

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Headquartered in Singapore, Musim Mas Group is a fully integrated palm oil corporation that delivers the highest quality and innovative palm oil products and derivatives used across multiple industries worldwide.

As one of the most prominent players in the palm oil industry, we aspire to be a responsible leader in the evolution of the industry, driving a new era of sustainability with innovation across the globe. To that aim, our dedicated, global team of professionals across the entire palm oil supply chain work closely with local and international stakeholders, ensuring that our products are economically viable, socially responsible, and environmentally appropriate.

Since 1972, Musim Mas has established deep and long-standing relationships with our customers and stakeholders worldwide. Our multi-cultural and multi-disciplinary workforce, located in 13 countries, brings innovation to meet the growing needs of our customers.

We are proud to be the preferred supply chain partner for palm oil and its derivatives. From our plantations, mills, refineries, kernel crushing plants, oleochemicals, and specialty fats plants, we manufacture palm oil and value-added derivatives before exporting these to customers via our extensive fleet of tankers and barges. Today, Musim Mas is Indonesia's largest palm oil exporter to customers located all around the world.

The steady growth of Musim Mas is underpinned by the quality of our management and supported by professionals dedicated to the highest standards of quality, safety, and efficiency. Our global marketing activities are undertaken by Inter-Continental Oils and Fats (ICOF), a member of Musim Mas Group.

Despite these achievements our business continues to face new challenges. As we have progressed, so have expectations from stakeholders for a responsible supply base. To achieve this, environmental stewardship has been a core pillar of our sustainability measures. Musim Mas strives to minimise and mitigate adverse impacts on the environment, by regularly assessing the impact of our operations through tools or exercises such as RSPO PalmGHG and CDP. We initiated our first Life Cycle Assessment (LCA) in 2019, to evaluate the impact of our operations on the environment, as well as develop holistic mitigation plans to minimize those impacts.

Musim Mas takes the impact of climate change seriously and is strongly committed to minimising GHG emissions within our operations. Our sustainability teams, senior management and the Board, are involved in decision-making pertaining to our climate-related risks and opportunities to ensure emission reductions are adequately managed throughout our operations.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date

January 1 2022

End date

December 31 2022

Indicate if you are providing emissions data for past reporting years

No

Select the number of past reporting years you will be providing Scope 1 emissions data for

<Not Applicable>

Select the number of past reporting years you will be providing Scope 2 emissions data for

<Not Applicable>

Select the number of past reporting years you will be providing Scope 3 emissions data for

<Not Applicable>

C0.3

(C0.3) Select the countries/areas in which you operate.

Brazil
China
Germany
India
Indonesia
Italy
Malaysia
Netherlands
Singapore
Spain
United Kingdom of Great Britain and Northern Ireland
United States of America
Viet Nam

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C-AC0.6/C-FB0.6/C-PF0.6

(C-AC0.6/C-FB0.6/C-PF0.6) Are emissions from agricultural/forestry, processing/manufacturing, distribution activities or emissions from the consumption of your products – whether in your direct operations or in other parts of your value chain – relevant to your current CDP climate change disclosure?

	Relevance
Agriculture/Forestry	Both own land and elsewhere in the value chain [Agriculture/Forestry only]
Processing/Manufacturing	Direct operations only [Processing/manufacturing/Distribution only]
Distribution	Direct operations only [Processing/manufacturing/Distribution only]
Consumption	No

C-AC0.6g/C-FB0.6g/C-PF0.6g

(C-AC0.6g/C-FB0.6g/C-PF0.6g) Why are emissions from the consumption of your products not relevant to your current CDP climate change disclosure?

Row 1

Primary reason

Analysis in progress

Please explain

Musim Mas Group is a fully integrated palm oil corporation that delivers innovative palm oil products and derivatives across multiple industries worldwide. These industries subsequently produce many possible applications of oil palm derivatives, thus, we strive to trace the final use, waste disposal, and end-of-life treatment. As such, we cannot control the processing methodology, final use, waste disposal, and end-of-life treatment of the products. Nevertheless, we are currently trying to develop methodology to integrate the consumption emission containing Musim Mas products into our scope and we will disclose accordingly when ready.

C-AC0.7/C-FB0.7/C-PF0.7

(C-AC0.7/C-FB0.7/C-PF0.7) Which agricultural commodity(ies) that your organization produces and/or sources are the most significant to your business by revenue? Select up to five.

Agricultural commodity

Palm Oil

% of revenue dependent on this agricultural commodity

More than 80%

Produced or sourced

Both

Please explain

Musim Mas business activities cover the whole palm oil supply chain including:

- o Managing Oil Palm plantations to produce Fresh Fruit Bunches
- o Milling oil palm fruits to produce crude palm oil (CPO) and Palm Kernel (PK)
- o Crushing PK to obtain crude palm kernel oil (PKO)
- o Refining CPO and PKO
- o Further processing to produce value-added products such as specialty fats, oleochemicals, biodiesel, soap, palm wax and functional products such as emulsifiers
- o Manufacturing consumer goods such as cooking oil and personal care products
- o Shipping and merchandising value-added products to global destinations

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
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C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual or committee	Responsibilities for climate-related issues
Director on board	The director on board, senior management, and relevant sustainability teams meet quarterly to assess and review key ESG issues including overseeing and monitoring climate-related risks and opportunities such as GHG emissions, biodiversity, deforestation, landscape restoration, conservation, and wildlife protection. In 2022, we published the Biodiversity and Climate Resiliency Action Plan outlining our efforts and targets within our own operations and global supply chain to address biodiversity conservation that is linked to the context of global climate change.

C1.1b

(C1.1b) Provide further details on the board’s oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – all meetings	Reviewing and guiding annual budgets Overseeing major capital expenditures Overseeing acquisitions, mergers, and divestitures Reviewing innovation/R&D priorities Overseeing and guiding employee incentives Reviewing and guiding strategy Overseeing and guiding the development of a transition plan Monitoring the implementation of a transition plan Overseeing and guiding scenario analysis Overseeing the setting of corporate targets Monitoring progress towards corporate targets Overseeing and guiding public policy engagement Overseeing value chain engagement Reviewing and guiding the risk management process	<Not Applicable>	Sustainability objectives in climate change, NDPE commitments, and reduction of GHG emissions continue to become the major factors in our operational actions, decision-making, and business strategy. To achieve our sustainability goals, these issues are periodically discussed through a Quarterly Meeting. The quarterly meeting serves as a discussion platform among the Board, Directors, and Head of Departments to discuss the progression of all ongoing projects and matters, including climate change, deforestation, and GHG emission reduction issues. The Director of Sustainability together with the relevant Sustainability Team will brief the board on all of the sustainability issues covering the environment as well as social aspects, including climate-related issues and GHG emissions reduction. The outcome of this discussion includes plans of action, risk management policies, annual budgets, business plans and so on. Consequently, the results of discussions and action plans will be shared and communicated throughout all relevant departments, ensuring the messages are conveyed to all layers of workers. In alignment with the GRI reporting standard, we publicly communicate our annual sustainability progress through Sustainability Report (https://www.musimmas.com/sustainability-report/).

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	Musim Mas is fully committed to implementing sustainability practices at the highest level across our operations. Our board member is extensively involved with the latest forest-related issues and standards. As such, he co-chaired the Standing Committee for Standards and has been actively involved in the RSPO over the years, co-chaired the Biodiversity and HCV working group, the Compensation task force, and currently sits on the board of the RSPO. Moreover, he is a member of the High Carbon Stock Approach Executive Committee. Accordingly, sustainability achievements such as full and beyond compliance with national and international certification schemes including RSPO, ISCC, POIG, ISPO, MSPO, and ITSNC principles and guidelines are continuously maintained. We received a Gold rating in our 2022 Ecovadis assessment.	<Not Applicable>	<Not Applicable>

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Position or committee

Other C-Suite Officer, please specify (Director of Sustainability)

Climate-related responsibilities of this position

- Managing annual budgets for climate mitigation activities
- Managing major capital and/or operational expenditures related to low-carbon products or services (including R&D)
- Managing climate-related acquisitions, mergers, and divestitures
- Providing climate-related employee incentives
- Developing a climate transition plan
- Implementing a climate transition plan
- Integrating climate-related issues into the strategy
- Conducting climate-related scenario analysis
- Setting climate-related corporate targets
- Monitoring progress against climate-related corporate targets
- Managing public policy engagement that may impact the climate
- Managing value chain engagement on climate-related issues
- Assessing climate-related risks and opportunities
- Managing climate-related risks and opportunities

Coverage of responsibilities

<Not Applicable>

Reporting line

Reports to the board directly

Frequency of reporting to the board on climate-related issues via this reporting line

Quarterly

Please explain

The Director of Sustainability oversees and resolves any sustainability matter including climate-related issues such as certifications, biodiversity, emissions, waste management, and conservation. Our Director of Sustainability reviews the Group's sustainability policy and strategy, as well as collaborates with the Group's key customers to identify synergies for enhancing palm oil's sustainability proposition in the world commodity sector. Our Director of Sustainability also actively participates in many high-level committees such as RSPO. Moreover, the Director of Sustainability develops climate-related management programs and action plans for conservation initiatives at the group level. Our Director of Sustainability reports to the board quarterly on the progress and achievements of the sustainability activities.

In 2022, as approved by the board, our Director of Sustainability attended COP 27 in Egypt where Musim Mas signed up to the Agriculture Sector Roadmap to 1.5°C. Following the roadmap, the world's largest agri-commodity traders and processors are committing to develop a shared roadmap for enhanced supply chain action consistent with a 1.5°C pathway. Musim Mas is presently undergoing projects in formulating emissions reduction roadmap and targets (near-term and net-zero) including Land Use Change for validation in accordance with the Science Based Target initiative (SBTi) and SBTi FLAG framework.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Climate-related issues have been one of the biggest factors that led Musim Mas toward many climate-related risk assessments and sustainable certification and verification. As such, Musim Mas implements sustainability practices and NDPE policy (No Deforestation and Peat Exploitation) across the supply chain. To track the progress of our sustainability practices, both annual achievements and targets are updated and publicly communicated to stakeholders through our annual Sustainability Report. In achieving the targets, both action plans and projects will be discussed quarterly along with the Board.

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive

Director on board

Type of incentive

Monetary reward

Incentive(s)

- Bonus - % of salary
- Promotion
- Salary increase

Performance indicator(s)

- Achievement of climate transition plan KPI
- Progress towards a climate-related target
- Achievement of a climate-related target

Incentive plan(s) this incentive is linked to

Both Short-Term and Long-Term Incentive Plan

Further details of incentive(s)

Our Director on Board works and is evaluated annually based on the Key Performance Indicator (KPI) where compensation and benefits are awarded accordingly. Both

qualitative and quantitative assessments are developed by the Board and Compensation Committees in assessing the KPI. Examples of performance indicators include but are not limited to progress towards the GHG emissions reduction target (i.e. 55% GHG reduction against our 2006 baseline), full compliance with the sustainability standards and certifications such as RSPO, ISCC, MSPO, ITSNC, and POIG as well as HCV and HCS guidelines. Others include awards and recognitions related to sustainability such as the SPOTT ranking, CDP scorecard, and Ecovadis scorecard. Moreover, transitioning toward the decarbonization pathway of the 1.5C world will also be a key metric including SBTi targets. Among many, these indicators were selected as they are aligned with the company's vision and they allow Musim Mas to objectively quantify the progress of the company in the field of sustainability including climate change. The results of the KPI will link to promotion, salary, and the amount of bonus earned.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

Musim Mas uses progress toward its sustainability targets as the threshold of success. Therefore, incentives are provided if progress is either linear to the overall target or exceeds a linear trend. Below are some of the performance indicators and the progresses as of 2022:

- In realizing the transition toward the decarbonization pathway, Musim Mas set various initiatives including a 55% reduction target in GHG intensity against our 2006 baseline by 2025. In 2022, we achieve 53% reductions against our 2006 baseline, and we are well on track to reaching our 2025 target of a 55% reduction. Moreover, we are currently undergoing a project to develop emissions reduction roadmap and targets toward 2050 (net-zero) in accordance with the SBTi framework and SBTi FLAG in line with the 1.5 Degrees pathway.
- Maintain and achieve full compliance with recognized sustainability standards and certification schemes (RSPO, ISCC, POIG, MSPO, ITSNC, ISPO) in our operations. In 2022, 15 out of 17 PTs have achieved ISPO certifications and are on track to achieve 100% ISPO-certified operations prior to 2025.
- We proactively monitor our supply chain to detect deforestation, development of peat, and fires. Our suppliers share maps and information about their supply base, enabling us to conduct risk assessments and establish Traceability to Plantation (TTP) measures. We are aiming to achieve 100% traceability to plantations by 2025. As of 2022, we have achieved 97% and are on track to achieve the target.
- We received a gold rating in our 2022 Ecovadis assessment improving from a silver rating in 2021.
- Published our Biodiversity and Climate Resiliency Action Plan where we communicate our efforts and targets in addressing biodiversity and climate change in line with our sustainability commitments which are stipulated in our sustainability policy.
- Signed up to the Agriculture Sector Roadmap to 1.5°C addressing forest loss in supply chains and accelerating collaboration with others to achieve that goal. It commits the companies to implement time-bound plans and report publicly on their progress towards the targets on an annual basis.

