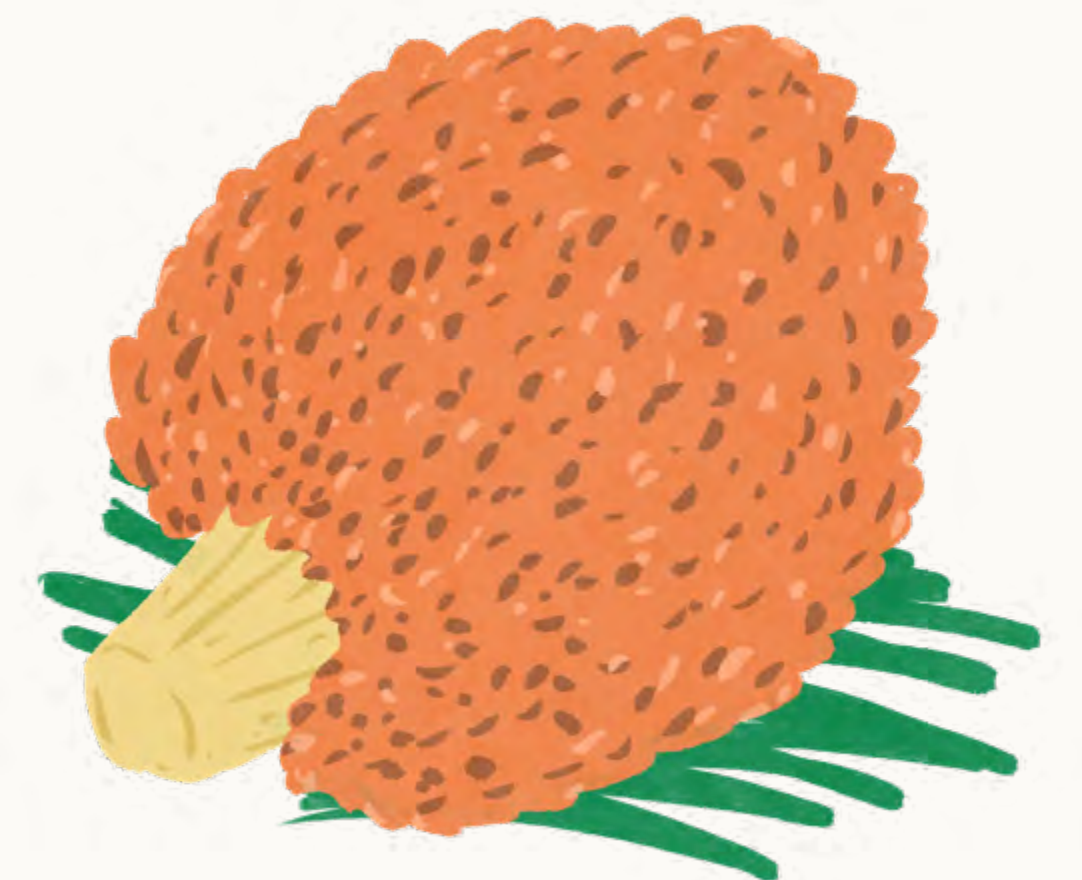
**Note:** Our 2019 and 2020 traceability data covered our Indonesian and Malaysian supply bases. Since 2021, it has included our Thailand supply base after we began sourcing from the region.

## ✿ Coconut Traceability



In 2022, Musim Mas began mapping the supply base of our coconut operations. **We are proud to announce we achieved 99% TTP for the coconut oil we sourced in 2023** by applying our experience and expertise in palm oil traceability.<sup>29</sup> This accomplishment is also a testament to our robust supplier and smallholder engagement initiatives.

Although we apply the same rigorous standards to sourcing coconut as we do to palm oil, coconut traceability is a relatively new endeavor with its unique set of challenges. We continue to fine-tune our traceability programs and are currently focused on engaging more stakeholders, including governments and industry peers as we strive to achieve 100% coconut TTP by 2025.



<sup>28</sup> Traceability to plantation (TTP) refers to traceability to place of production, i.e., a company's concession, a farm, or a village for certain FFB dealers and/or smallholders.

<sup>29</sup> We have adopted the same TTP methodology for palm oil and coconut oil.

\* These figures, independently verified by Control Union (Malaysia) Sdn. Bhd., cover 14 refineries as well as nine kernel crushing plants. Three refineries not processing palm-based products are excluded. Additionally, six other refineries that only source from the 14 verified refineries are also excluded from verification to avoid repetition. See the verification statements for [TTM](#) and [TTP](#).

## Assessing, Managing and Monitoring NDP Risks

[GRI 308-1, 308-2, 414-1, 414-2, 13.23.4]

[SASB FB-AG-430a.1, FB-AG-430a.3]

We use a combination of approaches to manage NDP risks in applying our No Deforestation, No Peat, and No Exploitation (NDPE) commitments, as outlined in our 2021 [NDP Risk Management Framework \(RMF\)](#). Our NDP Risk Management Framework informs but does not replace independent assessments of NDPE compliance. Our annual assessments categorize new and existing suppliers as low-, medium-, or high-risk by overlaying TTP data on supply shed maps that include conservation and peat areas.

In 2023, as per our RMF methodology, we incorporated updated maps and information on palm planted areas to ensure that our assessment remains stringent and is based on the latest available data. As a result, we identified one supplier mill as high-risk and 36 mills as medium-risk. Nevertheless, 93.8%# of the total 601 CPO and PK suppliers assessed were identified as low-risk. We are developing plans to engage the high-risk mill in 2024.#

Supplier Risk Levels 2021–2023 (No., %)

Risk Level	Criteria	2021		2022		2023	
		No.	%	No.	%	No.	%
!!! High	Overlaps with >10% of risk indicators	1	0.2%	0	0%	1	0.2%#
!! Medium	Overlaps with 2-10% of risk indicators	15	2.6%	16	2.7%	36	6.0%#
! Low	Overlaps with <2% of risk indicators/RSPO Identity Preserved certified	560	97.2%	586	97.3%	564	93.8%#



*In 2022, we established that our copra and coconut sourcing area has a low deforestation risk. We continue to assess risks via the NDP RMF.*



# EY has performed limited assurance procedures on these figures/information.



## ✳️ Monitoring for Deforestation

Our Geographic Information System (GIS) team proactively monitors landscapes in Indonesia, Malaysia, and Thailand for No Deforestation and No Peat (NDP) and fire risks. From January to December 2023, more than 10.36<sup>#</sup> million hectares of our suppliers' concessions in Indonesia, Malaysia, and Thailand were also remotely monitored for deforestation by Earthqualizer.<sup>30</sup>

In addition to TTP data and supply shed maps, we support and use publicly available data, industry reference tools, and monitoring systems operated by environmental NGOs and other entities, including Earthqualizer and Global Forest Watch (GFW). We augment these tools with our outreach programs and landscape initiatives, which supply landscape-level spatial development data to guide future expansion and development in line with regulations.

### ■ Musim Mas Deforestation Monitoring System

#### 👁️ Earthqualizer Platform

Industry reference B2B monitoring platform

#### 🔒 Public Sources

We collect, update, and cross-check information using public sources such as, GeoRSPO, Greenpeace, Kepo Hutan, and Global Forest Watch

#### 🔍 Internal Monitoring

To establish TTP, our suppliers share maps and information about their supply base

#### 🔔 GFW Integrated Deforestation Alerts

An innovative platform by the Global Forest Watch (GFW) and supporting agencies/universities that provides deforestation alerts through multiple analytical systems, namely GLAD, GLAD-S2 and RADD. Combined, these can detect change in primary forests as well as plantations and younger forests

## Verified-Deforestation Free

We use a systematic, volume-based approach, leveraging our NDP RMF and TTP data to calculate the deforestation-free volume of our supply chain. First, we compute the TTP percentages for internally- and externally-sourced FFB.

Next, we use our NDP RMF methodology to calculate the percentage of risk by assessing the overlap between FFB supply sheds, as well as conservation and peat areas. The percentage of deforestation-free claim for

each mill will be derived from the identified risk percentage. This results in a deforestation-free percentage for each mill and its supply base.

Finally, we calculate a weighted percentage of deforestation-free volume based on the contribution of each individual mill to our total supply.

This report marks the first time we are reporting on supplier verified deforestation-free volumes. Our deforestation-free score in 2023 was 99.41%.\*



\* This figure has been independently verified by Control Union (Malaysia) Sdn. Bhd. See the verification statement [here](#).

# EY has performed limited assurance procedures on these figures/information.

<sup>30</sup> This area covers suppliers' group-level concessions in Indonesia, Malaysia, and Thailand.

## Supplier Progress on NDP Commitments

[GRI 13.4.3] [SASB FB-AG-430a.1, FB-AG-430a.2]

As a signatory to the [Agriculture Sector Roadmap to 1.5°C](#), Musim Mas is committed to having 100% of our palm oil volumes in the “Delivering” category for No Deforestation and No Peat according to the NDPE Implementation Reporting Framework (IRF) by 2025.<sup>31</sup>

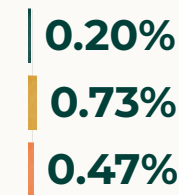
In 2023, 95.00%\* of our supplier volumes were in the “Delivering” category for their No Deforestation commitments, and 95.69%\* were in the “Delivering” category for their No Peat commitments. Our suppliers’ progress has improved over the years, and we continue to collaborate closely with them to reach the 100% target.

Supplier Progress According to NDPE IRF Categories (% Volumes)

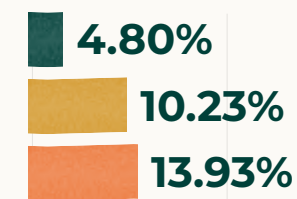
### No Deforestation Progress 2021-2023 (%)



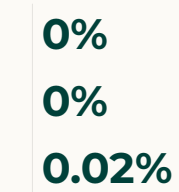
#### Progressing



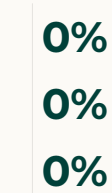
#### Commitments and Starting Actions



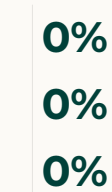
#### Awareness



#### Known



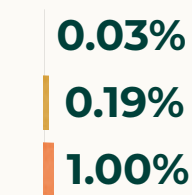
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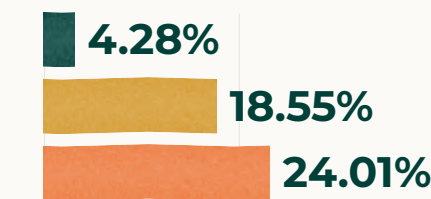
### No Peat Progress 2021-2023 (%)



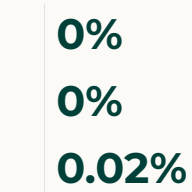
#### Progressing



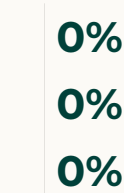
#### Commitments and Starting Actions



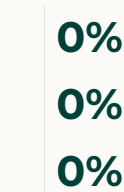
#### Awareness



#### Known



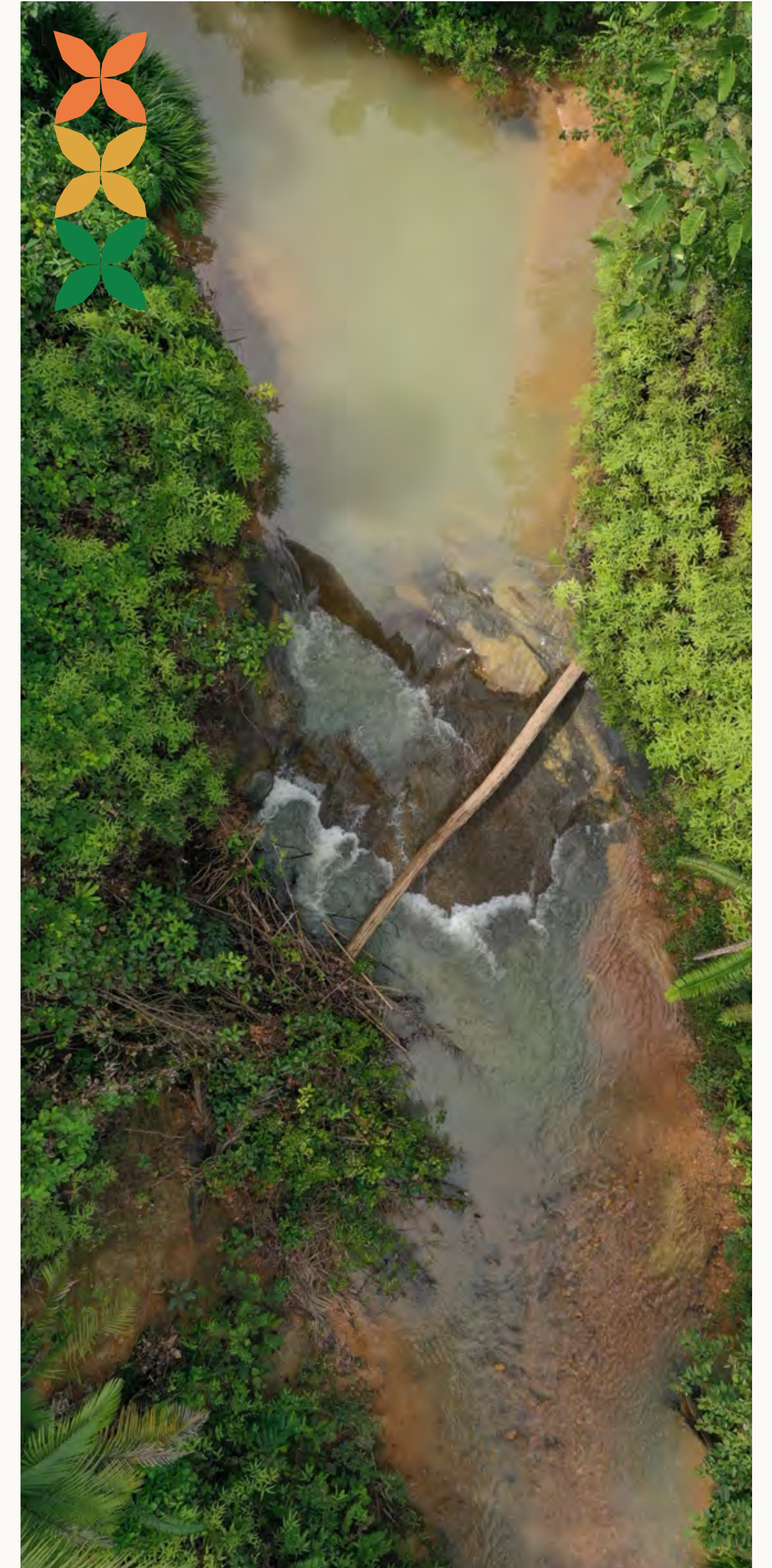
#### Unknown



2023 2022 2021

**Notes:**

- All suppliers are classified into one of six categories based on the NDPE IRF.
- The charts above present the aggregated data for all our plants which source CPO, PK and its derivatives, as well as all supplying mills in our supply chain for the January-December 2023 reporting period\*.



<sup>31</sup> See the Tropical Forest Alliance and Proforest’s report on [Progress on No Deforestation & No Peat Commitments in the Palm Oil Sector: Reporting Using the NDPE- Implementation Reporting Framework](#).

\* The individual data has been independently verified by Control Union (Malaysia) Sdn. Bhd. See the verification statement [here](#).

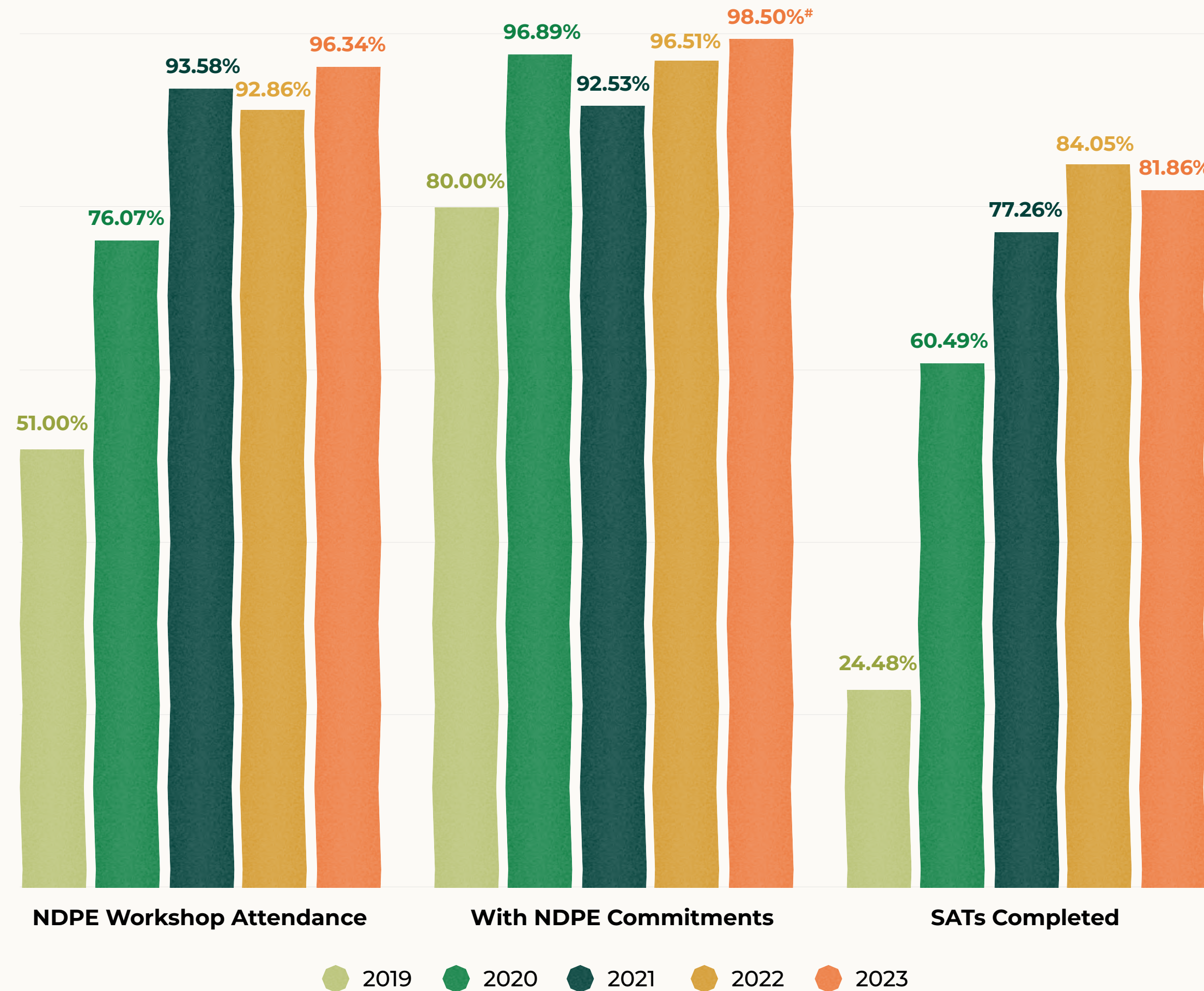
## Supplier NDPE Engagement

Our suppliers' progress determines the success of our entire supply chain. We engage with suppliers over the phone, online, and through in-person meetings. We require them to attend workshops and submit their NDPE commitments in line with our policy obligations. In 2023, we conducted six in-person and online workshops. In addition to NDPE topics, we also introduced our new digital traceability system to our suppliers.

We also require suppliers to complete the Musim Mas Self-Assessment Tool (SAT) to disclose their NDPE commitments and implementations. This tool allows us to identify potential improvement areas and develop tailored roadmaps and time-bound action plans to monitor their progress towards compliance while supporting them in meeting our requirements.

As of December 2023, 96.34% of our suppliers have attended an NDPE workshop, 98.50%# have submitted their NDPE commitments, and 81.86% have completed SATs.

Supplier Engagement on NDPE Commitments 2019-2023 (%)



Musim Mas continues to engage with and train our copra and coconut oil suppliers, conducting one NDPE workshop in 2023.

### Training Independent Smallholders in Our Supply Base

We continue to train independent smallholders inside and outside our supply base to improve their understanding of NDPE principles and support their certification efforts. In 2023, 16,269# independent smallholders were part of the Musim Mas supply base, 3,496# (21%) of which were part of our training programs.

For more information of our training programs, see: [Independent Smallholders](#)

# EY has performed limited assurance procedures on these figures.

### Engaging FFB Dealers for Greater Traceability in Malaysia

As part of a joint program with the Proforest-Daemeter Partnership and other palm oil producers to increase TTP in Peninsular Malaysia, we engaged Proforest to conduct a workshop in Muar, Johor, in June 2023 to improve FFB dealers’ knowledge and awareness of NDPE, and train them on relevant TTP data collection techniques.

[Promoting the Sustainable Production of Palm Oil Through Dealer Engagement](#)

### Monitoring Suppliers’ Certification Status

We monitor our suppliers to ensure their continued adherence to local and internationally recognized sustainability certification schemes and standards, including the RSPO, Indonesian Sustainable Palm Oil (ISPO), Malaysian Sustainable Palm Oil (MSPO), and the International Sustainability and Carbon Certification (ISCC) standards.

Certification assures us that they have been independently audited and verified by recognized bodies to adhere to sustainability standards. Many of our suppliers adhere to more than one certification scheme or standard, with 67.4% certified against at least one.

Certification Status of Supplier Mills by Country 2023 (% Certified)

Country	Certification	% of Total Suppliers
Indonesia	RSPO-certified suppliers	30.0%
	ISPO-certified suppliers	52.6%
	ISCC-certified suppliers	10.1%
Malaysia	RSPO-certified suppliers	22.5%
	MSPO-certified suppliers	96.9%
	ISCC-certified suppliers	8.5%
Thailand	RSPO-certified suppliers	87.5%



## Addressing No Exploitation in Supply Chains

[GRI 2-24, 3-3, 414-1, 414-2] [SASB FB-AG-430a.2, FB-AG-430a.3]

Musim Mas is a member of the United Nations Global Compact (UNGC), upholding its principles on human rights and social responsibility. We are developing a strategy to engage suppliers further and ensure their alignment particularly with the No Exploitation component of our NDPE commitments.

In 2023, following our labour and human rights assessment with Dignity in Work for All (DIWA, formerly Verité Southeast Asia), we integrated its findings into our developing Human Rights Due Diligence (HRDD) strategy. We will build our strategy taking into account the latest industry-driven standards and regulations, including the draft NDPE IRF provisions on land and labour rights.