Entitled to incentive

Director on board

Type of incentive

Non-monetary reward

Incentive(s)

Internal company award

Public recognition

Performance indicator(s)

Achievement of climate transition plan KPI

Progress towards a climate-related target

Achievement of a climate-related target

Incentive plan(s) this incentive is linked to

Both Short-Term and Long-Term Incentive Plan

Further details of incentive(s)

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Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan

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- Signed up to the Agriculture Sector Roadmap to 1.5°C addressing forest loss in supply chains and accelerating collaboration with others to achieve that goal. It commits the companies to implement time-bound plans and report publicly on their progress towards the targets on an annual basis.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	3	Targets, strategies, and action plans can be found in our annual Sustainability Report. https://www.musimmas.com/sustainability-report/
Medium-term	3	10	Targets, strategies, and action plans can be found in our annual Sustainability Report. https://www.musimmas.com/sustainability-report/
Long-term	10	30	Targets, strategies, and action plans can be found in our annual Sustainability Report. https://www.musimmas.com/sustainability-report/

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

Definition: Musim Mas defines substantive financial impact as impacts that significantly affect and disrupt our supply chains which in turn affect the financial performance of the company.

We identify substantive financial impact in the following ways:

- Any impact that could potentially inflict a financial loss of around 10 percent or higher of current EBITDA estimates.
- Any climatic event that will drastically affect the yield and productivity of oil palm crops as well as palm oil supply.
- Any drastic drop in supply (of raw materials) of 20 percent or more, which affects our production cost as well as production volume.

Recognizing the climate-related risks, Musim Mas implements a robust corporate governance and risk management framework to continuously monitor, identify, and manage the arising risks. This framework is managed and aligned with our NDPE and sustainability policies which include no deforestation, no peatland development regardless of its depth, GHG emission reduction, waste management, traceability to plantations, etc.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations
Upstream
Downstream

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

Since 2014, Musim Mas' sustainability policy serves as the principal framework for our sustainability commitments including NDPE, traceability, climate change, and social commitments. Our Sustainability Policy is refreshed every five years following the latest and highest international sustainability standards covering our entire global operations including that of our third-party suppliers. The climate-related topic is integrated into our multi-disciplinary company-wide risk management process where risk and opportunity assessments are discussed in the Board agenda.

Risk Identification and Assessment:

For each of our climate-related risks, we have a comprehensive risk management framework and Standard Operating Procedure (SOP). These documents outline the various approaches and controls that are in place, as well as the responsibilities of management in addressing both the overall risk and the specific measures to mitigate it. To ensure that our risk management remains effective, we consider several factors, including business growth, environmental outlook, and the potential worst-case scenarios our operations may encounter in different timeframes (short-term, medium-term, and long-term). The Board regularly reviews these risk areas, determining the actions and responsibilities required for Musim Mas to achieve its strategic objectives while also taking into account Environmental, Social, and Governance (ESG) considerations. After the Board's review, the identified responsibilities and actions are shared and assigned to relevant departments. These departments then develop action plans and projects to address the risks. Before proceeding with any of these plans or projects, they are reported back to the Board for approval. The progress of these initiatives is reported to the Board on a quarterly basis to keep them informed about the ongoing efforts to manage climate risks effectively.

Risk Mitigation and Response:

1. In mitigating physical risks related to precipitation, temperature, and sea-level rise:

- Physical risks such as extreme weather (i.e. El Niño) could lead to a decrease in yield by 15% and increase the risk of fire which may cause a substantive impact on our business in both the short term and medium term. Hence, we monitor changing weather patterns on a regular basis and take action to mitigate any negative effects. For example, in preparation for dry seasons, we construct water ponds to maintain water levels in surrounding areas and for fire control, and the construction of fire breaks is also used to slow the fire spread. Moreover, we utilized satellite monitoring tools such as NOAA, MODIS, and VIIRS to monitor our hotspots at and around our concessions with monthly reports available.
- To further mitigate fire risk, we launched our Fire Free Village Programme (FFVP) to engage and educate local communities including smallholders in protecting forests from fire. As of December 2022, our FFVP covered 74 villages spanning 450,769 hectares and has conducted 127 trainings in the communities. In 2022, 46 villages were awarded for being fire-free.
- We invest in R&D for resilient planting materials to withstand climate change-related weather changes and impacts. Our Genetic and Agriculture Research Center, situated at our Riau plantation comprises dedicated units that manage and optimize agronomy, crop protection, and peat to maintain consistent and high production. We achieve these goals through intensive breeding programs, adopting high nursery management standards, and developing planting materials with desirable traits like earlier harvesting, higher extraction rates, and increased disease resistance.

2. In mitigating transitional risks related to regulatory, technology, market changes, and reputation risks:

- With the growing international agreements concerning GHG emissions reduction, the implementation of stricter International and/or national regulations become inevitable. To ensure compliance, in 2022, Musim Mas has installed 17 methane capture plants resulting in an emission intensity of 2.77 tCO₂e/mtCPO (53% lower than our baseline emissions of 2006, on track to reach 55% target by 2025). Moreover, we are developing roadmap to set near-term by 2030 and net-zero by 2050 targets following the SBTi (FLAG) framework.
- To ensure NDPE compliance, suppliers are to complete Musim Mas Self-Assessment Tool (SAT). This evaluation enables suppliers to self-declare information about their operations which allows Musim Mas to identify potential risk areas at the mill level. As of 2022, 84% of our suppliers have completed their assessments. Moreover, there are also monthly reports on deforestation using various methods and tools including satellite monitoring, ground patrol, GFW, and RADD. Musim Mas also collaborates with the Earthqualizer to monitor deforestation in all of our suppliers and own concessions with bi-weekly reports available.
- We conduct an extensive review of suppliers' land legalities and status, planting history, and other supporting materials to determine whether the FFB is sourced from conflict-free land. As such, we have achieved 100% traceability to mill since 2015 and 97% traceability to plantation (TTP) in 2022. We are on track to achieve 100% full traceability to plantation by December 2025.
- In case of complaints concerning breaches to our NDPE Policy, Grievance Channels and Controlled Purchase Protocol (CPP) are available to resolve issues, secure remedy and remediation, and exclude errant suppliers as the last resort. If a breach of the NDPE policy is confirmed, we will engage with the relevant suppliers. In 2022, no suppliers have been excluded from our operations.
- We continue to adhere to relevant regulations and certification schemes such as RSPO, ISCC, and ISPO principles and guidelines where annual audits are conducted. Since 2021, all 15 of our integrated mills have been RSPO certified with 34 of our downstream operations have been certified against the RSPO Supply Chain Certification Standard (SCCS).
- To ensure transparency to our customers, we communicate our sustainability commitments, progress, milestones, and targets in our annual Sustainability Report following the GRI reporting standard. Moreover, Musim Mas participates in known public assessments including SPOTT and Ecovadis. In the 2022 Ecovadis assessment, we received a Gold rating placing among the top percentile.
- We train and share knowledge of good agricultural practices (GAP) with our smallholders such as land clearing methods without using fire and responsible application of fertilizers and pesticides to minimize any excess runoff of nutrients to water bodies which could potentially result in eutrophication and acidification. These chemical inputs are frequently monitored to ensure optimal usage has been achieved. Application of GAP will benefit the environment and the smallholders as lower chemical input will lead to reduced direct operational costs.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & Inclusion	Please explain
Current regulation	Relevant, always included	Musim Mas including all of the suppliers must comply with the current applicable local and national laws and regulations, especially those which are related but are not limited to habitat and ecosystem, local communities, and health and safety. For example, Peraturan Menteri Pertanian Republik Indonesia Nomor 11/Permentan/OT.140/3/2015 (updated Perpres 44/2020) or namely Indonesian Sustainable Palm Oil (ISPO) is relevant for us, thus, it is used as part of Musim Mas' operational decision making. Since ISPO's sustainability standard is mandatory for palm oil operations in Indonesia, it is included in our risk assessment.
Emerging regulation	Relevant, always included	With the growing international agreements concerning climate change and GHG emission reduction commitment, the implementation of stricter International and/or national regulations become inevitable. For example, the recent adoption of the ISCC regulation of RED II demands us to further reduce our GHG emissions. Therefore, to ensure continual adherence to the latest regulations, dedicated teams are established to constantly monitor and keep abreast of any new laws and regulations that could affect the business. Moreover, through our internal assessment, we also simulate and project our annual GHG emission values to track and prepare us in case of new savings requirements or guidelines are to be applied.
Technology	Relevant, always included	Knowing the need to address the growing global demand, Musim Mas invests in technologies to continuously increase productivity and maximize yield while simultaneously minimizing its environmental impact. For example, in the effort to achieve our 55% reduction in emissions intensity against the 2006 baseline by 2025, we invest in technology such as methane capture plants in our operating POMs. To date, we have 17 methane capture with a total of 619,749 MT CO2e of emissions avoided in 2022. Align with one of the key pillars in our sustainability policy of driving innovation in sustainable practices, the technology-related risk is included in our risk assessment.
Legal	Relevant, always included	Legal is relevant to our operations and included in our risk assessment. Failure to comply with our legal obligations in relation to climate change is a key risk to our business. For example, failure to comply with the applicable legal in the country or area where we are operating could lead to sanctions which affected our business. Musim Mas is actively participating in the Indonesian PROPER and aims for the highest reward. Program for Pollution Control, Evaluation, and Rating (PROPER) is Indonesia's national environmental reporting initiative. It uses a colour-coded rating scheme to grade factories' pollution control performance against regulatory standards. Our current PROPER status and reward is available in our Sustainability Report https://www.musimmas.com/wp-content/uploads/2022/10/Musim-Mas-SR2021.pdf
Market	Relevant, always included	Emerging regulations concerning sustainability including climate change have influenced the palm oil market. For example, the preferences in the market toward sustainably sourced products have led us to participate in various sustainability certification and verification schemes, such as RSPO, ISCC, ITSNC and POIG. To mitigate the risk, dedicated teams are established to ensure continual sustainability compliances and engagement with the stakeholders, customers, and public through meetings, sustainability disclosure platforms, and the annual Sustainability Report. For more information on our sustainability practices, please refer to https://www.musimmas.com/sustainability-report/
Reputation	Relevant, always included	With the increasing awareness of climate change, sustainability management plays an integral role in our business operations and reputation. Our sustainability practices framework is managed in our NDPE policy. An example of the risks includes investors and/or some banks starting to require sustainability assessment as one of their funding criteria. To communicate our sustainability progress and targets, Musim Mas annually publishes Sustainability Report and actively participates in various recognized third-party assessments such as CDP, Ecovadis, SPOTT, and PROPER to benchmark and showcase our sustainable progress at the highest level. Additionally, we are also working closely with the local community and other relevant parties (i.e. Siak and Pelalawan Landscape collaboration) to ensure that our actions are not only done in accordance with the FPIC principles but also help the surrounding communities. Lastly, Musim Mas through its relevant department, constantly monitor the media and effectively engage with the stakeholders and public (i.e. customers) through meetings, journal, and annual sustainability report, demonstrating the innovation and measures taken by Musim Mas. More information on the latest updates can be found at https://www.musimmas.com/newsroom/ .
Acute physical	Relevant, always included	Acute physical including climate changes may lead to extreme weather conditions such as drought and flood. Consequently, this may reduce our oil palm yield which affects our financial performance. For example, drought or excessive rainfall can lower Fresh Fruit Bunch (FFB) production due to a forest fire or disruption of the fertilizer application program. To mitigate these, some measures taken include satellite monitoring such as the NOAA to identify and monitor hotspots at and around our concessions. To date, approximately 5 million hectares at and around our concessions are monitored daily for hotspots across Indonesia. Additionally, we also initiate a fire-free village program along with the local communities to educate and encourage best agriculture practices and risks associated with the use of fire for land preparation. As of 2022, 74 villages accounting for approximately 450,769 ha are covered under Free Fire Village Program FFVP or Masyarakat Bebas Api, with 127 trainings conducted. To accelerate our NDPE progress, we collaborate with the Consortium of Resource Experts (CORE) - Proforest and Daemeter – on implementing NDPE commitments, the Extension Services Programme and landscape collaborations. For more information on fire management, please refer to https://www.musimmas.com/sustainability/fire-management-and-prevention/ . The awareness of climate change and its impact may also bring about a change in customers' preferences. For this, we actively socialize and disclose our NDPE and sustainability policies through workshops and websites across the supply chain (https://www.musimmas.com/sustainability/).
Chronic physical	Relevant, always included	Considering Musim Mas operation is closely related to the ecosystems, chronic physical risks such as the ongoing global warming that led to a higher temperature can affect the yield of our palm oil production. Thus, parameters such as soil health and water balance are essential to be actively monitored and maintained. For example, the rising temperature may affect the productivity of our upstream operations. Recognizing the risk, Musim Mas implements best agricultural practices such as operating 100% zero waste mills that utilize POME as land irrigation as well as reusing bio-waste and organic matter from our plantations to return nutrients to the soil which promotes soil health and utilizing internal or public tools such as NOAA to monitor and assess hotspots due to extreme weather-related risks. For more information on Musim Mas sustainability practices, please refer to https://www.musimmas.com/sustainability/environmental-protection/ .