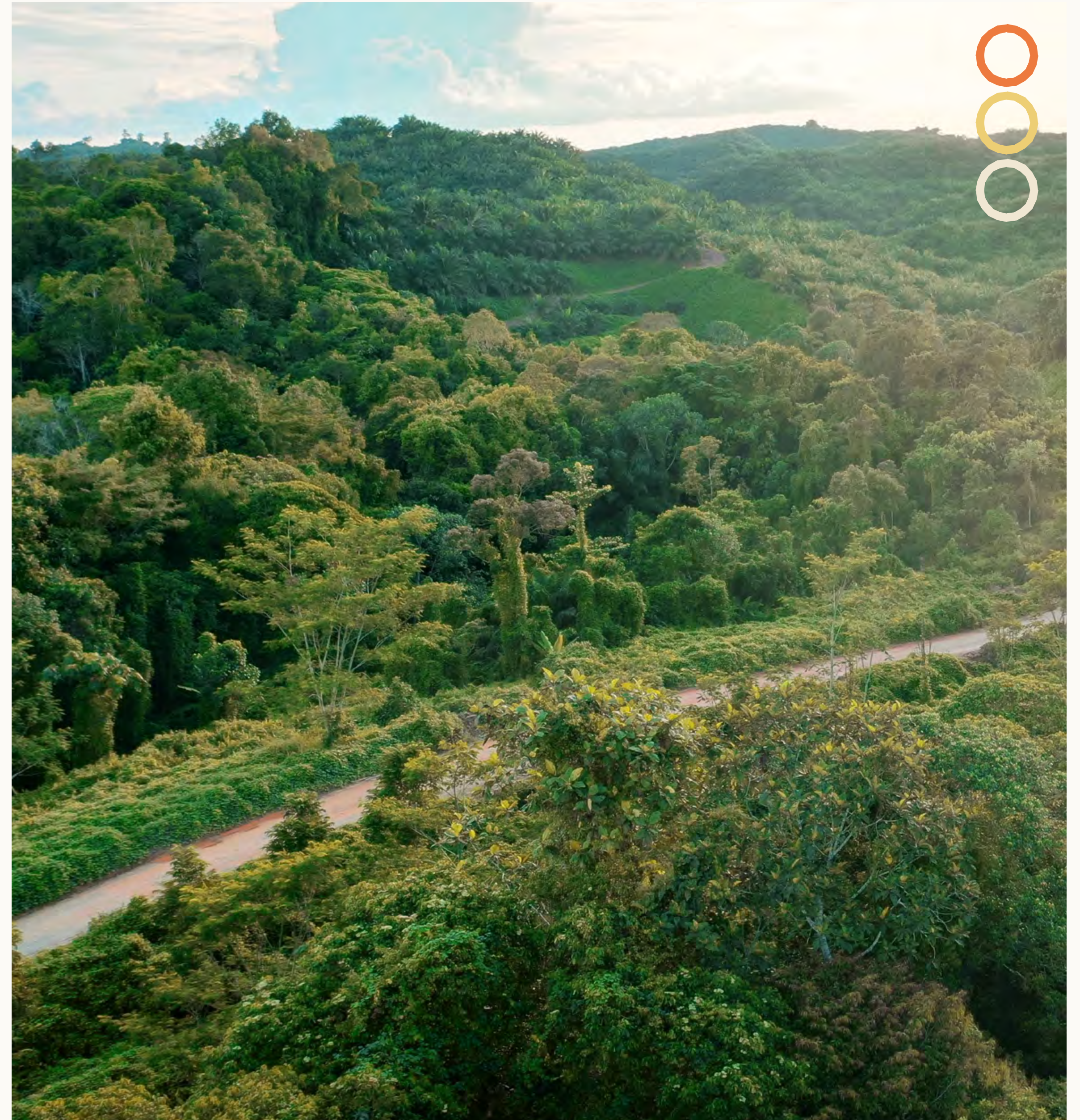
In order to identify, prevent, mitigate, and account for human rights risks, the strategy will detail our approach to risk management. This includes how we build capacity among suppliers through our supplier workshops. The strategy also outlines our risk assessment process, from data collection via our SAT to categorizing our suppliers according to their risk level.

Additionally, we will take into consideration public information on land conflicts and other No Exploitation-related complaints submitted through our internal and the RSPO grievance platforms.

» For more information, see: [Improving Our Labour and Human Rights Practices](#)

As an active member of the NDPE IRF Working Group, Musim Mas volunteered to pilot the draft NDPE IRF for land and labour rights, and integrated key criteria to our Musim Mas SAT during the testing phase. Key learnings from the pilot include the need for companies to implement robust systems to monitor and manage social issues and related non-compliances within their supply chains.

We are revising our SAT to incorporate HRDD elements. This work is targeted to be completed in 2024. The revised SAT will include more questions about supplier land and labour rights programs and their implementation. We are also planning HRDD workshops for Malaysian and Indonesian suppliers in 2024 and will share more information about these initiatives in our next report.



# Grievances



[GRI 2-16, 2-25, 2-26, 3-3, 308-2, 13.4.5] [SASB FB-AG-430a.2]

## Update on a Musim Mas Grievance on RSPO Portal

In January 2021, a grievance alleging customary land ownership issue concerning our West Sumatra subsidiary was filed via the RSPO complaints portal. In August 2023, the RSPO Complaints Panel issued a decision letter dismissing the case. Following the 60-day appeal period, the RSPO Complaints Panel officially closed the case in November 2023. For more details regarding the case, please refer to the link [here](#).

## Supplier Grievances

Any confirmed cases of deforestation or peatland development by existing suppliers that occurred after the cut-off date of 31 December 2015 activates our [grievance mechanism](#) and necessary remediation steps under our Controlled Purchase Protocol.<sup>32</sup>

In 2023, two grievances were filed against our suppliers via the Musim Mas grievance mechanism. The first was related to alleged deforestation while the second was related

to alleged environmental, human rights, and governance violations resulting from operations without a land use permit on community-titled land.

Our teams review and monitor all active grievance cases to arrive at compliance and a resolution. We are working with the suppliers and affected stakeholders to resolve these two grievance cases and 19 active cases from previous years.

We recognize that reconciling cases and satisfying industry requirements for a fully NDPE-compliant supply chain may take years. Beyond procedural formalities, Musim Mas requires suppliers to make demonstrable progress when resolving grievances to ensure meaningful change. The three grievances stemming from a [2022 Rainforest Action Network Report](#) alleging indirect sourcing of FFB from plantations that encroach on the boundaries of the Rawa Singkil Wildlife Reserve have since been closed.

### \* **Controlled Purchase Protocol**

Grievances filed on or after January 2020 are subject to our [Controlled Purchase Protocol \(CPP\)](#), a complaints resolution process that allows us to maintain business relationships with suppliers who demonstrate progress towards resolving them. The protocol is based on three principles: suppliers' willingness to engage, their positivity to act, and proof of progress against agreed-upon milestones and criteria.

Musim Mas will cease business with suppliers unwilling to engage with us or who repeatedly fail to meet agreed-upon milestones in cases involving critical grievances, including breaches of ND or NP commitments, regulatory violations, and withdrawal from the RSPO. In 2023, one supplier was reinstated into our supply chain, while another was suspended for refusing to halt deforestation and undergo High Conservation Value – High Carbon Stock (HCV-HCSA) assessments.

### ■ ■ **Third-Party Supplier Grievances Raised and Closed**

	Raised	Closed	Active
<b>2023 cases</b>	2	0	2
<b>Cumulative cases 2019-2023</b>	70	49	21

<sup>32</sup> Based on our records, the total area linked to registered non-compliant deforestation within supplier' operations since 2019 is 7,959 ha.



# Stakeholder Collaboration

[GRI 2-28, 2-29, 3-3, 13.4.1]

Musim Mas seeks to be at the forefront of sustainability conversations, engaging directly with stakeholder groups that either impact or are impacted by our operations and the wider issues linked to our sector. These groups include academic institutions, certification bodies, communities and their representatives, customers and partners, employees, financial institutions and investors, government and regulatory bodies, NGOs, smallholders, and suppliers.

We also contribute to multi-stakeholder industry, landscape, and issue-focused partnerships that address emerging challenges and opportunities. These partnerships' interests and concerns influence and support the success of our initiatives, including how we develop and update our strategies, management decisions, and operational procedures.

We publish and update our sustainability policies and reporting, inviting stakeholder input at every opportunity, consulting our technical experts, and engaging with

selected stakeholders for our annual materiality updates and sustainability reports. For an overview of our stakeholder engagement approaches and objectives, see [here](#).

[Our Partners](#)

Our annual materiality assessments cover the environmental, social, and governance (ESG) issues we focus on. Consulting with stakeholders is critical to identifying and prioritizing these topics.

[Materiality Process](#)



One of the core focus areas of our [Sustainable Coconut Sourcing Strategy](#) is collective action. We engage with partners, suppliers, customers, and stakeholders who share common objectives and will continue to work closely with them on our sustainable coconut sourcing initiatives.

## Notable Partnerships in 2023



### Environmental Programs

- Renewed **Tesso Nilo National Park Foundation (YTNTN) contract** for another three years (2024-2026); added a new program with local women community members to plant crops to deter elephants and direct them back to their natural habitat
- Collaborated with a local university on **Taman Kehati** project to develop a biodiversity park and wildlife conservation efforts within one of our estate's conservation area



### Human Rights Programs

- Collaborated with **DIWA** to improve or better implement human rights grievance mechanisms, women empowerment programs, and gender committees



### Smallholder Programs

- Established new partnership with **Bunge** to promote sustainable practices among smallholder farmers in Sambas
- Renewed partnership with **General Mills** in Aceh Singkil
- Renewed partnership with **Nestlé and AAK** in Subulussalam
- Continued Biodiverse & Inclusive Palm Oil Supply Chain (BIPOSC) partnership with **Livelihood Funds (L3F), SNV, ICRAF, Danone, L'Oréal and Mars Incorporated**
- Continued **ETH Zurich** research program to better understand the conditions under which supply chain sustainability initiatives can lead to reduced deforestation



### Supply Chain Programs

- Involved in the **NDPE IRF No Deforestation and No Peat Working Group**, and **Land and Labour Working Group**
- Engaged **Proforest** to conduct a TTP workshop in Muar, Johor, Malaysia in partnership with the Proforest-Daemeter Partnership and other palm oil producers

## Transparency, Reporting, and Evaluation

To help us improve our operations, we maintain an open dialogue with our stakeholders, welcome their constructive feedback, and strive to be transparent by keeping them well-informed on Group-wide matters. In addition to regular reports and communications on our website, we actively participate in various voluntary and mandatory benchmarking and public verification programs to assess our sustainability commitments and monitor our progress, including EcoVadis, CDP (formerly known as Carbon Disclosure Project), PROPER, Forest500, the Zoological Society of London’s Sustainability Policy Transparency Toolkit (ZSL SPOTT), and the World Benchmarking Alliance’s (WBA) [Food and Agriculture Benchmark](#) and WBA [Nature Benchmark](#).<sup>33</sup>

### \* Notable Achievements in 2023



2023 EcoVadis assessment: Received Gold Medal for PT Musim Mas



2023 ZSL SPOTT assessment: Ranked 7th out of 100 companies (91.8% score)



Inaugural Double 'A' achievement for CDP 2023  
 • Water Security (A)  
 • Forests (A)  
 • Climate Change (B)

Received [RSPO Excellence Award](#) for Smallholder Impact

Received [Green PROPER](#) ratings for 11 mills, and Blue PROPER ratings for two mills and seven plantations

## Sustainable Financing

Musim Mas signed its inaugural Sustainability-linked Revolving Credit Facility with Rabobank and HSBC Bank in August 2024. The uncommitted Revolving Credit Facility (RCF) of EUR 150 million was converted into a Sustainability-linked Loan (SLL).

<sup>33</sup> These WBA assessments are conducted bi-annually. The next assessment will be in 2025.

### Striking a Balance: Avoiding Greenwashing While Enhancing Corporate Vulnerability

Commentary by  
**Robin Hicks**  
 Associate Director, Eco-Business



The rise of sustainability reporting has led to a concurrent increase in greenwashing – misleading or exaggerated sustainability claims. This growing problem poses significant challenges and is facilitated by business-friendly regulatory frameworks, limited NGO presence, low consumer awareness, and minimal penalties for filing false claims. Greenwashing will remain a problem in Asia unless robust regulations are implemented and enforced.

Genuine sustainability exposes corporations to more vulnerabilities, and companies must be more transparent about their challenges and setbacks in becoming greener. I commend Musim Mas for its sustainability efforts and the progressive leadership the company has displayed through its smallholder programs and other initiatives. However, the company can improve its status as an industry leader by acknowledging the complexities and challenges of sustainability. Reporting the difficulties Musim Mas encounters will foster greater trust and drive meaningful progress in the palm oil industry.

I look forward to seeing how the company will navigate these challenges in pursuing its sustainability agenda.

*Robin is a sustainability journalist with over seven years of experience writing about the palm oil sector, including indigenous rights and the environmental and social impact of land use and deforestation. His work with Musim Mas includes independent reporting and sponsored content. Robin also writes about waste and plastic pollution, deep-sea mining, and corporate sustainability claims.*

[See our press release: Musim Mas Signs its first SLL with Rabobank and HSBC Bank](#)

The SLL is hinged on three material Key Performance Indicators (KPIs), in line with the Loan Market Association (LMA) SLL Principles: RSPO certification of independent smallholders, training of independent smallholders, and maintaining a deforestation-free palm oil supply chain. To ensure transparency and accountability, the progress of KPIs will be externally verified on an annual basis.





# Product Quality and Safety

[GRI 3-3, 416-1] [SASB FB-AG-430b.1]

Musim Mas works closely with global brands to supply products customized for their specific needs and applications. We fully understand the highest standards of product safety and quality expected by our customers. We cultivate non-genetically modified (non-GMO) oil palms and adhere to strict product quality and safety policies.

Our products and refineries undergo regular inspections and audits and are certified against various domestic and international Global Food Safety Initiative (GFSI)-recognized standards, including:

- Food Safety System Certification (FSSC) 22000 based on the International Organization for Standardization (ISO) 22000
- Codex Alimentarius Commission/ Recommended Code of Practice (CAC/ RCP) 1:2011
- Hazard Analysis and Critical Control Point (HACCP) Management System (MS) 1480
- HACCP Indonesian National Standard (*Standar Nasional Indonesia, SNI*).

Our products are also certified under Good Manufacturing Practice (GMP), Halal, and Kosher standards, affirming our adherence to international quality standards and dietary requirements. Furthermore, certifications such as RSPO, ISCC, and ISPO demonstrate that our products meet the highest standards of sustainability.

We adhere to applicable EU regulations, including contaminant thresholds for vegetable oils and fats. We screen possible entry routes for contaminants like mineral oils, glycerol-based contaminants 3-monochloropropane diol (3-MCPD), and glycidyl esters (GE) in our processing chains and use various methods to effectively remove them and their precursors per the Codex Alimentarius International Food Standards. We use only food-grade lubricants and incorporate double refining and post-stripping technology in our processes and continuously explore innovative technologies across our integrated operations to mitigate potential contaminants.

Musim Mas follows industry best practices and prepares for product recalls in the unlikely event that they occur.

Our efforts also extend to our suppliers. We collaborate with them and provide support to ensure they meet our customers' stringent requirements and the highest product quality and safety standards.

[Healthier Without 3-MCPD](#)

[Managing Mineral Oil Contaminants in Foods](#)



*We conduct annual recall simulations and dry runs for selected products to ensure all relevant parties understand their responsibilities and can respond effectively if any products are found to be unsafe.*





**PILLAR 4**

**Drive Innovation in Sustainable Practices**

[GRI 3-3]

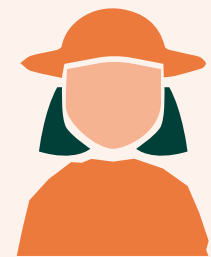
Musim Mas strives to meet the increasing demand for palm oil while navigating an ever-changing global market and an evolving regulatory landscape. Our innovative solutions expand the scope and reach of our sustainability commitments, ensuring they are effectively and meaningfully implemented within and beyond our operations.

✦ Notable Innovations in 2023



Release of new oil palm varieties

» See: Improving Yields



Women smallholders program

» See: Smallholders Program Partnership



Ongoing stakeholder partnerships to improve smallholder livelihoods, reduce deforestation, and advance regenerative agriculture

» See: Smallholders Program Partnership





# Transforming Landscapes

[GRI 3-3, 203-2, 304-1, 13.4.1]

Musim Mas believes in a multifaceted, collaborative approach involving all stakeholders to address the dynamic nature of industry supply bases, particularly those involving independent smallholders. Our landscape approach is based on engaging with stakeholders outside our supply base, including smallholders, local communities, third-party suppliers, civil society organizations, local governments, industry peers, and various program implementation partners to achieve tangible, long-term impacts. Leveraging our experience and expertise in landscape programs, we play a vital role in driving collective action to achieve the objectives of the [Agriculture Sector Roadmap to 1.5°C](#).

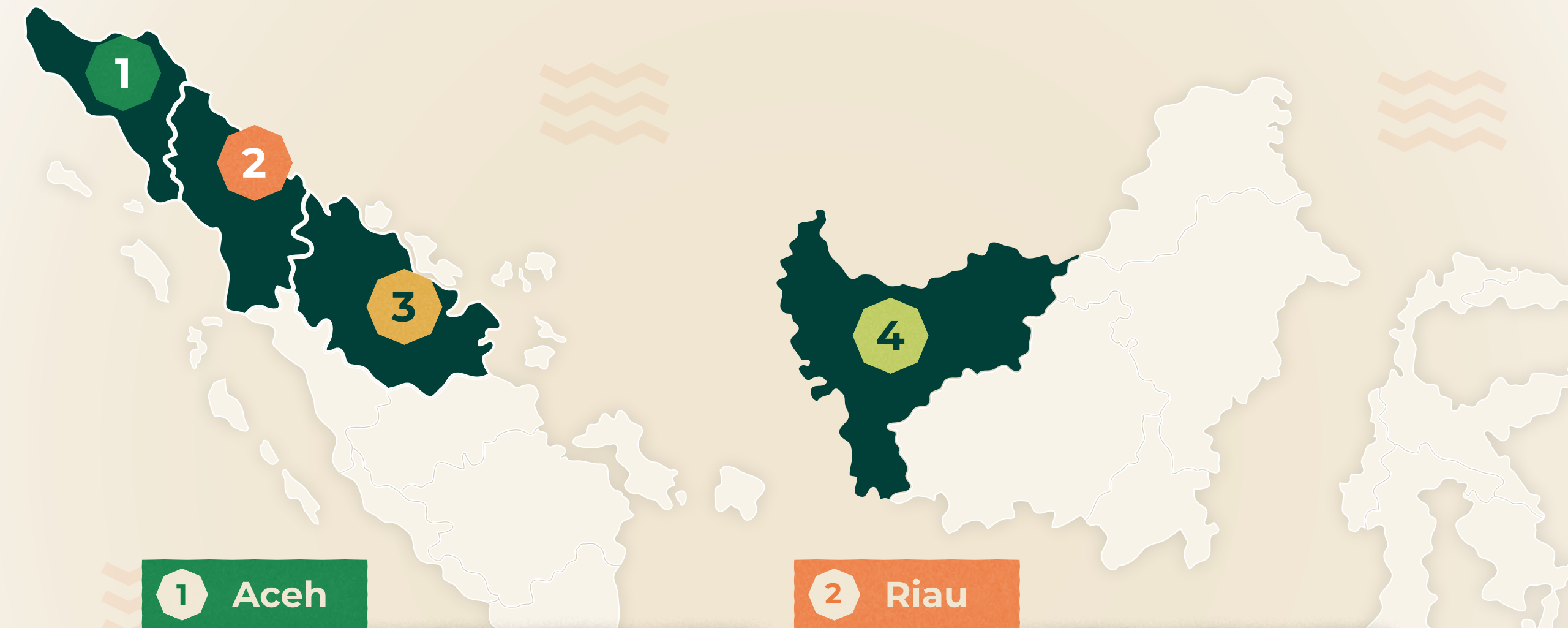
Our efforts are focused on several priority landscapes in Indonesia, selected based on the presence of critical conservation areas, locations of our key operations, and multi-stakeholder collaborations that enable the effective implementation of our programs.

We continue to support independent smallholders in these priority landscapes through our Smallholders Hubs and other initiatives.

In September 2024, we rolled out a second landscape strategy covering our remaining priority landscapes: Riau, South Sumatra, West Kalimantan, North Sumatra and Central Kalimantan. With this strategy, we have successfully achieved our [No Deforestation, No Peat, and No Exploitation \(NDPE\) roadmap](#) target of developing landscape strategies for all six of our initial priority areas. Moving forward, we will provide annual progress updates for all six priority landscapes in a consolidated report.

[See our Projects in the Aceh Landscape Report 2022/23](#)

[See our Landscape Strategy](#)



## 1 Aceh

- 3 Smallholders Hubs (Aceh Tamiang, Aceh Singkil and Subulussalam)
- Verified Sourcing Area (VSA) program
- RADD piloted in Aceh Tamiang (now under IDA)
- Supporting landscape level HCV-HCS mapping
- ETHZ research
- Areas for Priority Transformation (APT)
- Land Legalisation Program (Aceh Singkil)
- Leuser Ecosystem

## 2 Riau

- Founding member of Siak-Pelalawan Landscape Program
- 2 Smallholders Hubs (Sungai Linau and Dayun, Siak)
- Tesso Nilo Flying Squad
- Landscape-level mapping of HCV-HCS areas
- Tesso Nilo National Park
- Giam Siak Kecil-Bukit Batu Bioreserve

## 3 North Sumatra

- Biodiverse & Inclusive Palm Oil Supply Chain (BIPOSC) project on regenerative agriculture program (Labuhanbatu)

## 4 West Kalimantan

- 1 Smallholders Hub (Sambas)
- Social Forestry Program

**Note:**

1. This map shows an overview of our existing programs.
2. Those in **green** are protected areas adjacent to our operations.

## The Importance of Landscape Approaches

Commentary by  
The Tropical Forest Alliance (TFA)

Palm oil companies with midstream and downstream operations lead the way in landscape programs, surpassing all other sectors. The number of these companies is increasing, and they continue to expand the scope and reach of their initiatives. However, these companies represent a tiny fraction of the thousands of palm oil processors and manufacturers who belong to the Roundtable on Sustainable Palm Oil (RSPO). The industry must improve its outreach efforts and incentivize companies to collaborate with stakeholders outside their supply chains on long-term projects that will not only benefit palm oil producers, but also society and the environment.