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical	Drought
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Primary potential financial impact

Decreased revenues due to reduced production capacity

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Musim Mas is a fully integrated palm oil company with all of our oil palm plantations located in Indonesia. The occurrence of extreme weather such as drought and flood can lower the productivity of our operations and disrupt our palm oil sales, which in turn, affects the performance of the company. In 2015, Indonesia experienced the climatic phenomenon of El Nino. The El Nino phenomenon has led to lower rainfalls and higher temperatures contributing to drought stress for crops including oil palm crops. Our data suggested that a prolonged drought can lower the oil palm fruits (FFB) yield by approximately 15%. Moreover, prolonged drought may also increase the risk of fire. Other extreme weather occurrences such as floods can affect the fertilizer application schedule, leading to a lower yield. Thus, this poses risks to Musim Mas operations.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

675

Potential financial impact figure – maximum (currency)

810

Explanation of financial impact figure

Adverse weather conditions can have significant impacts on the productivity of our operations, specifically, prolonged drought or floods that occur over several weeks. Our average CPO yield is estimated to be in the range of 5-6 MT CPO/ha. Hence, taking a reduction of yield by 15% due to extreme weather (i.e. prolonged drought), CPO production can drop to 4.25 - 5.1 MT CPO/ha (or lowered by 0.75 - 0.9 MT CPO/ha). Consequently, taking an average CPO price (2020-2022) of USD 900 per MT CPO, the potential financial impact varies between USD 675 - USD 810 per hectare.

Calculations:

(A) = average CPO yield = 5-6 MT CPO/ha

(B) = average CPO price (2020-2022) = \$900/MT CPO

(C) = estimated reduction of yield due to prolonged drought = 15%

(D) = potential financial impact due to reduction of CPO production = (A) x (B) x (C) = \$675 - \$810/ha

Cost of response to risk

30000

Description of response and explanation of cost calculation

As stipulated in our Sustainability Policy (covering 2020-2025), we are committed to no deforestation of HCS forests, no conversion of HCV areas, and no new developments on peatlands (regardless of depth) after 31 Dec 2015. Best management practices and operating procedures are carried out to alleviate the impacts of extreme weather such as drought, the practices with respective timescales are as follows:

- Satellite monitoring such as the MODIS, NOAA, and VIIRS is used to monitor hotspots at and around our concessions with monthly reports available (no end date).
- Provide training and equip firefighting teams to take action at the first sign of an outbreak as well as install fire breaks to slow the spread, should a fire occur (no end date).
- Launch a Fire Free Village Programme (FFVP) to engage and educate local communities on fire risks that may arise due to prolonged drought (no end date). As of December 2022, our FFVP covered 74 villages spanning 450,769 hectares and has conducted 127 trainings in the communities with 46 villages awarded for being fire-free. These initiatives are still ongoing in 2022.
- Operate 100% zero waste mills utilizing dried decanter solids, boiler ash, and POME to be repurposed as organic fertilizer and land application respectively which improves the soil nutrition and moisture retention capability to ameliorate the drought effects (no end date).
- Construct water ponds in our upstream operations areas to be used as water reserves in mitigating the risk of long drought and fire.

CASE STUDY

In 2022, our monitoring system identified 97 hotspots within our concessions, which took place during the dry season. Of these, only three turned out to be fires, affecting approximately four hectares of unplanted area. We will continuously track and monitor hotspots within and surroundings our concessions and invest in training firefighters to take action at the first sign of an outbreak.

COST OF RESPONSE

The cost of response corresponds to the construction of water ponds in our operations. The total cost of \$30,000 (A x B) is derived from the estimated cost of a water pond of \$1000 (A) multiplied by the approximated number of water ponds constructed in our operations (B). The actual construction cost may fluctuate depending on the location, soil type, and size of each water pond.

Comment

Progress towards the implementation of sustainability practices in our operations can be found at <https://www.musimmas.com/sustainability-report/>

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation	Enhanced emissions-reporting obligations
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Primary potential financial impact

Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

With the growing international agreements concerning climate change, the implementation of stricter International and/or national regulations becomes inevitable. For example, the decision of the International market to pose stricter guidelines on the import of palm oil has impacted the market. Consequently, more customers prefer sustainably certified palm oil products and derivatives. With the variability of international regulations and decisions imposed on the palm oil sector, the financial impact on our business varies accordingly. Failure to comply may result in fines and/or loss of market. For example, international guidelines such as the latest RED II may impact our financial performance with the updated emission factor and threshold in its GHG emissions. Failure in meeting the GHG threshold may limit the availability of qualified supply bases which may damage the brand, thus, leading to a loss of market. Moreover, rather than self-declarations by companies, independent third parties verifications will be required in terms of demonstrating credibility and transparency leading to an increase in compliance costs. Thus, this poses a risk to Musim Mas.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

90000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Financial impact due to changes in customers' behavior and preferences could range widely from mild to severe. For example, if the European market shifts its preferences solely to demand more sustainable and certified palm oil products, then the financial impact will be milder in comparison to if the palm oil products are to be rejected completely. The impact on stricter sustainable demand is only limited to the cost needed in fulfilling the third-party verifications (including the operational cost to comply with the certification scheme standards) and supplier engagement costs, whereas the latter, the financial impact will be severe due to the loss of our major market.

The certification cost per unit to be able to enter the European Market i.e. ISCC is \$5000. In 2022, 18 of our processing units have been ISCC certified. Hence, the financial impact corresponds to the estimated certification costs of MMG operations derived from the certification cost per unit (\$5000) x total units (18) = \$ 90,000. All our ISCC certificates are available publicly on the ISCC website <https://www.iscc-system.org/certificates/valid-certificates/>.

Cost of response to risk

60000000

Description of response and explanation of cost calculation

To prepare for the new possible requirements of regulations and standards, we take measures with respective timescales as follows:

- Participates in working groups of various sustainability certification schemes to maintain compliance with the up-and-coming principles and standards (no end date). For example, Musim Mas is actively participating in RSPO working groups.
- Achieves and maintains 100% sustainability certification schemes such as RSPO, ISCC, MSPO, ITSNC, and ISPO in our operations (no end date). These will also serve as a credible benchmark in our operation to keep track of our sustainability progress. As of 2022, all 15 integrated mills and 18 mills have been RSPO and ISCC certified respectively.
- Promotes traceability tools such as Musim Mas Self-Assessment (SAT) Tool to engage with suppliers. As of 2022, 84% of suppliers have completed the form. We are on track to achieve 100% of suppliers completing the SAT by 2025.
- Participates in various known public assessments and benchmarking programs including CDP, SPOTT, Ecovadis, etc (no end date). Through improvement in our sustainability practices, we received a gold rating in our 2022 Ecovadis assessment.
- Implements best agricultural practices and pledges to no deforestation, no peatland development regardless of its depth, emission reduction, waste management, traceability to plantations, etc (no end date).
- Collaborate with multiple stakeholders in various sustainability initiatives to assist surrounding communities and communicate our brand values (no end date). For example, the landscape approach surrounding Siak and Pelalawan involves local NGOs, communities, companies, and government agencies. For more information, please refer to <https://www.musimmas.com/sustainability/landscape/>

COST OF RESPONSE

To ensure compliance and reduction in our GHG emissions, we have built 17 methane capture plants in our mills as of December 2022 with a total of 619,749 MT CO2e emissions avoided. The cost of response corresponds to the total cost for the methane capture installation in our operations. The calculation is derived from the capital cost of one methane capture plant (USD 3-4 million) multiplied by the total methane capture built (17) resulting in an estimated investment of \$60,000,000. Full information on our sustainability practices can be found at <https://www.musimmas.com/sustainability/ndpe-policy/> and <https://www.musimmas.com/sustainability-report/>

Comment

Musim Mas takes active steps to go beyond industry-recognized sustainability standards and will continue to step up in response to critical industry issues in our quest to contribute to a more sustainable industry and an equitable world (<https://www.musimmas.com/sustainability-report/>).

C2.4**(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.**Identifier**

Opp1

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

With the growing international agreements concerning climate change and GHG emission reduction commitment, the implementation of stricter International and/or national regulations becomes inevitable. In line with our sustainability policy, increasing brand value through sustainability certifications and environmental disclosure is beneficial for our business performance. With the increasing demand for sustainable products, there is an opportunity for Musim Mas to better market products that fulfill the emission guidelines and are sustainably certified.

Sustainability schemes such as RSPO, ISCC, ITSNC, MSPO, and POIG are conducted independently in our operations, thus, ensuring proper implementation and compliance with the principles and criteria of the respective sustainability certification schemes. Our operations are audited and benchmarked annually against the principles and guidelines of the schemes. Dedicated teams are established to ensure continued adherence to the respective schemes. Regular training and workshops are also conducted to ensure adherence to the latest principle and criteria of the schemes. Moreover, Musim Mas participates in many public assessments and benchmarking programs including CDP, Ecovadis, SPOTT, and PROPER to communicate and rate our sustainability commitments, achievements, and progress at the highest level.

Time horizon

Medium-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

12000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

As customers become more aware of the importance of sustainability practices, the preferences in the market toward sustainably labeled products have increased. It is assumed that the increase in brand value is in line with the potential increase in sales of certified palm oil. The potential financial impact figure is then derived from (A) the estimated year-to-year increase in sales of certified palm oil by 2% and (B) the estimated revenue from sales of certified palm oil. In 2022, the sales of certified palm oil are estimated to represent around USD 600 million. Hence, the potential financial impact figure is estimated to be $A \times B = \text{USD } 12 \text{ million}$.

Cost to realize opportunity

90000

Strategy to realize opportunity and explanation of cost calculation

To seize this opportunity, Musim Mas takes actions with respective timescale as follows:

- Invests and takes technological approaches to reduce GHG emissions such as methane capture plant installation. As of December 2022, 17 methane capture plants are operated in our mills
- Adopts and maintains various well-recognized certification and verification schemes in our operations (no end date) such as RSPO, POIG, ISCC, and ISPO to track and rate our sustainability progress including GHG emissions. Since 2021, we continue to maintain respective schemes (RSPO-certified and POIG-verified) for all of our 15 integrated mills
- Publicly disclose our annual progress, milestones, and targets of our sustainability commitments and practices through Musim Mas websites, stakeholders meetings, and Sustainability Report according to GRI standards (no end date). For more information, please refer to <https://www.musimmas.com/sustainability-report/>
- Partner and collaborate with other stakeholders to engage in landscape approaches to mitigate the risk of NDPE in our supply chains and communicate our brand values (no end date). For instance, Musim Mas collaborates with the Sustainable Trade Initiative, the Government of Aceh, Forum Konservasi Leuser, Pusat Unggulan Perkebunan Lestari, downstream actors (e.g. General Mills, Nestle, AAK), local civil society organizations (Earthqualizer & Earthworm Foundation) and suppliers, including those outside our supply chain to have Aceh Tamiang verified as a deforestation-free and traceable commodities producer.
- Achieves full traceability to plantation throughout our supply chain. Presently, we have achieved 100% traceability to mill since 2015 and 97% traceability to plantation as of December 2022. We are on track to achieve 100% full traceability to plantation by 2025.
- Promote our sustainability practices and brand through public assessments (no end date). In 2022, we received a Gold medal in our 2022 Ecovadis assessment and will continue to participate in 2023.

CALCULATION

The certification cost per unit to be able to enter the European Market i.e. ISCC is \$5000. In 2022, 18 of our processing units have been ISCC certified. Hence, the cost of response corresponds to the estimated certification costs of MMG operations derived from the certification cost per unit (\$5000) x total units (18) = \$90,000. All our ISCC certificates are available publicly on the ISCC website <https://www.iscc-system.org/certificates/valid-certificates/>.

Comment

Musim Mas takes active steps to go beyond industry-recognized sustainability standards and will continue to step up in response to critical industry issues in our quest to contribute to a more sustainable industry and equitable world.

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of new technologies

Primary potential financial impact

Reduced indirect (operating) costs

Company-specific description

Methane is a by-product of palm oil mill effluent (POME). It is usually released in the form of gas which is found to be detrimental to the environment. Recognizing this, Musim Mas invests heavily in Methane Capture Facilities to capture and utilize the gas to reduce our GHG emissions. Through biogas engine generators, the captured methane gas is then converted to generate electricity where the electricity will be used in the milling process and to provide 24-hour utilities for all the workers and their families living in the plantations. Additionally, it can also go to the surrounding local communities, and in some cases to the national grid in return for electricity credit.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-high

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

6000000

Potential financial impact figure – maximum (currency)

15000000

Explanation of financial impact figure

The figure corresponds to the annual monetary savings of our installed methane capture plants. These estimated savings are sourced from the substitution of diesel and electricity credit from the national grid.

Calculation:

(A) = estimated investment of methane capture = \$60,000,000

(B) = estimated payback period of methane capture = 4-10 years

(C) = potential financial impact = (A) / (B) = \$6,000,000 - \$15,000,000 per year

Cost to realize opportunity

60000000

Strategy to realize opportunity and explanation of cost calculation

With the installation of 17 methane capture plants in our operations, we have avoided carbon emission 619,749 MT CO₂e in 2022. The Palm Oil Mill Effluent (POME) is processed anaerobically in a closed pond to be used as an electricity source. The cost to realize the opportunity corresponds to the estimated capital cost of a methane capture plant. The investment capital cost of one methane capture plant ranges from 3 million to 4 million USD depending on the FFB processed. Additionally, to maintain and operate the plants, there will be an operational cost that is already included in our overall operational cost. For this, the cost of response taken is corresponding to the capital cost.

CALCULATION

The cost of response corresponds to the total cost for the methane capture installation in our operations. The calculation is derived from the capital cost of one methane capture plant (USD 3-4 million) multiplied by the total methane capture built (17) resulting in an estimated investment of \$60,000,000.

Comment

Full information on our sustainability practices can be found at <https://www.musimmas.com/sustainability/ndpe-policy/> and <https://www.musimmas.com/sustainability-report/>

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a climate transition plan that aligns with a 1.5°C world?

Row 1

Climate transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a climate transition plan within two years

Publicly available climate transition plan

<Not Applicable>

Mechanism by which feedback is collected from shareholders on your climate transition plan

<Not Applicable>

Description of feedback mechanism

<Not Applicable>

Frequency of feedback collection

<Not Applicable>

Attach any relevant documents which detail your climate transition plan (optional)

<Not Applicable>

Explain why your organization does not have a climate transition plan that aligns with a 1.5°C world and any plans to develop one in the future

Following the COP26 climate summit, Musim Mas acknowledges the importance of developing a business strategy that will contribute to limiting warming to 1.5°C. In alignment with the 1.5°C Pathway, Musim Mas signed up to the Agriculture Sector Roadmap to 1.5°C At COP27 in Egypt. With the roadmap, Musim Mas will submit emissions reduction targets including land use change for validation in accordance with the SBTi (including FLAG) framework. Presently, Musim Mas is undergoing project on GHG accounting following the GHG Protocol in line with the SBTi framework. Moreover, our sustainability policy has imposed sustainability standards including climate-related and NDPE for our global operations.

Explain why climate-related risks and opportunities have not influenced your strategy

<Not Applicable>

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios Bespoke transition scenario	Company-wide	1.5°C	<p>Musim Mas takes the impact of climate change seriously and is committed to minimize greenhouse gas (GHG) emissions within our operations. For this, Musim Mas has set a target that is to reduce GHG emission intensity in 2025 by 55% for RSPO-certified mills against the 2006 baseline. Audited annually, we use the RSPO PalmGHG to set the target and track the GHG emissions of our upstream operation towards the target of GHG emissions intensity of 2025. Our Sustainability Teams, Senior Management, and the Board are involved in decision-making relating to our climate-related risks and opportunities to ensure emission reductions are adequately managed throughout our operations. Scenarios considered include the potential impact of extreme weather (i.e. drought) on yield, fire risk, etc which result in higher GHG emissions. Our strategies to mitigate GHG emissions include but are not limited to no new planting on peat and in conservation areas, employing good water management practices on existing planted peat, implementing Good Agriculture Practices (GAP), maintaining soil health and structure, and operating methane capture facilities at all our mills.</p> <p>In the 2022 audit, our emission intensity was 53% less than our 2006 baseline and is well on track to achieve our 2025 target of a 55% GHG intensity reduction. For more information, please refer to https://www.musimmas.com/sustainability/environmental-protection/.</p> <p>At the moment, Musim Mas is developing emissions reduction roadmap and set targets in line with the SBTi and SBTi FLAG guidances following the 1.5 Degrees pathway scenario. Moreover, we are also waiting for the finalized version of Land-Sector-and-Removals-Guidance from GHG Protocol.</p>
Physical climate scenarios RCP 8.5	Company-wide	<Not Applicable>	<p>We used the RCP8.5 ("pessimistic" scenario) to prepare us for the worst-case scenario. The "pessimistic" scenario (SSP3 RCP8.5) represents a fragmented world with uneven economic development, higher population growth, lower GDP growth, and a lower rate of urbanization, all of which potentially affect water usage; and steadily rising global carbon emissions, with CO2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels (WRI Aqueduct, 2015).</p> <p>Our main operations are located in Indonesia. Hence, scenario analysis of the physical risks is assessed for our operations in Indonesia. As such, we looked at the operations' risk exposure to various physical risks such as drought, sea level rise, and flood using the Climate Change Knowledge Portal by Worldbank. Our upstream operations of plantations and mills are located in Sumatra and Kalimantan regions. These operations require water for plant growth and production processes respectively. Using the Climate Change Knowledge Portal by Worldbank, our scenario analysis shows that the largest 1-day precipitation in the time period of 2040-2059 increases by 4.54 mm compares to the historical reference of 1995-2014. Moreover, the annual precipitation is expected to increase by roughly 0.4 mm and increase by 29.5 mm per decade between 2001-2050 in Sumatera and Kalimantan regions respectively. Heavy rain could lead to localized flooding or damage infrastructure (roads, culverts, bridges). It can also adversely affect field operations, such as harvesting or scheduled applications of fertilizers or pesticides. Hence, these will lead to lower yields and OER of palm oil.</p>

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

- How the implementation of stricter International and/or national regulations with the growing international agreements concerning forest conservation, biodiversity protection, and emission reduction commitment can influence our business strategy?
- How physical risks such as precipitation, droughts, floods in a different timeframe (short, medium, long term) could impact our yield and operations?

Results of the climate-related scenario analysis with respect to the focal questions

The 2022 Enhanced NDC Indonesia has committed to reducing emissions unconditionally by nearly 32% and to achieve net-zero by 2060 or sooner. Moreover, international guidelines such as the EU Corporate Sustainability Reporting Directive (CSRD) will require European companies to start reporting on various climate-related targets, along with other elements of sustainability in 2025. As such, failure in meeting the sustainability metrics such as the GHG threshold and NDPE commitments may limit the availability of qualified supply bases which may damage the brand, thus, leading to a loss of market. In regard to both transitional and physical risks, Musim Mas takes the following initiatives:

- We track and simulate our GHG emissions to ensure our GHG emissions are maintained below the demanded threshold to comply with regulatory standards and certification schemes such as ISCC and RSPO. In 2022, Musim Mas achieve emission intensity of 2.77 tCO₂e/mtCPO (53% lower than our baseline emissions of 2006) calculated using PalmGHG RSPO. We are on track to achieve our reduction to 55% target by 2025.
- Achieves and maintains 100% sustainability certifications schemes throughout our supply chains (no end date). These will also serve as a credible benchmark in our operations to keep track of our sustainability progress.
- Participates in various known public assessments and benchmarking programs (no end date) such as Ecovadis and SPOTT. In 2022, we received a Gold rating for our Ecovadis assessment.
- Engage with suppliers to complete the Self-Assessment Tool to assess NDPE risks at the mill level. In 2022, 84% have completed the form and are on track to achieve 100% completion by 2025.
- Ensure that 100% of supply base/suppliers' mill with concession (>9 million ha) is monitored via satellite imagery for deforestation and peatland development such as Earthqualizer, RADD (no end date).
- Monitor hotspots at and around our concessions using methods such as satellite monitoring (NOAA, MODIS) and regular site patrol (no end date).
- Collaborate with multiple stakeholders in various sustainability initiatives to assist surrounding communities and communicate our brand values (no end date). For example, the landscape approach surrounding Siak and Pelalawan involves local NGOs, communities, companies, and government agencies.

In alignment with the 1.5C pathway, Musim Mas is developing an emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG guidances following the 1.5 Degrees pathway scenario. Moreover, we are also waiting for the finalized version of Land-Sector-and-Removals-Guidance from GHG Protocol.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	<p>With the growing international agreements concerning climate change and GHG emission reduction commitment, the implementation of stricter International and/or national regulations becomes inevitable. For example, the decision of the international market to pose stricter sustainability guidelines toward the import of palm oil has impacted the market. The changes in European market preferences toward sustainably sourced products have led us to further improve and promote our sustainability practices across our supply chain.</p> <p>Recognizing the dynamics of the market, we have publicly announced our sustainability commitment with the launch of our first sustainability policy in 2014. To track and evaluate our sustainability progress, we are independently audited annually against various sustainability certification and verification schemes, such as RSPO, ISCC, POIG, ISPO. Furthermore, we also annually disclose our sustainability progress, targets, and achievements to our customers and relevant stakeholders through well-recognized bodies such as CDP, Ecovadis, SPOTT, and PROPER as well as our internal Sustainability Report (https://www.musimmas.com/sustainability-report/). In 2022, through improvement in our sustainability practices and disclosures, we received a Gold medal in our 2022 Ecovadis assessment.</p>
Supply chain and/or value chain	Yes	<p>Following our NDPE policy, we focus on eliminating deforestation, peatland development, and the slash-and-burn land-clearing method. This framework has led us to improve our monitoring tools such as satellites and drones, implement High Carbon Stock Assessment (HCSA), and develop a traceability mechanism to identify the FFB source area which aligns with our NDPE vision.</p> <p>As of 2022, 96% of our suppliers either have an NDPE policy or adopted the Musim Mas Sustainability Policy. Presently, we have achieved 100% traceability to mill since 2015 and 97% traceability to plantation per December 2022. We are on track to achieve full traceability to plantations by 2025. In recent years, suppliers are required to complete the Musim Mas Self-Assessment Tool (SAT) which is an exhaustive set of questions against our NDPE requirements. As of 2022, 84% of our suppliers have completed the Self-Assessment Tool.</p>
Investment in R&D	Yes	<p>Recognizing the need to address growing global demand, Musim Mas continues to maximize our oil palm yield while consciously mitigating environmental impacts. Musim Mas R&D team continues to optimize agriculture practices, including efficient usage of fertilizers and pesticides to reduce environmental impacts such as climate change and eutrophication. Our Genetic and Agriculture Research Center, situated at our Riau plantation comprises dedicated units that manage and optimize agronomy, crop protection, and peat to maintain consistent and high production. It aims to provide our operations with the most advanced and elite oil palm planting materials, individually tailored to suit different environments, ensuring we generate optimal yields across all the Group's plantations. We achieve these goals through intensive breeding programs, adopting high nursery management standards, and developing planting materials with desirable traits like earlier harvesting, higher extraction rates, and increased disease resistance.</p> <p>In addition, we also implement Integrated Pest Management (IPM) where we use barn owls to reduce rat population. This procedure is expected to reduce the usage of rodenticides. In 2019, we have successfully transitioned away from using benomyl and glufosinate-ammonium, bringing our total to four-phased out pesticides since 2018. In 2020, we also successfully phased out two pesticides namely Cypermethrin and Mancozeb.</p>
Operations	Yes	<p>To ensure continued compliance to new regulations concerning climate change and sustainability aspects, we implement several emission reduction activities such as methane capture installation, no new planting and development on high carbon stock areas and peatland, shifting fossil fuel usage to biofuel, etc. All these efforts are to ensure that our target towards lower emissions can be achieved. As of 2022, we have successfully constructed and operated 17 methane capture plants in our palm oil mills.</p>

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs Capital expenditures Capital allocation Acquisitions and divestments Access to capital Assets Liabilities	With the growing international agreements concerning climate change and GHG emissions reduction commitment, the implementation of stricter International and/or national regulations becomes inevitable. The increasing demand for sustainable labeled products has propelled us to further improve our sustainability practices. Recognizing the importance of sustainability and climate change, the budget to improve our environmental performance is heavily considered in our financial planning. Depending on the action plans, these improvements might require additional capital and operating expenditures. These improvements include but are not limited to achieving and maintaining various certification schemes (i.e. RSPO, ISCC, POIG, etc.), building methane capture plants in our mills, and promoting smallholders collaboration. As of 2022, 17 methane capture plants have been built and 3,537 smallholders have achieved RSPO certification. Following our sustainability policy and financial planning, Musim Mas will continuously improve our sustainability practices. For details on our sustainability progress, milestones, and targets, please visit https://www.musimmas.com/sustainability-report/ . Moreover, please refer to https://www.musimmas.com/sustainability/certifications/ to see the status and progress of our certifications.

C3.5

(C3.5) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition	Indicate the level at which you identify the alignment of your spending/revenue with a sustainable finance taxonomy
Row 1	No, but we plan to in the next two years	<Not Applicable>

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Intensity target

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number

Int 1

Is this a science-based target?