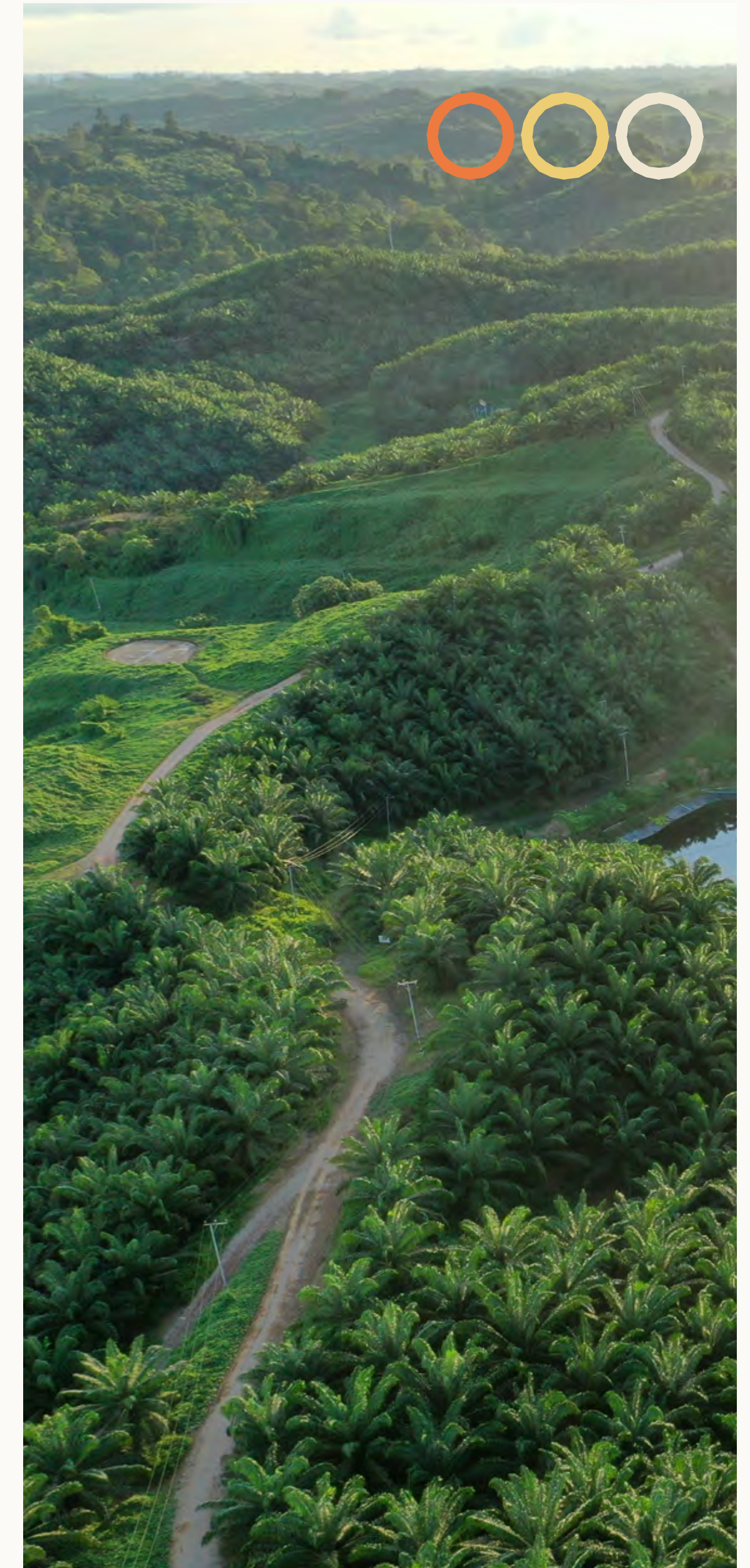
Landscape-level approaches must adopt long-term strategies to address three challenges: the leakage market, smallholder inclusion, and scale. They must account for the relatively large number of smallholders in geographically restricted agricultural zones, the complexities of maintaining relationships and engaging extensively with independent smallholders and other stakeholders, and increasingly strict legal and regulatory frameworks, including the European Union Deforestation Regulation (EUDR).

Musim Mas is one of the few companies that understands the importance of a long-term approach to landscape-level projects. Its industry-leading Smallholders Hubs integrate with jurisdictional-scale projects, multiplying the company's impact through collaborations with industry, government, and civil society stakeholders, NGOs, and local populations. The strength of Musim Mas' work lies in their on-the-ground knowledge and strong relationship with partners and buyers, all of whom support their landscape initiatives.

Musim Mas is an industry leader, setting an example and providing insights that other companies can follow to integrate landscape-level projects into their sustainability strategies. Like Musim Mas, companies must look beyond sustainability risks, find ways to prioritize action and engage in collaborative multisector projects with stakeholders in committed and progressive jurisdictions. The palm oil sector must realize that a single company going 'clean' and purchasing 100% sustainable palm oil is not enough. The entire industry must embrace sustainability to have an impact.

*TFA is a global public-private partnership platform with 170 partners, including Musim Mas. Collaborating with diverse stakeholders, TFA mobilizes private sector actors to embrace sustainability in production landscapes. TFA also facilitates knowledge exchange through its Jurisdictional Action Network and Jurisdictional Approaches Resource Hub (JARH) and has published a [JARH case study](#) on Musim Mas' Smallholders Hubs*

» See also: [TFA's commentary on Achieving Sector-Wide Goals](#)



# Improving Yields



Musim Mas believes that future growth in oil palm production should rely on developing higher-yielding oil palm varieties rather than expanding land use. We invest in research and development (R&D) to strengthen land-use efficiency, maximize yields, and enhance productivity. Focusing on these improvements allows us to reduce greenhouse gas emissions and minimize our impact on forests and biodiversity as we meet the growing demand for palm oil.

Our Genetic and Agriculture Research Center in Riau houses specialized facilities and teams dedicated to driving innovation in agronomic practices, such as cultivating superior oil palm varieties and optimizing crop protection and peat management methods at our plantations.



## New Oil Palm Varieties



After more than a decade of extensive R&D, we have released four new oil palm varieties: GS1, GS2, GS3, and GS4, also known as the Musim Mas GS Series. These new varieties have resulted from the selective crossbreeding of non-GMO Dura and Pisifera (DxP) oil palms and have been approved by the Indonesian government's assessment body for plantation varieties (TPV).

Our new GS varieties have a rapid fruiting cycle and can produce fruit bunches within

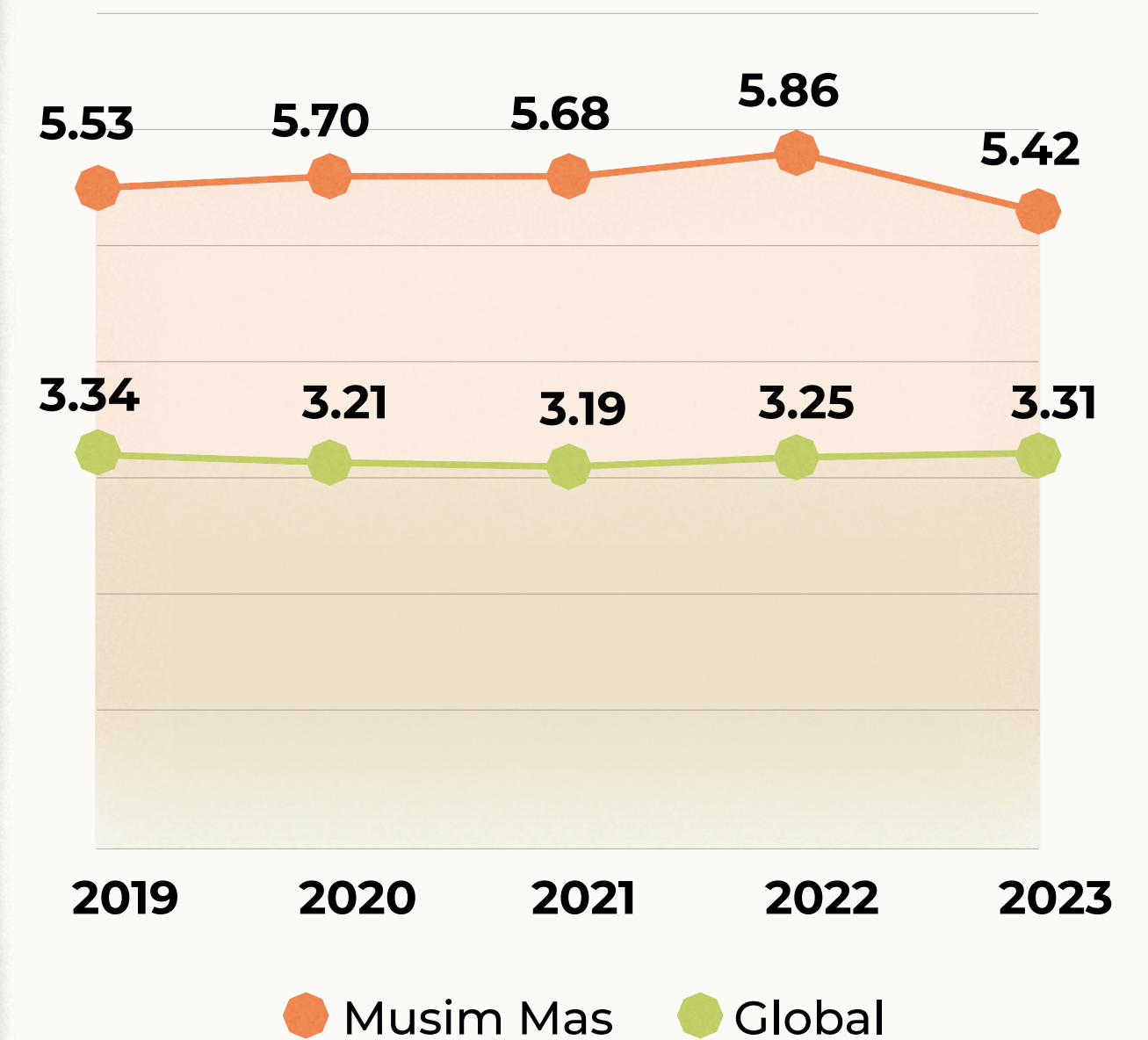
25 months instead of the industry average of 30 months. They grow into oil palms with longer stalks that facilitate easier harvesting. **Bigger fruitlets also boost crude palm oil (CPO) extraction rates to 30%, with potential yields exceeding 10 tonnes (MT) of CPO per hectare, triple the industry average of 3.25 MT of CPO per hectare.**

Our GS Series demonstrates the strength of our R&D efforts and further cements Musim Mas' reputation as a leading seed-to-shelf agribusiness. We continue to pursue and invest in R&D into newer oil palm varieties with desirable traits that allow them to thrive in harsh environmental conditions and further improve productivity, land-use efficiency, and yields.

[Musim Mas Releases New Oil Palm Seed Varieties That Yield Nearly Triple the Industry Average](#)

Our industry-leading CPO yield was 5.42 tonnes per hectare in 2023 – 1.6 times higher than the global average.

Musim Mas CPO Yield vs. Global Average 2018-2022 (MT CPO/ha)



For more information on our yield, see: [Operational Overview](#)



# R&D on New Food Products and Applications



Our customers include food manufacturers who regularly require new and innovative products and ingredients. To meet their demands, our state-of-the-art R&D facility in Singapore, [the Novel IDEAS Center](#), enhances existing formulations and develops advanced palm oil products, including specialty fats for the food and beverage and animal feed industries. These versatile blends of high-quality fats, emulsifiers, and stabilizers can be used in gluten-free, sugar-free, frozen, and plant-based items, as well as livestock feed.

These innovations elevate the quality of food and beverages, contributing to desirable textures and seasonal flavors that appeal to international and regional palates. We take pride in our collaborative approach, working with customers to fulfill their requirements for palm oil products and ingredients that align with evolving consumer tastes.