No, but we anticipate setting one in the next two years

Target ambition

<Not Applicable>

Year target was set

2016

Target coverage

Product level

Scope(s)

Scope 1

Scope 2

Scope 2 accounting method

Location-based

Scope 3 category(ies)

<Not Applicable>

Intensity metric

Metric tons CO2e per metric ton of product

Base year

2006

Intensity figure in base year for Scope 1 (metric tons CO2e per unit of activity)

5.95

Intensity figure in base year for Scope 2 (metric tons CO2e per unit of activity)

0.01

Intensity figure in base year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for total Scope 3 (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in base year for all selected Scopes (metric tons CO2e per unit of activity)

5.96

% of total base year emissions in Scope 1 covered by this Scope 1 intensity figure

100

% of total base year emissions in Scope 2 covered by this Scope 2 intensity figure

100

% of total base year emissions in Scope 3, Category 1: Purchased goods and services covered by this Scope 3, Category 1: Purchased goods and services intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 2: Capital goods covered by this Scope 3, Category 2: Capital goods intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) covered by this Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution covered by this Scope 3, Category 4: Upstream transportation and distribution intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 5: Waste generated in operations covered by this Scope 3, Category 5: Waste generated in operations intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 6: Business travel covered by this Scope 3, Category 6: Business travel intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 7: Employee commuting covered by this Scope 3, Category 7: Employee commuting intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 8: Upstream leased assets covered by this Scope 3, Category 8: Upstream leased assets intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution covered by this Scope 3, Category 9: Downstream transportation and distribution intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 10: Processing of sold products covered by this Scope 3, Category 10: Processing of sold products intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 11: Use of sold products covered by this Scope 3, Category 11: Use of sold products intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products covered by this Scope 3, Category 12: End-of-life treatment of sold products intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 13: Downstream leased assets covered by this Scope 3, Category 13: Downstream leased assets intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 14: Franchises covered by this Scope 3, Category 14: Franchises intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Category 15: Investments covered by this Scope 3, Category 15: Investments intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Other (upstream) covered by this Scope 3, Other (upstream) intensity figure

<Not Applicable>

% of total base year emissions in Scope 3, Other (downstream) covered by this Scope 3, Other (downstream) intensity figure

<Not Applicable>

% of total base year emissions in Scope 3 (in all Scope 3 categories) covered by this total Scope 3 intensity figure

<Not Applicable>

% of total base year emissions in all selected Scopes covered by this intensity figure

100

Target year

2025

Targeted reduction from base year (%)

55

Intensity figure in target year for all selected Scopes (metric tons CO2e per unit of activity) [auto-calculated]

2.682

% change anticipated in absolute Scope 1+2 emissions

0

% change anticipated in absolute Scope 3 emissions

0

Intensity figure in reporting year for Scope 1 (metric tons CO2e per unit of activity)

2.77

Intensity figure in reporting year for Scope 2 (metric tons CO2e per unit of activity)

0

Intensity figure in reporting year for Scope 3, Category 1: Purchased goods and services (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 2: Capital goods (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 5: Waste generated in operations (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 6: Business travel (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 7: Employee commuting (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 8: Upstream leased assets (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 10: Processing of sold products (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 11: Use of sold products (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 13: Downstream leased assets (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 14: Franchises (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Category 15: Investments (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Other (upstream) (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for Scope 3, Other (downstream) (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for total Scope 3 (metric tons CO2e per unit of activity)

<Not Applicable>

Intensity figure in reporting year for all selected Scopes (metric tons CO2e per unit of activity)

2.77

Does this target cover any land-related emissions?

Yes, it covers land-related and non-land related emissions (e.g. SBT approved before the release of FLAG target-setting guidance)

% of target achieved relative to base year [auto-calculated]

97.3154362416107

Target status in reporting year

Underway

Please explain target coverage and identify any exclusions

Our GHG emission analysis is conducted using Roundtable Sustainable Palm Oil (RSPO) PalmGHG calculator, which is a life cycle analysis (LCA)-based calculator. The calculator includes emissions of land use change, peat oxidation, fertilizers, fuel consumption, POME as well as crop sequestration. Our target is a 55% reduction in emissions intensity by 2025, against our 2006 baseline covering all of our 15 integrated mills. The 15 integrated mills have obtained RSPO certification and are annually audited against RSPO Principles and Guidances including GHG emissions calculations.

Plan for achieving target, and progress made to the end of the reporting year

The reduction in emission intensity is the culmination of our sustainability practices such as cessation of new planting on peat and high carbon stock area, installation of methane capture plants, a shift of fossil fuel usage to biofuel, and implementation of integrated pest management practices to reduce pesticide usage. Additionally, Musim Mas's R&D department also strives to keep on improving our oil yield and land-use efficiency to further lower our emission intensity.

In 2022, Musim Mas avoided 619,749 MT CO2e following the installation of 17 methane capture plants resulting in an emission intensity of 2.77 tCO2e/mtCPO (53% lower than our baseline emissions of 2006). The calculation of the emission intensity follows the RSPO PalmGHG calculator and is audited annually and assured by independent third-party verification. Moreover, our strategies to reduce GHG emissions include but are not limited to no new planting on peat and in conservation areas, employing good water management practices on existing planted peat, implementing Good Agriculture Practices (GAP), maintaining soil health and structure, and operating methane capture facilities at all our mills. Through Good Agricultural Practices (GAP) such as mulching stems and leaves from our plantations and repurposing dried decanter solids and boiler ash from our mills as organic fertilizer, we can minimize our fertilizer consumption leading to lower emissions. With these best practices, we are on track to achieve the 55% GHG emission reduction target by 2025.

Moreover, we are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and develop emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We are also waiting for the finalized version of Land-Sector-and-Removals-Guidance from GHG Protocol.

List the emissions reduction initiatives which contributed most to achieving this target

<Not Applicable>

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Net-zero target(s)

Other climate-related target(s)

C4.2b

(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.

Target reference number

Oth 1

Year target was set

2021

Target coverage

Company-wide

Target type: absolute or intensity

Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Engagement with suppliers	Other, please specify (Percentage of suppliers ISPO certified)
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Target denominator (intensity targets only)

<Not Applicable>

Base year

2021

Figure or percentage in base year

0

Target year

2025

Figure or percentage in target year

100

Figure or percentage in reporting year

25

% of target achieved relative to base year [auto-calculated]

25

Target status in reporting year

Underway

Is this target part of an emissions target?

Engagement with smallholders can lead to an increase in yields (i.e. socialization on good agricultural practices), better access to national and international markets, improvement in livelihoods, and a reduction in the risk of land conversion. Through the best management practices, the reduction in fertilizers and pesticides as well as LUC practices will contribute to the reduction in GHG emissions along our supply chains. To ensure credibility, Musim Mas's supply chain is in compliance with the sustainability standards such as ISPO and RSPO.

Our Smallholders Program embeds valuable skills within the smallholders and communities through the Smallholders Hub approach. Instead of training the smallholders directly, we build greater capacity by training local government agricultural officers, also known as Village Extension Officers (VEOs). We train VEOs on Good Agricultural Practices (GAP) and No Deforestation, No Peat, and No Exploitation (NDPE) principles. These officers then share their expertise with independent smallholder farmers and equip them with the knowledge needed for responsible farming. In 2022, Musim Mas established 7 smallholder hubs across Kalimantan and Sumatra regions. In all, Musim Mas will continue to engage and socialize the importance of sustainability certification to relevant smallholders. For more information, please refer to <https://www.musimmas.com/sustainability/smallholders/independent-smallholders/>.

Is this target part of an overarching initiative?

Remove deforestation

Please explain target coverage and identify any exclusions

The target covers the scheme smallholders supplying to our mills.

Plan for achieving target, and progress made to the end of the reporting year

Musim Mas aims to achieve 100% ISPO certification for the scheme smallholders supplying to our mills by 2025. As of 2022, approximately 25% of smallholders have obtained ISPO certification. Musim Mas will continue to actively engage and socialize the importance of sustainability certification to smallholders.

List the actions which contributed most to achieving this target

<Not Applicable>

C4.2c

(C4.2c) Provide details of your net-zero target(s).

Target reference number

NZ1

Target coverage

Company-wide

Absolute/intensity emission target(s) linked to this net-zero target

Not applicable

Target year for achieving net zero

2050

Is this a science-based target?

No, but we anticipate setting one in the next two years

Please explain target coverage and identify any exclusions

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We are also waiting for the finalized version of Land-Sector-and-Removals-Guidance from GHG Protocol.

Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?

Unsure

Planned milestones and/or near-term investments for neutralization at target year

<Not Applicable>

Planned actions to mitigate emissions beyond your value chain (optional)

We will explore action plans once our baseline emissions are finalized and key hotspots are identified.

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	17	619749
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Fugitive emissions reductions	Agricultural methane capture
-------------------------------	------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

619749

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1
 Scope 2 (location-based)
 Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

10000000

Investment required (unit currency – as specified in C0.4)

60000000

Payback period

4-10 years

Estimated lifetime of the initiative

21-30 years

Comment

Conventionally, POME is stored in a large open pond where its treatment is dependent on anaerobic bacteria to break down the organic matter in the wastewater. To overcome the detrimental emission of methane gas, Musim Mas installs methane capture facilities with the purpose to capture the methane gas, thus, reducing the emission from mill operations. The methane capture plants utilize the captured methane gas as a gas engine feed to generate electricity. The generated electricity is then used for mill operation and workers' housing where the excess will be sent to the national grid in return for electricity credit. In 2022, this process has avoided 619,749 tCO2eq of GHG emissions through our 17 methane capture plants.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Compliance with regulatory requirements/standards	To ensure continual adherence to local, national, and international regulations, Musim Mas strives to continuously reduce emissions from our operations. For this, we always provide a dedicated budget that will be used for emission reduction activities such as methane capture facilities for Palm Oil Mill Effluent (POME), research and development of fertilizers and pesticides, development of GAP, and training and workshops to improve GAP in our operations. For more information on our sustainability practices, please visit https://www.musimmas.com/sustainability-report/ .

C-AC4.4/C-FB4.4/C-PF4.4

(C-AC4.4/C-FB4.4/C-PF4.4) Do you implement agriculture or forest management practices on your own land with a climate change mitigation and/or adaptation benefit?

Yes

C-AC4.4a/C-FB4.4a/C-PF4.4a

(C-AC4.4a/C-FB4.4a/C-PF4.4a) Specify the agricultural or forest management practice(s) implemented on your own land with climate change mitigation and/or adaptation benefits and provide a corresponding emissions figure, if known.

Management practice reference number

MP1

Management practice

Land use change

Description of management practice

Prior to any new planting, land-use planning is conducted following Musim Mas Sustainability Policy to identify whether the targeted land is under any category of High Carbon Stock (HCS). If the land is identified as a conservation area, the land will be set aside.

Primary climate change-related benefit

Emission reductions (mitigation)

Estimated CO2e savings (metric tons CO2e)

470000

Please explain

The figure is quantified using the land carbon stock default value provided by the RSPO PalmGHG. Assuming all our HCS areas of 2000 ha are disturbed forests and taking the difference between the emission factor of oil palm and disturbed forests of 235.29 tCO2e/ha, an emission savings of 470,000 tCO2e is estimated.

Management practice reference number

MP2

Management practice

Fertilizer management

Description of management practice

By-products from our processing processes, such as boiler ash and dry decanter solid are used as organic fertilizers in our plantations. These by-products contain N and P contents which can be used to substitute N-fertilizers and P-fertilizers. Consequently, the reduction in fertilizer usage leads to better environmental impacts (i.e. eutrophication) and healthier financial performance.

Primary climate change-related benefit

Reduced demand for fertilizers (adaptation)

Estimated CO2e savings (metric tons CO2e)

0

Please explain

The savings from these practices have not been quantified.

Management practice reference number

MP3

Management practice

Integrated pest management

Description of management practice

In the effort to reduce the usage of synthetic pesticides, Musim Mas takes the approach of using integrated pest management practices. For example, the usage of barn owl programs to control the rat populations and the utilization of *Cassia Cobanensis*, *Tunera Subulata*, and *Antigonon Leptopus* to control the caterpillar populations.

Primary climate change-related benefit

Reduced demand for pesticides (adaptation)

Estimated CO2e savings (metric tons CO2e)

0

Please explain

The savings from these practices have not been quantified.

Management practice reference number

MP4

Management practice

Fire control

Description of management practice

Musim Mas commits to adhere to our zero-burn policy in our plantations. For this, we actively engage with our smallholders to develop best agricultural practices (i.e. alternative methods for land clearance) while simultaneously encouraging them to pursue RSPO certification. Additionally, we also continue to improve our fire management practices to mitigate the fire risk. For instance, besides the RADD partnership and satellite monitoring, we also provide training and firefighting equipment to the villages along with monetary or non-monetary incentives if the villages remain to be fire-free. Recognising the risk of fire, as a member of the Fire Free Alliance, we launched our Fire Free Village Programme (FFVP) to engage and educate local communities including smallholders in protecting forests from fire. As of December 2022, our FFVP covered 74 villages spanning 450,769 hectares and has conducted 127 trainings in the communities. In 2022, 46 villages were awarded for being fire-free.

Primary climate change-related benefit

Emission reductions (mitigation)

Estimated CO2e savings (metric tons CO2e)

0

Please explain

The savings from these practices have not been quantified.

Management practice reference number

MP6

Management practice

Replacing fossil fuels by renewable energy sources

Description of management practice

Musim Mas is proud to operate zero-waste mills, which means we reclaim 100% of the non-hazardous waste we produce and recycle it back into our processes. At our mills, we recover energy from palm kernel shells (PKS) and palm fiber (from mesocarp and EFB) by using them to fuel our boilers. In addition, our methane capture facilities harness methane from POME to generate electricity that powers our mills, estates, and workers' housing. Any surplus electricity we generate is exported to the national grid. Moreover, Empty fruit bunches (EFB) are mulched and applied back at our plantations as fertilizer.

Primary climate change-related benefit

Reduced demand for fossil fuel (adaptation)

Estimated CO2e savings (metric tons CO2e)

799416

Please explain

In 2022, the total energy generated from the consumption of PKS and palm fiber as boiler fuel across all our mills is around 7.2 million GJ. Using the Biograce's EF of coal and biomass (112.3 gCO₂e/MJ and 1.27 gCO₂e/MJ respectively), the estimated savings from using PKS and fiber instead of coal is 111.03 gCO₂e/MJ.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon

Other, please specify (ISCC & RSPO)

Type of product(s) or service(s)

Other	Other, please specify (Palm oil and its derivatives)
-------	--

Description of product(s) or service(s)

Musim Mas is a vertically integrated palm oil business offering an extensive portfolio of palm oil products and derivatives including Crude Palm Oil (CPO), Refined Bleach and Deodorized Palm Oil (RBDPO), and Palm Methyl Esther (PME). Our products are sold under the certification of RSPO and ISCC which set strict criteria for emission and sustainable practices. The ISCC certification scheme complies with the Renewable Energy Directive (RED) which is the legal framework for the implementation of renewable energy targets for the transport sector in the European Union. Following the requirements of the RED II, ISCC requires a minimum level of GHG savings for final biofuels of at least 50%. Additionally, RSPO requires the certification units to identify and assess their GHG emissions along with the implementation and monitoring plan to reduce and minimize the emissions.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Other, please specify (ISCC)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Cradle-to-gate

Functional unit used

Megajoule biofuel

Reference product/service or baseline scenario used

Following the ISCC EU 205 v4.0, a fossil fuel comparator of biofuels for transport is taken as the reference product.

Life cycle stage(s) covered for the reference product/service or baseline scenario

Cradle-to-gate

Estimated avoided emissions (metric tons CO₂e per functional unit) compared to reference product/service or baseline scenario

0.000066

Explain your calculation of avoided emissions, including any assumptions

The figure corresponds to the emissions savings with the unit of tCO₂e per MJ biofuel. The calculation is based on a life-cycle approach from upstream operations to our refineries (Cradle-to-Gate) calculated following the ISCC EU 205 guidances. Compared to the fossil fuel comparator (94 gCO₂e/MJ), Musim Mas produces biofuel with emissions savings of approximately 70% (or ~28 gCO₂e/MJ). Hence, the estimated avoided emission is 66 gCO₂e/MJ.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

20

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

No

Name of organization(s) acquired, divested from, or merged with

<Not Applicable>

Details of structural change(s), including completion dates

<Not Applicable>

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	Yes, a change in boundary	Although the emissions from offices and warehouses are insignificant (estimated to be approximately 1%) in comparison to the total emissions from the production and processing facilities of our operations (i.e. plantations, mills, refineries). Both business activities are relevant to our operations, hence the emissions are included in our boundary.

C5.1c

(C5.1c) Have your organization's base year emissions and past years' emissions been recalculated as a result of any changes or errors reported in C5.1a and/or C5.1b?

	Base year recalculation	Scope(s) recalculated	Base year emissions recalculation policy, including significance threshold	Past years' recalculation
Row 1	No, because the impact does not meet our significance threshold	<Not Applicable>	Although the emissions from offices and warehouses are insignificant (estimated to be approximately 1%) in comparison to the total emissions from the production and processing facilities of our operations (i.e. plantations, mills, refineries). Both business activities are relevant to our operations, hence the emissions are included in our boundary.	No

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

1119103

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 2 (location-based)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

212393

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 2 (market-based)

Base year start

January 1 2016

Base year end

December 31 2016

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 1: Purchased goods and services

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 2: Capital goods

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 4: Upstream transportation and distribution

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 5: Waste generated in operations

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 6: Business travel

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 7: Employee commuting

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 8: Upstream leased assets

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 9: Downstream transportation and distribution

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 10: Processing of sold products

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 11: Use of sold products

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 12: End of life treatment of sold products

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

We are presently working to account for our baseline emissions of Scope 1,2,3 emissions following the GHG Protocol covering our global operations and set emissions reduction roadmap and targets in line with the SBTi and SBTi FLAG framework. We will update the baseline figure once they are ready.

Scope 3 category 13: Downstream leased assets

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

Not relevant to our operations.

Scope 3 category 14: Franchises

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

Not relevant to our operations.

Scope 3 category 15: Investments

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

Not relevant to our operations.

Scope 3: Other (upstream)

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

Not relevant to our operations.

Scope 3: Other (downstream)

Base year start

January 1 2021

Base year end

December 31 2021

Base year emissions (metric tons CO2e)

0

Comment

Not relevant to our operations.

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

The Greenhouse Gas Protocol Agricultural Guidance: Interpreting the Corporate Accounting and Reporting Standard for the Agricultural Sector

The Greenhouse Gas Protocol: Scope 2 Guidance

The Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Standard

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO₂e?

Reporting year

Gross global Scope 1 emissions (metric tons CO₂e)

1514141

Start date

<Not Applicable>

End date

<Not Applicable>

Comment

The Scope 1 emissions are calculated in accordance with the methodology set out in the GHG Protocol Corporate Standard and the operational control approach to include all sources of emissions from its industrial sites, warehouses, distribution centers, and corporate vehicle fleet, by applying emissions factors and global warming potentials to the activity data. The global warming potentials used to characterize the impact of the emissions correspond to data in the IPCC Fifth Assessment Report (AR5).

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

The Scope 2 emissions are calculated in accordance with the methodology set out in the GHG Protocol Corporate Standard and the operational control approach to include all sources of emissions from its industrial sites, warehouses, and distribution centers by applying emissions factors and global warming potentials to the activity data. The global warming potentials used to characterize the impact of the emissions correspond to data in the IPCC Fifth Assessment Report (AR5).

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO₂e?

Reporting year

Scope 2, location-based

430914

Scope 2, market-based (if applicable)

455546

Start date

<Not Applicable>

End date

<Not Applicable>

Comment

N/A

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure?

No

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.**Purchased goods and services****Evaluation status**

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

37035367

Emissions calculation methodologyAverage data method
Spend-based method**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

Please explain

The emission calculated in this category includes the extraction, production, and transportation of goods and services purchased or acquired by Musim Mas. The emission is determined by gathering information on the mass or economic value of goods and services purchased and multiplying it by the appropriate secondary emission factor. The emission factors are derived from but are not limited to Ecoinvent 3.8, UK BEIS, and CEDA. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Capital goods**Evaluation status**

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

25981

Emissions calculation methodologyAverage data method
Spend-based method**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

Please explain

The emission in this category is calculated by gathering information on the mass or economic value of goods purchased and multiplying it by the appropriate secondary emission factor. The emission factors are derived from but are not limited to Ecoinvent 3.8, UK BEIS, and CEDA. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Fuel-and-energy-related activities (not included in Scope 1 or 2)**Evaluation status**

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

547008

Emissions calculation methodology

Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The emission in this category is calculated using emission factors for upstream emissions per unit of consumption. The emission factors are derived from but are not limited to Ecoinvent 3.8, UK BEIS and IEA. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Upstream transportation and distribution**Evaluation status**

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

546004

Emissions calculation methodology

Distance-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The emission in this category is determined using the mass, distance, and mode of transport, then applying the appropriate mass-distance emission factor. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Waste generated in operations

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

29107

Emissions calculation methodology

Average data method

Waste-type-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The amount of waste per type and waste treatment is gathered across all Musim Mas operations to determine the emission in this category. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Business travel

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1534

Emissions calculation methodology

Spend-based method

Distance-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

This category covers the emissions related to business travel for all Musim Mas employees from all countries. A mix of spending data and unit data is used to calculate emissions in this category. The related emission factors from UK BEIS and CEDA databases are applied. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Employee commuting

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

11725

Emissions calculation methodology

Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

This category includes the emissions associated to the commuting of employees from their homes to their worksites. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Upstream leased assets

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

6037

Emissions calculation methodology

Average data method

Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

A mix of spending data and unit data is used to calculate emissions in this category. The related emission factors from IEA and CEDA databases are applied. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

447015

Emissions calculation methodology

Distance-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The emission in this category is determined using the mass, distance, and mode of transport, then applying the appropriate mass-distance emission factor. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Processing of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

1122492

Emissions calculation methodology

Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The majority of Musim Mas's products are intermediate goods that will be further processed. The processing-related emissions are estimated by applying the relevant emission factor to each category of intermediate products sold. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Use of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

180101

Emissions calculation methodology

Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

This category includes the direct use-phase emissions of products sold by Musim Mas. The emissions are estimated by applying the relevant emission factor to each category of products sold. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

End of life treatment of sold products

Evaluation status

Relevant, calculated

Emissions in reporting year (metric tons CO2e)

5434

Emissions calculation methodology

Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

The emissions of this category are associated to the packaging of sold products. We are currently undergoing project to account our baseline emissions of Scope 1,2,3 following the SBTi and SBTi FLAG framework. The above figure is a preliminary calculation for our Scope 3 emissions.

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Not applicable as Musim Mas does not lease downstream assets.

Franchises

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Not applicable as Musim Mas does not own any franchises.

Investments

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Not applicable.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Not applicable as all upstream emissions are already included in the Scope 3 upstream categories explained above.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Please explain

Not applicable as all downstream emissions are already included in the Scope 3 downstream categories explained above.

C-AC6.8/C-FB6.8/C-PF6.8

(C-AC6.8/C-FB6.8/C-PF6.8) Is biogenic carbon pertaining to your direct operations relevant to your current CDP climate change disclosure?

Yes

C-AC6.8a/C-FB6.8a/C-PF6.8a

(C-AC6.8a/C-FB6.8a/C-PF6.8a) Account for biogenic carbon data pertaining to your direct operations and identify any exclusions.

CO2 emissions from land use management

Emissions (metric tons CO2)

1188566

Methodology

Default emissions factors

Please explain

The figure corresponds to the land conversion emissions in our upstream operations calculated using the RSPO PalmGHG.

CO2 removals from land use management

Emissions (metric tons CO2)

0

Methodology

Default emissions factors

Please explain

Musim Mas is annually audited against various sustainability schemes such as RSPO.

Sequestration during land use change

Emissions (metric tons CO2)

1118051

Methodology

Default emissions factors

Please explain

The figure corresponds to the crop sequestration in our upstream operations calculated using the RSPO PalmGHG.

CO2 emissions from biofuel combustion (land machinery)

Emissions (metric tons CO2)

6610

Methodology

Default emissions factors

Please explain

These emissions relate to biofuel consumption within our plantation operations.

CO2 emissions from biofuel combustion (processing/manufacturing machinery)

Emissions (metric tons CO2)

2852040

Methodology

Default emissions factors

Please explain

These emissions relate to biofuel consumption within our processing operations (mills, refineries, and oleochemicals).

CO2 emissions from biofuel combustion (other)

Emissions (metric tons CO2)

11212

Methodology

Default emissions factors

Please explain

These emissions relate to biofuel consumption within our non-processing operations (shipping and warehouses).

C-AC6.9/C-FB6.9/C-PF6.9

(C-AC6.9/C-FB6.9/C-PF6.9) Do you collect or calculate greenhouse gas emissions for each commodity reported as significant to your business in C-AC0.7/FB0.7/PF0.7?

Agricultural commodities

Palm Oil

Do you collect or calculate GHG emissions for this commodity?

Yes

Reporting emissions by

Total

Emissions (metric tons CO2e)

1945054

Denominator: unit of production

<Not Applicable>

Change from last reporting year

Lower

Please explain

Our emissions are lower than the previous year since there is a newly operated methane capture and lower consumption of fossil-based fuel in our processing facilities. The emissions are quantified using a calculator provided by the GHG Protocol.

Explain why you do not calculate GHG emission for this commodity and your plans to do so in the future

<Not Applicable>

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.00018

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

1945054

Metric denominator

unit total revenue

Metric denominator: Unit total

10800000000

Scope 2 figure used

Location-based

% change from previous year

12

Direction of change

Decreased

Reason(s) for change

Change in renewable energy consumption

Other emissions reduction activities

Change in revenue

Please explain

Our emissions are lower than the previous year (-5%) since there is a newly operated methane capture and lower consumption of fossil-based fuel in our processing facilities. Moreover, our revenue increased from \$10b to \$10.8b in 2022. Hence, a net reduction in the intensity of 12%.

Intensity figure

0.1

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

1945054

Metric denominator

metric ton of product

Metric denominator: Unit total

18711119

Scope 2 figure used

Location-based

% change from previous year

46

Direction of change

Decreased

Reason(s) for change

Change in renewable energy consumption

Other emissions reduction activities

Change in output

Please explain

Our emissions are lower than the previous year (-5%) since there is a newly operated methane capture and lower consumption of fossil-based fuel in our processing facilities. Moreover, our total output increased from 10,759,065 mt to 18,711,119 mt in 2022 due to alignment in the data collection of our processing facilities. Hence, a net reduction in the intensity of 46%.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	1085915	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	22726	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	376357	IPCC Fifth Assessment Report (AR5 – 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/area/region.

Country/area/region	Scope 1 emissions (metric tons CO2e)
Indonesia	1375886
Malaysia	15153
China	27
India	32779
Spain	31102
Netherlands	336
Italy	8362
Viet Nam	4113
Singapore	46353
Germany	30

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Plantations	366703
Palm Oil Mills	47309
Refineries and oleochemicals	999383
Jetties, ramps, warehouses	8540
Offices	999
Shipping	91207

C-AC7.4/C-FB7.4/C-PF7.4

(C-AC7.4/C-FB7.4/C-PF7.4) Do you include emissions pertaining to your business activity(ies) in your direct operations as part of your global gross Scope 1 figure?

Yes

C-AC7.4a/C-FB7.4a/C-PF7.4a

(C-AC7.4a/C-FB7.4a/C-PF7.4a) Select the form(s) in which you are reporting your agricultural/forestry emissions.

Emissions disaggregated by category (advised by the GHG Protocol)

C-AC7.4b/C-FB7.4b/C-PF7.4b

(C-AC7.4b/C-FB7.4b/C-PF7.4b) Report the Scope 1 emissions pertaining to your business activity(ies) and explain any exclusions. If applicable, disaggregate your agricultural/forestry by GHG emissions category.