- [Functional Blends that Enable Food & Beverage Innovations](#)
- [Innovating in the Growing Frozen Breads Market](#)
- [The Right Fats for Healthy and Productive Livestock](#)
- [Enabling Food and Beverage Product Development](#)





## Assurance Statement

[GRI 2-5]

### Independent Limited Assurance Report

To the Management of Musim Mas Holdings Pte Ltd (“Musim Mas”),

#### \* Scope

We have been engaged by Musim Mas to perform a ‘limited assurance engagement’, as defined by International Standards on Assurance Engagements, here after referred to as the engagement, to report on Musim Mas’ sustainability performance metrics as set out in the Subject Matter Information section below (the “Subject Matter”) contained in Musim Mas’ sustainability report as of 20 September 2024 for the financial year ended 31 December 2023 (“the Report”).

Other than as described in the preceding paragraph, which sets out the scope of our engagement, we did not perform assurance procedures on the remaining information included in the Report, and accordingly, we do not express a conclusion on this information.

#### \* Subject Matter Information

Our limited assurance engagement covers the following Subject Matter for the above-mentioned period:

Sl. No.	Information for Assurance	Scope for Palm Oil Segment	Countries
1	GHG emissions intensity across palm operations in 2023	RSPO-certified mills only	Indonesia
2	Water use intensity (m <sup>3</sup> /MT FFB processed) in 2023	RSPO-certified mills only	Indonesia
3	BOD and COD quality (mg/l) for POME in 2023	RSPO-certified mills only	Indonesia
4	<p>Scheme smallholders that Musim Mas supports under these programs:</p> <ul style="list-style-type: none"> <li>• KKPA: Number of KKPA programs and number of smallholders</li> <li>• VDP: Number of villages</li> </ul> <p>Note: Musim Mas operates two scheme smallholder programs:</p> <ol style="list-style-type: none"> <li>1. Kredit Koperasi Primer Anggota (KKPA) and</li> <li>2. Village Development Program (VDP)</li> </ol>	Mills and plantations	Indonesia
5	<ol style="list-style-type: none"> <li>1. Number of independent smallholders involved in Musim Mas program that supplies Musim Mas in 2023;</li> <li>2. Total number of independent smallholders supplying to Musim Mas in 2023</li> </ol>	Mills and plantations	Indonesia
6	Total hectares of suppliers’ (group-level) concession monitored through a combination of methods as at 31 December 2023	Concession land owned by monitored suppliers (i.e. supplying mills integrated with plantations)	Indonesia, Malaysia & Thailand
7	Programs in place to support high-risk mills identified as at 31 December 2023	All supplying mills during the year	Indonesia, Malaysia & Thailand
8	Percentage of suppliers classified under low- to medium- to high-risk mills as of 31 December 2023	All supplying mills during the year	Indonesia, Malaysia & Thailand
9	Percentage of suppliers that have an NDPE policy or adopted Musim Mas Sustainability Policy as at 31 December 2023	All supplying mills during the year	Indonesia, Malaysia & Thailand
10	COD quality (mg/l) for PORE in 2023	PT Musim Mas Belawan	Indonesia



## \* Criteria Applied by Musim Mas

In preparing the Subject Matter, Musim Mas applied the criterion of "Accuracy" as defined by GRI and specific criteria determined by Musim Mas as being relevant for its sustainability performance. Such Criteria were specifically designed for sustainability performance; as a result, the Subject Matter may not be suitable for another purpose.

## \* Musim Mas' Responsibilities

Musim Mas' management is responsible for selecting Criteria, and for presenting the Subject Matter in accordance with that Criteria, in all material respects. This responsibility includes establishing and maintaining internal controls, maintaining adequate records and making estimates that are relevant to the preparation of the subject matter, such that it is free from material misstatement, whether due to fraud or error.

## \* EY's Responsibilities

Our responsibility is to express a conclusion on the presentation of the Subject Matter based on the evidence we obtained.

We conducted our engagement in accordance with the *International Standard for Assurance Engagements*

*Other Than Audits or Reviews of Historical Financial Information* ('ISAE 3000 (Revised)') and *ISAE 3410: Assurance Engagements on Greenhouse Gas Statements* and the terms of reference for this engagement as agreed with Musim Mas on 24 May 2024. Those standards require that we plan and perform our engagement to express a conclusion on whether we are aware of any material modifications that need to be made to the Subject Matter in order for it to be in accordance with the Criteria, and to issue a report. The nature, timing, and extent of the procedures selected depend on our judgment, including an assessment of the risk of material misstatement, whether due to fraud or error.

We believe that the evidence obtained is sufficient and appropriate to provide a basis for our limited assurance conclusions.

## \* Our Independence and Quality Management

We have maintained our independence and confirm that we have met the requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants and have the required competencies and experience to conduct this assurance engagement.

EY also applies International Standard on Quality Management 1, *Quality Management for Firms that Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services engagements*, which requires that we design, implement and operate a system of quality management including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

## \* Description of Procedures Performed

Procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Our procedures were designed to obtain a limited level of assurance on which to base our conclusion and do not provide all the evidence that would be required to provide a reasonable level of assurance.

Although we considered the effectiveness of management's internal controls when determining the nature and extent of our procedures, our assurance engagement was not designed to provide assurance on internal controls. Our procedures did not include testing controls or performing procedures relating to checking aggregation or calculation of data within IT systems.



The GHG quantification process is subject to scientific uncertainty, which arises because of incomplete scientific knowledge about the measurement of GHGs. Additionally, GHG procedures are subject to estimation (or measurement) uncertainty resulting from the measurement and calculation processes used to quantify emissions within the bounds of existing scientific knowledge.

A limited assurance engagement consists of making enquiries, primarily of persons responsible for preparing the Subject Matter and related information, and applying analytical and other appropriate procedures.

1. Inquiries with Musim Mas' Sustainable Supply Chain team, Independent Smallholder team and Sustainability team to:
  - a. Understand principal business operations,
  - b. Appreciate key sustainability issues and developments,
  - c. Map out information flow for sustainability reporting and the relevant controls, and
  - d. Identify data providers with their responsibilities

2. Virtual interviews with and sought clarifications from employees and Management in Singapore and Indonesia to understand key sustainability issues related to the selected indicators, data collection processes and accuracy of reporting.

3. Conducting walk-through of systems and processes for data aggregation and reporting with relevant personnel to understand the quality of checks and control mechanisms in relation to the Subject Matter in the Sustainability Report.

4. Performing of analytical reviews on data and inquire with relevant personnel when anomalies are observed.

5. Obtaining of documentation through sampling methods to check accuracy of the data in relation to the Subject Matter in the Sustainability Report.

6. Checking data and statements had been correctly transcribed from corporate systems and / or supporting evidence, in relation to the Subject Matter in the Sustainability Report.

7. Obtaining of relevant certifications and reports in relation to the Subject Matter in the Sustainability Report.

8. Relying on Musim Mas' management representation letter on the Subject Matter in the Sustainability Report.

We also performed such other procedures as we considered necessary in the circumstances.

## Conclusion

Based on our procedures and the evidence obtained, we are not aware of any material modifications that should be made to the Subject Matter as of 20 September 2024 for the year ended 31 December 2023, in order for it to be in accordance with the Criteria.

## Restricted Use

This report is intended solely for the information and use of Musim Mas and is not intended to be and should not be used by anyone other than those specified parties.

*Ernst & Young LLP*

**Ernst & Young LLP**

20 September 2024  
Singapore

## Appendices

### Aligning with the Recommendations from the Taskforce on Climate-Related Financial Disclosures (TCFD)

Our first TCFD disclosure aims to identify and enhance our understanding of the climate-related risks and opportunities affecting our business. By aligning with the TCFD, we can more effectively communicate these impacts to our stakeholders, outline the actions we will take to mitigate the worst effects of climate change and seize opportunities in the transition to a low-carbon economy.

#### \* Governance

The Musim Mas Board, led by our Executive Chairman, maintains oversight over the management of climate-related risks and opportunities. At quarterly meetings, the Board, Directors, and Heads of Departments assess and review key sustainability and ESG issues, and trends. These include formulating various action plans, risk management policies, and annual plans to address climate-related risks and opportunities.

Our sustainability objectives regarding climate change, reducing greenhouse

gas (GHG) emissions, and upholding our No Deforestation, No Peat, and No Exploitation (NDPE) commitments are key drivers of our operational actions, decision-making, and business strategy. For example, the budget to improve our environmental performance is an important part of our financial planning. It includes measures to reduce emissions (e.g., building methane capture facilities and adopting power co-generation in our mills), promote smallholder collaboration in upholding our NDPE commitments, and engage with local communities to prevent and manage fires.

Musim Mas is fully committed to ensuring our relevant personnel and collaborators have the appropriate expertise to manage sustainability and climate-related issues. Our Director of Sustainability is extensively involved and well-versed in the latest forest-related issues and standards. He currently sits on the Board of the Roundtable on Sustainable Palm Oil (RSPO), where he also co-chairs the Standing Committee for Standards and is a member of the Board Finance Committee.

Our sustainability team regularly participates in training sessions, such as peat management and Science Based Targets initiative (SBTi) target-setting best practices, as well as various RSPO

working groups, to maintain a robust and diversified skill set for tackling climate-related issues. We assign dedicated personnel in the relevant departments to inform our teams about climate-related issues by continuously monitoring regulatory developments, changing weather patterns, soil quality, and water balance, among others, to assess our exposure to climate-related risks and opportunities. We have also established a carbon team with the expertise to assess and monitor our carbon emissions and their reduction.

» [For more details, see: Corporate and Sustainability Governance](#)

#### \* Risk Management

Musim Mas' Sustainability Policy has served as the principal framework for our sustainability commitments since 2014. It includes climate-related topics that are integrated into our company-wide risk management process, as well as risks and opportunities to be discussed as part of the Board agenda. Recognizing the potentially significant impacts of climate-related risks on our business, Musim Mas employs a comprehensive risk management framework and Standard Operating Procedure (SOP) to continuously monitor, identify, assess, and manage climate-related risks.

These include, among others, physical climate risks relating to the rise in frequency and severity of extreme weather events, and transitional risks relating to regulatory, market, and technological disruptions brought about by the transition to a low-carbon economy. The size and scope of each risk is monitored by specific teams in relevant departments through a climate risk assessment that considers factors such as business growth, existing and emerging climate-related regulatory requirements, environmental outlooks (e.g., changing weather patterns and soil conditions), and potential worst-case scenarios in different timeframes (short-, medium- and long-term).

The SOP then outlines the processes that allow relevant departments and teams to mitigate, transfer, accept, and control these risks based on their scale and financial impact.<sup>34</sup> The Board regularly reviews these risk areas, considering ESG factors and the necessary actions to achieve strategic objectives. After the Board's review, responsibilities and actions are shared and assigned to the relevant departments, which are then tasked with developing action plans and projects to address these risks. Implementation of action plans requires Board approval, and progress is typically reported to the Board on a quarterly basis to ensure their oversight of the risk management process.

<sup>34</sup> Musim Mas identifies substantive financial impact as: (1) any impact that could potentially inflict a financial loss of around 10 percent or higher of current EBITDA estimates, (2) any climatic event that will drastically affect the yield and productivity of oil palm crops as well as palm oil supply, (3) any drastic drop in supply (of raw materials) of 20 percent or more, which affects our production cost as well as production volume.

## Strategy

Musim Mas recognizes that adaptive strategies are necessary to maintain market competitiveness and business resilience to climate-related risks. Our inaugural climate risk scenario analysis, conducted in 2024, identified the impacts of medium- and long-term climate-related risks and opportunities on our business. The outcomes of this analysis will guide our management of these climate-related risks and opportunities and will be integrated into our business strategy and financial planning.

For instance, we invest heavily in monitoring weather events and building gray infrastructure to mitigate the impacts of extreme floods and storms. We also invest in methane capture facilities to reduce our carbon emissions and exposure to future carbon pricing and work closely with stakeholders to maintain compliance with climate-related regulations.

» See: [Understanding our Climate-related Risks and Opportunities](#)

## Metrics & Targets

Recognizing the urgency of combatting the climate crisis, we have set a range of ambitious targets to reduce our carbon emissions and their associated impacts on the environment. For instance, we were one of the 13 signatories of the Agriculture Sector Roadmap to 1.5°C at the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27), which aims to halt commodity-linked deforestation consistent with a 1.5°C warming pathway.

This year, we bolstered our long-term commitment to sustainability by reaching our target to reduce upstream GHG emission intensity by 55% from a 2006 baseline, two years ahead of schedule. Building on this progress, we are currently seeking SBTi validation for our near- and long-term emission reduction targets, with the goal of reaching net-zero emissions by 2050.

We track various metrics to monitor our progress towards targets and measure our exposure to climate-related risks and opportunities, including Scope 1, Scope 2, and Scope 3 emissions, energy consumption, area conserved, hotspots and wildfires detected, and water use.

» For more information on these metrics, see: [Targets and Progress](#)

» See also: [Pillar 2: Deliver Positive Environmental Impacts](#)

## TCFD Index

The table below indexes our disclosures against the TCFD recommendations in this sustainability report, in alignment with the four thematic areas: Governance, Strategy, Risk Management, and Metrics & Targets.

Pillar	TCFD Recommendations	Sections referenced in our 2023 Sustainability Report
Governance	Board oversight	<ul style="list-style-type: none"> <li>Corporate and Sustainability Governance</li> </ul>
	Role of management	<ul style="list-style-type: none"> <li>Aligning with the Recommendations from the Taskforce for Climate-Related Financial Disclosures (TCFD)</li> </ul>
Strategy	Climate-related risks and opportunities over the short medium, and long term	<ul style="list-style-type: none"> <li>Approach to Sustainability</li> <li>Understanding our Climate-Related Risks and Opportunities</li> </ul>
	Impact on business, strategy, and financial planning	<ul style="list-style-type: none"> <li>Aligning with the Recommendations from the Taskforce for Climate-Related Financial Disclosures (TCFD)</li> </ul>
	Resilience of strategy and scenario analysis	
Risk Management	Process for identifying and assessing climate-related risks	<ul style="list-style-type: none"> <li>Understanding our Climate-Related Risks and Opportunities</li> </ul>
	Process for managing climate-related risks	<ul style="list-style-type: none"> <li>Aligning with the Recommendations from the Taskforce for Climate-Related Financial Disclosures (TCFD)</li> </ul>
	Integrating processes into overall risk management framework	
Metrics & Targets	Metrics used	<ul style="list-style-type: none"> <li>Targets and Progress</li> </ul>
	Scope 1, Scope 2, and Scope 3 GHG emissions and related risks	<ul style="list-style-type: none"> <li>Group Emissions</li> <li>Understanding our Climate-Related Risks and Opportunities</li> </ul>
	Targets and performance	<ul style="list-style-type: none"> <li>Aligning with the Recommendations from the Taskforce for Climate-Related Financial Disclosures (TCFD)</li> </ul>

## Musim Mas' Contributions to the SDGs

As part of our 2023 materiality update, we revisited the alignment of our material topics, program objectives, and downstream risks and opportunities to the United Nations' Sustainable Development Goals (SDGs) and their targets, and our four Sustainability Policy Pillars. This is detailed below.

### Our Sustainability Pillars



**PILLAR 1**  
Improve the Lives of Smallholders, Workers, and Communities



**PILLAR 2**  
Deliver Positive Environmental Impacts



**PILLAR 3**  
Maintain Responsible and Enduring Relationships with Suppliers, Customers, and Stakeholders








**PILLAR 4**  
Drive Innovation in Sustainable Practices



### Primary SDGs

These are priority goals and targets that Musim Mas reports on and demonstrates contributions to. Corresponding SDG logos are displayed in the relevant sections of this report.

SDG	Relevant SDG Target	Material Topics and Contributions	Musim Mas Sustainability Policy Pillar
 <p><b>SDG 2: ZERO HUNGER</b></p>	<p><b>2.3:</b> By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous people, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment</p>	<p><b>Smallholder Engagement:</b> Including smallholders in our supply chain and implementing training and engagement programs to support them in addressing complex and interlinked barriers around yields, plantation management, land ownership, financial access and income, market access, replanting, economies of scale, and quality of life. Our programs cover scheme and independent smallholders in our operational landscapes. Beyond oil palm smallholders, we support women smallholders through a new dedicated program, and we are also working with coconut smallholders.</p>	<div style="background-color: #90EE90; padding: 5px; border: 1px solid black; display: inline-block;"><b>PILLAR 1</b></div>
	<p><b>2.4:</b> By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality</p>	<p><b>Innovation and R&amp;D:</b> Investing in R&amp;D to produce premium seedlings, increase yields, improve oil extraction rates, reduce reliance on chemicals, improve soil management, and focusing on sustainable and regenerative agriculture to improve the amount and quality of production and contribute to food security worldwide. We released four new oil palm seedlings (Musim Mas GS Series) with superior traits that result in greater yield, land-use efficiency, and productivity.</p>	<div style="background-color: #FF8C00; padding: 5px; border: 1px solid black; display: inline-block;"><b>PILLAR 4</b></div>

SDG	Relevant SDG Target	Material Topics and Contributions	Musim Mas Sustainability Policy Pillar
 <p><b>SDG 4: QUALITY EDUCATION</b></p>	<p><b>4.1:</b> By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes</p>	<p><b>Children’s Rights:</b> Providing access to education for school-age children living at Musim Mas plantations and from surrounding communities by:</p> <ul style="list-style-type: none"> <li>• Building and operating kindergartens, primary schools and secondary schools</li> <li>• Providing access to education services and facilities</li> <li>• Offering scholarships to deserving students</li> </ul>	<p><b>PILLAR 1</b></p>
 <p><b>SDG 6: CLEAN WATER AND SANITATION</b></p>	<p><b>6.1:</b> By 2030, achieve universal and equitable access to safe and affordable drinking water for all</p> <p><b>6.2:</b> By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations</p>	<p><b>Human Rights and Labour Rights:</b></p> <ul style="list-style-type: none"> <li>• Providing access to free, clean water at employee housing</li> <li>• Building wells in communities.</li> </ul> <p><b>Community Rights and Community Relations:</b></p> <ul style="list-style-type: none"> <li>• Providing sanitation facilities and maintaining sanitary premises at estates</li> <li>• Ensuring access to clean toilets at our operations</li> <li>• Providing toilets to communities and engaging with communities on sanitation.</li> </ul>	<p><b>PILLAR 1</b></p> <p><b>PILLAR 1</b></p>
 <p><b>SDG 8: DECENT WORK AND ECONOMIC GROWTH</b></p>	<p><b>8.5:</b> By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value</p> <p><b>8.7:</b> Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms</p>	<p><b>Human Rights and Labour Rights; Gender Equality; Occupational Safety and Health:</b></p> <ul style="list-style-type: none"> <li>• Upholding fundamental employee rights, including freedom of association; ensuring employees are treated fairly without discrimination, with dignity and respect; ensuring wages are at least in line with legal requirements; making sufficient provisions for employees to afford a basic but decent standard of living</li> <li>• Safeguarding the health and safety of employees and instilling a culture of safety; preventing accidents and work-related illnesses; promoting the well-being of employees; providing free healthcare</li> <li>• Respecting all human rights as outlined in the International Bill of Human Rights and UN covenants; adhering to the business principles set out in the UN Guiding Principles on Business and Human Rights (UNGP BHR) and applicable national laws; providing adequate housing, sanitation, community facilities, infrastructure, electricity, access to religious centers, etc.</li> <li>• Ensuring no workforce discrimination; respecting diversity and promoting gender equity; ensuring equal opportunities and full and effective participation in leadership for women at our operations</li> <li>• Operating Gender Committees, issuing family cards regardless of gender, providing breastfeeding centers, etc.; building and running childcare centers for preschoolers</li> </ul> <p><b>Human Rights and Labour Rights:</b></p> <ul style="list-style-type: none"> <li>• Upholding no-forced-labour and no-child-labour through our new addendum to our Sustainability Policy</li> <li>• Adhering to the UNGP BHR on Human Rights Due Diligence (HRDD)</li> <li>• Consistently ensuring human rights risks are properly assessed and managed through various programs and efforts</li> </ul>	<p><b>PILLAR 1</b></p> <p><b>PILLAR 1</b></p>








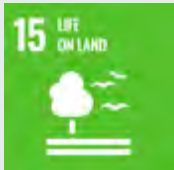

SDG	Relevant SDG Target	Material Topics and Contributions	Musim Mas Sustainability Policy Pillar
 <p><b>SDG 12: RESPONSIBLE CONSUMPTION AND PRODUCTION</b></p>	<p><b>12.2:</b> By 2030, achieve the sustainable management and efficient use of natural resources</p> <hr/> <p><b>12.7:</b> Promote public procurement practices that are sustainable, in accordance with national policies and priorities</p>	<p><b>Water Management; Waste Management:</b></p> <ul style="list-style-type: none"> <li>Optimizing water use and consumption at our mills</li> <li>Minimizing waste generated at our operations; reducing, reusing, recycling, and recovering 100% of upstream waste; exploring ways to reduce and recycle midstream and downstream waste</li> </ul> <hr/> <p><b>Supply Chain Engagement and Transparency; Grievance Resolution:</b></p> <ul style="list-style-type: none"> <li>Supply chain engagement and transparency; Grievance resolution;</li> <li>Continuously engaging with suppliers on our NDPE policy commitments through our NDPE roadmap to move the industry towards responsible and sustainable production; verifying NDPE progress using evidence-based approaches; supporting smallholders with national certification schemes (i.e. ISPO); supply chain engagement for coconut production</li> <li>Resolving external complaints and grievances in an accessible, effective, timely, and appropriate manner; bringing suppliers into compliance with NDPE requirements by enacting our Controlled Purchase Protocol (CPP) in cases of verified grievances on breached commitments.</li> </ul> <hr/> <p><b>Sustainability Certification and Compliance:</b></p> <ul style="list-style-type: none"> <li>Complying with leading industry certification and verification schemes within our operations to progressively raise standards in the palm oil sector; supporting leading industry certification and verification schemes to delink oil palm expansion and deforestation, protect forests, optimize productivity and efficiency, etc.</li> </ul>	<p><b>PILLAR 2</b></p> <hr/> <p><b>PILLAR 3</b></p> <hr/> <p><b>PILLAR 1 PILLAR 2</b> <b>PILLAR 3 PILLAR 4</b></p>
 <p><b>SDG 13: CLIMATE ACTION</b></p>	<p><b>13.1:</b> Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries</p>	<p><b>Climate Risk and Adaption:</b></p> <ul style="list-style-type: none"> <li>Minimizing GHG emissions through targeted reduction plans; generating energy from process waste, and investing in renewable energy sources (e.g., methane capture facilities). In 2023, we began reporting against the TCFD framework for the first time.</li> </ul>	<p><b>PILLAR 2</b></p>