Activity

Agriculture/Forestry

Emissions category

Mechanical

Emissions (metric tons CO2e)

19314

Methodology

Default emissions factor

Please explain

Following GHG protocol, the corresponding emissions refer to stationary and mobile combustions

Activity

Agriculture/Forestry

Emissions category

Non-mechanical

Emissions (metric tons CO2e)

347388

Methodology

Default emissions factor

Please explain

Following GHG protocol, the corresponding emissions refer to fertiliser application and peat oxidation

Activity

Processing/Manufacturing

Emissions category

Mechanical

Emissions (metric tons CO2e)

1029347

Methodology

Default emissions factor

Please explain

Following GHG protocol, the corresponding emissions refer to stationary and mobile combustions of our processing facilities

Activity

Processing/Manufacturing

Emissions category

Non-mechanical

Emissions (metric tons CO2e)

17345

Methodology

Default emissions factor

Please explain

Following GHG protocol, the corresponding emissions refer to wastewater from our processing facilities

Activity

Distribution

Emissions category

Mechanical

Emissions (metric tons CO2e)

91207

Methodology

Default emissions factor

Please explain

Following GHG protocol, the corresponding emissions refer to stationary and mobile combustions of our shipping facilities

Activity

Distribution

Emissions category

Non-mechanical

Emissions (metric tons CO2e)

9539

Methodology

Default emissions factor

Please explain

Following GHG protocol, the corresponding emissions refer to stationary and mobile combustions of our warehouses and offices.

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/area/region.

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Indonesia	383358	413557
Malaysia	7242	6505
China	1718	1704
India	14929	10637
Spain	11505	9910
Netherlands	7739	7252
Italy	2315	2525
Viet Nam	1971	3348
Singapore	65	51
Germany	18	24
United States of America	53	33
United Kingdom of Great Britain and Northern Ireland	0.6	0.4

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Plantations	0	0
Palm Oil Mills	0	0
Refineries and oleochemicals	429569	454178
Jetties, ramps, warehouses	782	843
Offices	438	386
Shipping	124	139

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

Yes

C7.7a

(C7.7a) Break down your gross Scope 1 and Scope 2 emissions by subsidiary.

Subsidiary name

Facility 1

Primary activity

Palm oil farming

Select the unique identifier(s) you are able to provide for this subsidiary

No unique identifier

ISIN code – bond

<Not Applicable>

ISIN code – equity

<Not Applicable>

CUSIP number

<Not Applicable>

Ticker symbol

<Not Applicable>

SEDOL code

<Not Applicable>

LEI number

<Not Applicable>

Other unique identifier

<Not Applicable>

Scope 1 emissions (metric tons CO2e)

105497

Scope 2, location-based emissions (metric tons CO2e)

0

Scope 2, market-based emissions (metric tons CO2e)

0

Comment

No purchase of electricity from the national grid (Scope 2 =0) as the power generated for the plantation is sourced through the electricity produced from the biogas of our own mills

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change in emissions	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	100000	Decreased	4.9	In 2022, our Scope 1+2 emissions decreased by 4.9%, due to the reduction of fossil-based fuel. Instead, our biomass, biodiesel, and natural gas consumption has increased in our operations. Through these activities, we estimate to reduce our emissions by 100,000 tons of CO2e. Our total Scope 1 and Scope 2 emissions in the previous year were 2,047,008 tons CO2e, therefore we arrived at -4.9% through $(-100,000/2,047,008) * 100 = -4.9\%$ decrease in emissions.
Other emissions reduction activities	11500	Decreased	0.6	In 2022, our Scope 1+2 emissions decreased by 0.6%, due to a newly operated methane capture plant in our operation. Previously treated aerobically (open pond), the wastewater is now treated anaerobically (closed pond) in methane capture facilities to produce electricity. Through these activities, we estimate to reduce our emissions by 11,500 tons of CO2e. Our total Scope 1 and Scope 2 emissions in the previous year were 2,047,008 tons CO2e, therefore we arrived at -0.6% through $(-11,500/2,047,008) * 100 = -0.6\%$ decrease in emissions.
Divestment	0	No change	0	Not applicable
Acquisitions	0	No change	0	Not applicable
Mergers	0	No change	0	Not applicable
Change in output	0	No change	0	Not applicable
Change in methodology	0	No change	0	Not applicable
Change in boundary	11000	Increased	0.55	As mentioned in the previous CDP 2022 disclosure, we have excluded offices and warehouse scopes in our disclosure as they are negligible. While negligible, both office and warehouse emissions are included back in the calculations since they are relevant to our operations. Thus, the calculated 11,000 tons of CO2e are added following the change in boundary (addition of office and warehouse emissions). Our total Scope 1 and Scope 2 emissions in the previous year were 2,047,008 tons CO2e, therefore we arrived at 0.55% through $(11,000/2,047,008) * 100 = 0.55\%$ increase in emissions.
Change in physical operating conditions	0	No change	0	Not applicable
Unidentified	0	No change	0	Not applicable
Other	0	No change	0	Not applicable

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Location-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	8709800	6152576	14862377
Consumption of purchased or acquired electricity	<Not Applicable>	0	568883	568883
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	8709800	6721459	15431259

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	Yes
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

Heating value

LHV

Total fuel MWh consumed by the organization

8709725

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

75989

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

8633737

Comment

N/A

Other biomass

Heating value

LHV

Total fuel MWh consumed by the organization

75

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

75

Comment

N/A

Other renewable fuels (e.g. renewable hydrogen)

Heating value

LHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

N/A

Coal

Heating value

LHV

Total fuel MWh consumed by the organization

4303347

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

4303347

Comment

N/A

Oil

Heating value

LHV

Total fuel MWh consumed by the organization

472319

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

250842

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

221478

Comment

N/A

Gas**Heating value**

LHV

Total fuel MWh consumed by the organization

1376910

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

1376910

Comment

N/A

Other non-renewable fuels (e.g. non-renewable hydrogen)**Heating value**

LHV

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

0

Comment

N/A

Total fuel**Heating value**

LHV

Total fuel MWh consumed by the organization

14862377

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

326830

MWh fuel consumed for self-generation of steam

0

MWh fuel consumed for self-generation of cooling

0

MWh fuel consumed for self- cogeneration or self-trigeneration

14535546

Comment

N/A

C8.2d**(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.**

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	5152546	5087441	3086939	3021834
Heat	326830	326830	75989	75989
Steam	7267773	7267773	4316906	4316906
Cooling	2180332	2180332	1295072	1295072

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Country/area of low-carbon energy consumption

Indonesia

Sourcing method

None (no active purchases of low-carbon electricity, heat, steam or cooling)

Energy carrier

<Not Applicable>

Low-carbon technology type

<Not Applicable>

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)

<Not Applicable>

Tracking instrument used

<Not Applicable>

Country/area of origin (generation) of the low-carbon energy or energy attribute

<Not Applicable>

Are you able to report the commissioning or re-powering year of the energy generation facility?

<Not Applicable>

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)

<Not Applicable>

Comment

We are currently exploring options in purchasing low-carbon electricity for our operations.

C8.2g

(C8.2g) Provide a breakdown by country/area of your non-fuel energy consumption in the reporting year.

Country/area

Indonesia

Consumption of purchased electricity (MWh)

473756

Consumption of self-generated electricity (MWh)

3018180

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

5866186

Total non-fuel energy consumption (MWh) [Auto-calculated]

9358122

Country/area

Malaysia

Consumption of purchased electricity (MWh)

10787

Consumption of self-generated electricity (MWh)

28530

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

51

Total non-fuel energy consumption (MWh) [Auto-calculated]

39368

Country/area

China

Consumption of purchased electricity (MWh)

2155

Consumption of self-generated electricity (MWh)

2

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

101

Total non-fuel energy consumption (MWh) [Auto-calculated]

2258

Country/area

India

Consumption of purchased electricity (MWh)

16121

Consumption of self-generated electricity (MWh)

67650

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

598

Total non-fuel energy consumption (MWh) [Auto-calculated]

84369

Country/area

Spain

Consumption of purchased electricity (MWh)

37679

Consumption of self-generated electricity (MWh)

5546

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

96

Total non-fuel energy consumption (MWh) [Auto-calculated]

43321

Country/area

Netherlands

Consumption of purchased electricity (MWh)

17560

Consumption of self-generated electricity (MWh)

455

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

158

Total non-fuel energy consumption (MWh) [Auto-calculated]

18173

Country/area

Italy

Consumption of purchased electricity (MWh)

6012

Consumption of self-generated electricity (MWh)

1493

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

7505

Country/area

Viet Nam

Consumption of purchased electricity (MWh)

4567

Consumption of self-generated electricity (MWh)

5160

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

87

Total non-fuel energy consumption (MWh) [Auto-calculated]

9814

Country/area

Singapore

Consumption of purchased electricity (MWh)

137

Consumption of self-generated electricity (MWh)

58617

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

58754

Country/area

Germany

Consumption of purchased electricity (MWh)

37

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

37

Country/area

United States of America

Consumption of purchased electricity (MWh)

65

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

65

Country/area

United Kingdom of Great Britain and Northern Ireland

Consumption of purchased electricity (MWh)

7

Consumption of self-generated electricity (MWh)

0

Is this electricity consumption excluded from your RE100 commitment?

<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)

0

Consumption of self-generated heat, steam, and cooling (MWh)

0

Total non-fuel energy consumption (MWh) [Auto-calculated]

7

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	No third-party verification or assurance
Scope 2 (location-based or market-based)	No third-party verification or assurance
Scope 3	No third-party verification or assurance

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and performance	Progress against emissions reduction target	ISAE 3000, Palm Oil Innovation Group (POIG), Roundtable on Sustainable Palm Oil (RSPO)	Our GHG calculation emission intensity for our 15 integrated mills is annually audited against RSPO principles and guidance and verified using ISAE 3000 standards. Progress toward the target of 55% emission intensity reduction by 2025 and emissions intensity baseline have been verified through POIG verification and annual EY assurance. FINAL-report-POIG-Remote-Audit-Musim-Mas-Group-2020.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

No, but we anticipate being regulated in the next three years

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

To sustain 1.5°C globally, the Indonesian government has set a Nationally Determined Contribution (NDC) and is to impose carbon tax on Industries including the Palm Oil sector as part of government commitment. In alignment with the 1.5C pathway, we have signed up for the Agriculture Sector Roadmap to 1.5C at COP27 in Egypt and are working on the decarbonization pathway following the SBTi and SBTi FLAG framework to set our near-term by 2030 and net-zero by 2050 targets. Among many sustainability initiatives, third-party certification schemes such as RSPO, ISCC, ISPO, and POIG are regarded as of high importance to our operations as these ensure continuous credibility and transparency of our sustainability practices. We will continue to achieve and maintain these certification schemes in our operations. Moreover, we also actively refresh our sustainability policy to follow the latest sustainability standards and requirements every 5 years. The scope of the Musim Mas Group Sustainability Policy encompasses all our operations and business units worldwide. To maintain relationships with our customers and other stakeholders, we communicate our sustainability progress, milestones, and targets through our annual sustainability policy and involve in partnerships such as the landscape approach in Aceh and Siak Pelalawan.

C11.2

(C11.2) Has your organization canceled any project-based carbon credits within the reporting year?

No

C11.3

(C11.3) Does your organization use an internal price on carbon?

No, but we anticipate doing so in the next two years

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers

Yes, our customers/clients

Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement

Engagement & incentivization (changing supplier behavior)

Details of engagement

Run an engagement campaign to educate suppliers about climate change
Provide training, support, and best practices on how to make credible renewable energy usage claims
Directly work with suppliers on exploring corporate renewable energy sourcing mechanisms

% of suppliers by number

100

% total procurement spend (direct and indirect)

100

% of supplier-related Scope 3 emissions as reported in C6.5

100

Rationale for the coverage of your engagement

As stipulated in our sustainability policy - Pillar 1, we provide training to our smallholders to enhance productivity, and good agricultural practices, and achieve compliance with standards, such as the RSPO. Engagement with smallholders can lead to an increase in yields (i.e. socialization on good agricultural practices), better access to national and international markets, improvement in livelihoods, and a reduction in the risk of land conversion. We also engage suppliers to adopt sustainability standards comprising Musim Mas' NDPE commitments. In line with our sustainability policy, we engage with all suppliers on our policy obligations and require them to: i) attend our NDPE workshops, ii) submit NDPE commitments, iii) complete the Musim Mas Self-Assessment Tool (SAT). Their commitments and progress will determine the success of our entire supply chain.

We use various monitoring methods such as Earthqualizer and RADD satellite monitoring platform to effectively monitor deforestation. As of 2022, we monitor more than nine million hectares across Indonesia and Malaysia covering all of our suppliers for deforestation and peat development. In case of complaints concerning breaches to our NDPE guidelines, Grievance Channels and Controlled Purchase Protocol (CPP) are available to resolve issues, secure remedy and remediation, and exclude errant suppliers as the last resort. If there is an allegation of NDPE violation across our supply chain, we will study the allegation through internal tools as well as publicly available tools such as satellite monitoring, GRAS, GFW, etc. If a breach of the NDPE policy is confirmed, we will engage with the relevant suppliers in question. Moreover, Musim Mas collaborates with Earthqualizer to monitor deforestation in all of our suppliers and own concessions with bi-weekly reports available.

Additionally, we also support and encourage our smallholders and third-party suppliers to pursue RSPO and ISPO certification by providing Agri practices knowledge. By doing this, we can work towards eliminating all deforestation and ensuring traceability within our supply chains.