SDG	Relevant SDG Target	Material Topics and Contributions	Musim Mas Sustainability Policy Pillar
 <p><b>SDG 15: LIFE ON LAND</b></p>	<p><b>15.1:</b> By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <hr/> <p><b>15.2:</b> By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally</p>	<p><b>Conservation and Management of HCV, HCS, and Peat Areas; Supply Chain Engagement and Transparency; Pesticide and Chemical Management:</b></p> <ul style="list-style-type: none"> <li>• Implementing our NDPE policy at Musim Mas operations; conserving, managing, and rehabilitating HCS forests and HCV areas, including riparian buffer zones; protecting waterways; assessing the impact of our operations on biodiversity, water, and ecosystems</li> <li>• Implementing our NDPE policy to promote deforestation-free commodities throughout the supply chain; holding suppliers, including smallholders, accountable for deforestation activities</li> <li>• Managing the use and handling of pesticides and chemicals; optimizing and reducing chemical fertilizer and pesticide use; adopting organic substitutes where possible.</li> </ul> <hr/> <p><b>Fire and Haze Prevention:</b></p> <ul style="list-style-type: none"> <li>• Managing and monitoring fires; reforestation of burnt areas; applying best management practices to manage existing plantations on peat; protecting soil from degradation; handling waste and chemicals responsibly</li> <li>• Implementing our NDPE policy to promote deforestation-free commodities throughout the supply chain; holding suppliers, including smallholders, accountable for deforestation activities</li> </ul> <hr/> <p><b>Supply Chain Engagement and Transparency:</b> Working towards traceability to plantation and full supplier visibility to eliminate deforestation in supply chains</p>	<p><b>PILLAR 2</b></p> <hr/> <p><b>PILLAR 2</b></p> <hr/> <p><b>PILLAR 3</b></p>
 <p><b>SDG 17: PARTNERSHIPS FOR THE GOALS</b></p>	<p><b>17.16:</b> Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries</p>	<p><b>Stakeholder Collaboration and Reporting; Landscapes; Product Quality and Safety:</b></p> <ul style="list-style-type: none"> <li>• Working with a broad range of industry players, government bodies, and civil society organizations to address pressing issues; collaborating on transforming the industry; maintaining transparent and accountable partnerships; contributing expertise, resources, and innovation to partnerships; collective action for coconut supply chain sustainability</li> <li>• Collaborating with private and public sector stakeholders in landscapes to transform the industry and support jurisdictional approaches</li> <li>• Staying responsive to customer needs and legislation on contaminant levels requiring mitigation efforts during the production of edible oils to minimize contaminants; increasing consumer awareness of nutritional, dietary, and health benefits</li> </ul> <hr/> <p><b>Innovation and R&amp;D:</b></p> <ul style="list-style-type: none"> <li>• Developing new solutions for using sustainable palm oil-based functional blends and specialty fats to address different industry needs</li> </ul>	<p><b>PILLAR 3</b></p> <hr/> <p><b>PILLAR 3</b></p>



## Secondary SDGs

These are goals and targets that Musim Mas directly or indirectly contributes to, with some level of reporting. Some of these goals and targets overlap with our primary SDGs.

SDG	Relevant SDG Target	Musim Mas Sustainability Policy Pillar
 <b>SDG 1: NO POVERTY</b>	<b>Target 1.4:</b> By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	<b>PILLAR 1</b>
 <b>SDG 2: ZERO HUNGER</b>	<b>Target 2.1:</b> By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round <b>Target 2.2:</b> By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons	<b>PILLAR 4</b>
 <b>SDG 4: QUALITY EDUCATION</b>	<b>Target 4.4:</b> Providing development opportunities by investing in capacity building, training, and technical skills programs to help employees achieve their career goals	<b>PILLAR 1</b>
 <b>SDG 5: GENDER EDUCATION</b>	<b>Target 5.1:</b> End all forms of discrimination against all women and girls everywhere <b>Target 5.6:</b> Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Program of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences	<b>PILLAR 1</b>
 <b>SDG 8: DECENT WORK AND ECONOMIC GROWTH</b>	<b>Target 8.5:</b> By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	<b>PILLAR 1</b>
 <b>SDG 12: RESPONSIBLE CONSUMPTION AND PRODUCTION</b>	<b>Target 12.2:</b> By 2030, achieve the sustainable management and efficient use of natural resources <b>Target 12.6:</b> Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle <b>Target 12.7:</b> Promote public procurement practices that are sustainable, in accordance with national policies and priorities	<b>PILLAR 2</b> <b>PILLAR 3</b>
 <b>SDG 13: CLIMATE ACTION</b>	<b>Target 13.1:</b> Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	<b>PILLAR 2</b>
 <b>SDG 15: LIFE ON LAND</b>	<b>Target 15.1:</b> By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	<b>PILLAR 2</b>
 <b>SDG 16: PEACE, JUSTICE AND STRONG INSTITUTIONS</b>	<b>Target 16.5:</b> Substantially reduce corruption and bribery in all their forms	<b>PILLAR 1</b>

## Glossary

**Biodiversity** The number and variety of plant and animal species within a region.

### **Biological Oxygen Demand (BOD)**

The amount of oxygen used when microorganisms decompose organic matter. Testing for BOD assesses the amount of organic matter in water.

**Carbon Dioxide Equivalents (CO<sub>2</sub>e)** A universal measurement for the impact of releasing (or avoiding the release of) different greenhouse gases.

**Chemical Oxygen Demand (COD)** The amount of oxygen required to oxidize soluble and particulate organic matter in water. COD testing uses a strong chemical agent to oxidize organic material in a wastewater sample under controlled conditions.

**Concession** Musim Mas uses this term to specifically refer to the physical boundaries of an area within a plantation, for example, when monitoring suppliers' lands and operations by satellite.

**Copra** The dried meat or kernel of a coconut that is a crucial ingredient in the production of coconut oil.

**Cradle-To-Gate** A life cycle assessment model that assesses a product's environmental footprint from raw materials extraction ("cradle") until it leaves the factory ("gate").

**Effluent** Water from industrial activities, including mill processes, discharged into another body of water.

**Fire-Free Village Programme (FFVP)** A fire management pilot program which provides training, equipment and economic incentives to local communities to help prevent fire.

**Fresh fruit bunches (FFB)** The raw material harvested from an oil palm tree. This weighs 10 to 40 kg, depending on the size and age of the tree.

**Free, Prior and Informed Consent (FPIC)** The principle that a community has the right to give or withhold its consent to proposed projects that may affect the lands they customarily own, occupy, or use.

**Global Reporting Initiative (GRI)** A multi-stakeholder sustainability reporting standard providing guidelines on report content and indicators.

### **Greenhouse Gas (GHG) Emissions**

Atmospheric gases that absorb and emit radiation within the thermal infrared range. The primary greenhouse gases are water vapour, carbon dioxide, methane, nitrous oxide, and ozone. Scope 1 GHG emissions are emissions released into the atmosphere as a direct result of an activity or series of activities at the facility level. Scope 2 GHG

emissions are released into the atmosphere from the indirect consumption of energy commodities.

**High Carbon Stock Approach (HCSA)** A global methodology used in agricultural land development planning and currently applied in fragmented tropical landscapes on mineral soils in the humid tropics. It distinguishes between HCS forest areas that require protection and degraded lands with low carbon and biodiversity values that may be considered for development.

### **High Conservation Value (HCV)**

Ecosystems of outstanding significance and critical importance due to their high biological, ecological, social, or cultural value. There are six types of HCVs, based on the social and environmental value of natural forests. These areas must be carefully managed and protected to maintain or enhance their value.

**Identity Preserved (IP)** RSPO supply-chain model separating sustainable palm oil from a single identifiable certified source from ordinary palm oil across every link in the supply chain.

**Independent Mills** Mills under Musim Mas control that source from third-party FFB suppliers instead of Musim Mas plantations.

**Independent Smallholders** Oil palm farmers who cultivate up to 20 hectares of land that are self-financed, managed, and equipped but not bound to any one mill.

### **Indonesian Sustainable Palm Oil (ISPO)**

Indonesia's mandatory national sustainable palm oil standard.

### **Integrated Pest Management (IPM)**

The careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations.

### **International Sustainability and Carbon Certificate (ISCC)**

A global biomass and bioenergy certification scheme.

### **Kredit Koperasi Primer Anggota (KKPA)**

A smallholder primary cooperative credit scheme, voluntarily initiated by Musim Mas in 1996. It provides smallholders with practical support to acquire the skills and technology needed to undertake palm oil cultivation.

### **No Deforestation, No Peat, No Exploitation (NDPE)**

Policies and practices adopted by palm oil companies that prevent deforestation, development on peatlands, and the exploitation of workers, communities, and smallholders.

## NDPE Implementation Reporting Framework (NDPE IRF)

A reporting tool that helps companies understand and systematically track progress in delivering their NDPE commitments in their palm oil supply chains.

**PalmGHG** An RSPO tool that calculates the emissions generated and sequestered from activities and processes at plantations and mills. See how it works [here](#).

**Palm Oil Collaboration Group (POCG)** A multi-stakeholder initiative that brings together companies from every link in the palm oil supply chain to accelerate the effective implementation of NDPE commitments.

**Palm Oil Innovation Group (POIG)** A multi-stakeholder initiative that promotes the adoption of responsible palm oil production practices by key players in the supply chain by developing and sharing a credible and verifiable benchmark that builds upon the RSPO Principles and Criteria, creating and promoting innovation.

**Palm Oil Mill Effluent (POME)** A by-product of processed FFB.

**Peat** An accumulation of partially decayed vegetable matter that forms in wetlands or peatlands, variously called bogs, moors, muskegs, pocosins, mires, and peat swamp forests.

**Plantation** Specifically refers to the place of production, be it a large industrial plantation with concessions and mills, a large farm without a mill, or a smallholder farm.

## Public Disclosure Program for Environmental Compliance (PROPER)

Indonesia's national environmental reporting initiative. It uses a colour-coded rating scheme to grade factories' pollution control performance against regulatory standards.

## Integrated Deforestation Alert (IDA)

A system by Global Forest Watch (GFW) that integrates satellite imagery and/or radar data (i.e., Radar for Detecting Deforestation [RADD]) for monitoring and near real-time alerts of deforestation.

**Roadmap** This term has two distinct meanings in this report. Our Roadmap to Responsible Supply Base) is Musim Mas' communication piece on targets and plans to bring suppliers into compliance with our commitments. Musim Mas also compiles supplier roadmaps with timebound plans and clear implementation milestones to guide suppliers toward compliance with our NDPE commitments.

## Roundtable on Sustainable Palm Oil (RSPO)

A multi-stakeholder organization that has developed a certification scheme for sustainable palm oil. All RSPO members must comply with the RSPO Principles and Criteria (P&C), a set of stringent standards governing sustainable palm oil production.

**Scheme Smallholders** Farmers operating under a program initiated by the Indonesian government to encourage the development of smallholder plantations, where plantation companies (nucleus estates) assist and support surrounding community plantations.

**Segregated (SG)** A supply-chain model assuring that RSPO-certified palm oil and its derivatives delivered to the end-user originate only from RSPO-certified sources. It permits the mixing of RSPO-certified palm oil from a variety of sources.

**Supply Shed** A group of suppliers comprising mills and their associated plantations and the independent plantations and smallholders that supply them.

**Toxicity** The degree to which a substance is harmful to living organisms. Toxicity in agricultural chemicals is measured using the LD50 methodology, i.e., the number of toxicity units corresponding to a lethal dose for 50% of a rat population.

## Village Development Program (VDP)

A Musim Mas program for scheme smallholders tailored to villages where plantations are community-managed rather than individually owned.

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