Impact of engagement, including measures of success

Below are some of the impact progress following our engagement in 2022:

- 84% of our suppliers have completed their assessments. This evaluation enables suppliers to self-declare information about their operations which allows Musim Mas to identify potential risk areas at the mill level.
- 96% of suppliers have either an NDPE policy or adopted Musim Mas Sustainability Policy
- Achieve 100% traceability to mill since 2015 and 97% traceability to plantation as of December 2022. We are on track to achieve 100% full traceability to plantation by December 2025.
- To ensure credibility that Musim Mas's supply chain is in full and beyond compliance with the highest sustainability standards, Musim Mas aims to achieve 100% ISPO certification for our scheme smallholders by 2025. As of 2022, approximately 25% of scheme smallholders have obtained ISPO certification.
- In 2022, no suppliers were excluded due to commitment breaches.

As for the measures of success, we expect our suppliers to continue to maintain their adherence to our Sustainability Policy. In 2022, no suppliers are excluded due to commitment breaches.

Our Smallholders Program embeds valuable skills within the smallholders and communities through the Smallholders Hub approach. Instead of training the smallholders directly, we build greater capacity by training local government agricultural officers, also known as Village Extension Officers (VEOs). We train VEOs on Good Agricultural Practices (GAP) and No Deforestation, No Peat, and No Exploitation (NDPE) principles. These officers then share their expertise with independent smallholder farmers and equip them with the knowledge needed for responsible farming. In 2022, Musim Mas established 7 smallholder hubs across Kalimantan and Sumatra regions. In all, Musim Mas will continue to engage and socialize the importance of sustainability certification to relevant smallholders. For more information, please refer to <https://www.musimmas.com/sustainability/smallholders/independent-smallholders/>.

Comment

To see more of our sustainability progress and targets, please refer to our annual Sustainability Report (<https://www.musimmas.com/sustainability-report/>).

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement & Details of engagement

Education/information sharing	Run an engagement campaign to education customers about your climate change performance and strategy
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% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

100

Please explain the rationale for selecting this group of customers and scope of engagement

One of the key pillars of our sustainability policy is to maintain responsible and enduring relationships with suppliers, customers, and stakeholders. We maintain an open dialogue with all our customers and welcome constructive feedback to improve our operations. We strive to be transparent by keeping stakeholders informed on Group-wide matters. Information channels include our annual sustainability reports (<https://www.musimmas.com/sustainability-report/>), website announcements (<https://www.musimmas.com/newsroom/>), and the RSPO Annual Communication of Progress. We make information on all grievances publicly available and maintain an active social media presence to engage with our stakeholders online. We also continuously engage with our customers to support the identification and management of ESG topics, and their impacts, risks, and opportunities.

Moreover, we also collaborate with multiple stakeholders including the government, customers (i.e. Unilever, AAK), local NGOs, etc to partner in various landscape approaches, for example, the Aceh and Siak Pelalawan landscapes (<https://www.musimmas.com/aceh-report/> and <https://www.musimmas.com/landscapes/siak-and-pelalawan/>). Additionally, Musim Mas participates in many public assessments and benchmarking programs including CDP, Ecovadis, SPOTT, and PROPER to rate and communicate our sustainability commitments and progress at the highest level. Musim Mas also adopts various certification schemes such as RSPO, ISCC, POIG, etc where annual independent audits are conducted in our operations.

Impact of engagement, including measures of success

Certifications are an excellent way to demonstrate Musim Mas' progress to every actor along the supply chain. Certifications assure our customers and consumers that we honour our sustainability commitments and add value to the products that end up in customers' hands. In 2022, we continue to achieve full compliance with various schemes such as RSPO, ISCC, ISPO, ITSNC, MSPO, and POIG in our operations.

As for the measure of success, we annually assess our customer's KPI scorecard which includes various sustainability metrics such as NDPE commitments, traceability measures, and public assessment scorecard, and aim to achieve satisfactory predicate for all of our customers. In 2022, we received a Gold award in Ecovadis which improved from the silver in the previous year and will continue to participate in 2023.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

Musim Mas engages our value chains in multiple channels including the landscape initiatives. Through the landscape approach, we are working our toward a responsible supply chain, including setting targets for supplier engagement and independent smallholders. Below is our Landscape strategy for Aceh.

Aceh is home to five million Indonesians from over ten ethnic groups, and the Leuser Ecosystem, an ecological hotspot known for its biological diversity. The proximity to protected areas and ongoing deforestation alerts attest to Aceh's status as a high-risk landscape. As a company that strives to take the lead in sustainability, Musim Mas works to ensure that our NDPE policy is implemented. Leveraging on our business relationships as a bridge for engagement, we identified and prioritized districts where our third-party suppliers are located: Aceh Timur, Aceh Tamiang and Aceh Singkil. For this, Musim Mas collaborates with multiple stakeholders including IDH (the Sustainable Trade Initiative), the Government of Aceh, downstream actors (Unilever, PepsiCo), EQ, and suppliers, including those outside our supply chain to have the Aceh landscape verified as a sustainable, deforestation-free and traceable commodities producer.

The Aceh landscape covers 142 villages with 42,644 oil palm farmers in Aceh Singkil, Aceh Selatan, Subulussalam and Aceh Tamiang. Align with our sustainability policy, Musim Mas engages closely with third-party suppliers, independent smallholders and stakeholders in three priority areas — Aceh Tamiang, Subulussalam and Aceh Singkil — to address risks of encroachment into the Leuser Ecosystem, specifically in Aceh Tamiang and the South Aceh region. For this, Musim Mas collaborates with IDH (the Sustainable Trade Initiative), the Government of Aceh, Forum Konservasi Leuser (FKL), Pusat Unggulan Perkebunan Lestari (PUPL), downstream actors (Unilever, PepsiCo, General Mills, Nestle, AAK), local civil society organizations (Earthqualizer & Earthworm Foundation) and suppliers, including those outside our supply chain to have Aceh Tamiang verified as a deforestation-free and traceable commodities producer. As a part of the program, Smallholder Hub was established to help village extension officers to build the capacity to deliver training to independent smallholders in their area. Moreover, the initiative assists villages in developing land use plans via a participatory planning approach and assists in the planning and drafting of village policy in Aceh Singkil and the South Aceh district.

Musim Mas's Aceh strategy comprises of three main objectives. Firstly, the engagement objective entails outreach to smallholders and mills to convey NDPE requirements and the possible consequences of non-compliance through Suppliers Workshops and our Smallholders Hub Program. Topics such as NDPE Policy, Traceability to Plantation (TTP), Self-Assessment Tool (SAT) requirements, capacity building, Good Agricultural Practices (GAP), financial literacy and certification requirements are covered. Secondly, the Assurance objective has components to ensure that the mills supplying crude palm oil and palm kernels to Musim Mas are NDPE compliant. We will use the NDP Risk management framework to build on the Assurance component laid out in our Aceh Strategy. Finally, the Monitoring and Response objective contains proactive elements to detect and verify deforestation at the landscape or jurisdictional level. Methods used include deforestation monitoring platforms (i.e. RADD, EQs) and outreach programs to external stakeholders to collaborate and tackle issues on the ground. All three objectives have a stated set of measurable targets to indicate progress. For example, since 2021, all Aceh suppliers participated in Musim Mas' supplier workshops with 100% of our suppliers in Aceh have since committed to our Musim Mas NDPE policy. Moreover, We have trained 265 village extension officers and 3,857 independent smallholders across our three Smallholders Hubs in Aceh Tamiang, Aceh Singkil, and Subulussalam. Following our NDP Risk Management Framework, 77.42% risk-based traceability was conducted for Aceh. For more information, please refer to <https://www.musimmas.com/aceh-report/> and <https://www.musimmas.com/sustainability-report/>.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

Yes, climate-related requirements are included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement

Complying with regulatory requirements

Description of this climate related requirement

In line with our sustainability policy, engaging with suppliers to adopt sustainability standards comprising Musim Mas' NDPE commitments is at the forefront of our efforts. We engage with all suppliers on our policy obligations and require them to: i) attend our NDPE workshops, ii) submit NDPE commitments, iii) complete the Musim Mas Self-Assessment Tool (SAT). Their commitments and progress will determine the success of our entire supply chain.

We use various monitoring methods such as Earthqualizer and RADD satellite monitoring platform to effectively monitor deforestation. As of 2022, we monitor more than nine million hectares across Indonesia and Malaysia covering all of our suppliers for deforestation and peat development.

In case of complaints concerning breaches to our NDPE guidelines, Grievance Channels and Controlled Purchase Protocol (CPP) are available to resolve issues, secure remedy and remediation, and exclude errant suppliers as the last resort. If there is an allegation of NDPE violation across our supply chain, we will study the allegation through internal tools as well as publicly available tools such as satellite monitoring, GRAS, GFW, etc. If a breach of the NDPE policy is confirmed, we will engage with the relevant suppliers in question. Moreover, Musim Mas collaborates with Earthqualizer to monitor deforestation in all of our suppliers and own concessions with bi-weekly reports available. In 2022, no suppliers were excluded due to commitment breaches.

% suppliers by procurement spend that have to comply with this climate-related requirement

100

% suppliers by procurement spend in compliance with this climate-related requirement

100

Mechanisms for monitoring compliance with this climate-related requirement

Certification

Supplier self-assessment

Grievance mechanism/Whistleblowing hotline

Supplier scorecard or rating

Response to supplier non-compliance with this climate-related requirement

Retain and engage

C-AC12.2/C-FB12.2/C-PF12.2

(C-AC12.2/C-FB12.2/C-PF12.2) Do you encourage your suppliers to undertake any agricultural or forest management practices with climate change mitigation and/or adaptation benefits?

Yes

C-AC12.2a/C-FB12.2a/C-PF12.2a

(C-AC12.2a/C-FB12.2a/C-PF12.2a) Specify which agricultural or forest management practices with climate change mitigation and/or adaptation benefits you encourage your suppliers to undertake and describe your role in the implementation of each practice.

Management practice reference number

MP1

Management practice

Knowledge sharing

Description of management practice

We frequently hold socialization with our FFB suppliers, in which we share our knowledge about good agricultural practices and environmental awareness.

Your role in the implementation

Knowledge sharing

Operational

Explanation of how you encourage implementation

We collect suppliers' data. These data will be used as a basis to effectively socialize with the suppliers to achieve a higher production rate and efficient usage of fertilizer. Using our own plantations as a case study, we share that it is not necessary to use higher usage (i.e. fuel, water, fertilizers, pesticides, etc.) as long as good agricultural practices are implemented. The reduction in these usages will directly result in lower direct cost, which would be favourable to our suppliers and environment. Method of engagement includes but are not limited to training and workshops on NDPE commitments as well as Musim Mas Self-Assessment Tool. As of December 2022, we have achieved 97% TTP with 84% of our suppliers have completed their assessments.

Climate change related benefit

Emissions reductions (mitigation)

Reduced demand for fossil fuel (adaptation)

Reduced demand for fertilizers (adaptation)

Reduced demand for pesticides (adaptation)

Comment

Reduction of agricultural inputs will directly translate to lower GHG emission.

Management practice reference number

MP2

Management practice

Diversifying farmer income

Description of management practice

We encourage our FFB suppliers to be RSPO and ISPO certified. RSPO certification could widen their market to reach big companies which require Sustainability Certification, such as RSPO. This could directly increase their income as RSPO certified FFBs has premium price.

Your role in the implementation

Procurement

Explanation of how you encourage implementation

Musim Mas fully supports and encourages our smallholders and third-party suppliers to pursue RSPO certification by providing Agri practices knowledge. As of 2022, we have socialized and trained more than 40,700 independent smallholders with 3,537 smallholders achieving RSPO certification. For more information on our smallholders' program, please refer to <https://www.musimmas.com/smallholders/>.

Climate change related benefit

Emissions reductions (mitigation)

Increasing resilience to climate change (adaptation)

Reduced demand for fertilizers (adaptation)

Reduced demand for pesticides (adaptation)

Comment

RSPO requires its smallholder members to identify their emission hotspots and establish mitigation plans to reduce the impact of the identified hotspots.

C-AC12.2b/C-FB12.2b/C-PF12.2b

(C-AC12.2b/C-FB12.2b/C-PF12.2b) Do you collect information from your suppliers about the outcomes of any implemented agricultural/forest management practices you have encouraged?

Yes

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

Yes

Attach commitment or position statement(s)

Agriculture Sector Roadmap to 1.5°C

Agriculture-Sector-Roadmap-January-2023_compressed-compressed.pdf

Describe the process(es) your organization has in place to ensure that your external engagement activities are consistent with your climate commitments and/or climate transition plan

As a member of the HCSA, FFA, GAPKI, POIG, RSPO, ISPO, and ISCC, Musim Mas is extensively involved with the latest climate-related issues and standards in the palm oil sector. As such, Musim Mas has been actively involved in the RSPO over the years, co-chaired the Biodiversity and HCV working group, the Compensation task force, and currently sits on the board of the RSPO. Moreover, we are part of the High Carbon Stock Approach Executive Committee. In turn, this extensive engagement and involvement have shaped our sustainability policy to the highest standards. Accordingly, sustainability achievements such as full and beyond compliance with international certification schemes including RSPO, ISCC, POIG, MSPO, ISPO, and ITSNC principles and guidelines have been fully maintained and recently received a gold rating for our Ecovadis assessments.

Following the commitments made at COP26, over the past year, the Tropical Forest Alliance, hosted by the World Economic Forum, with support from the World Business Council for Sustainable Development, has facilitated the process for the agricultural commodity companies to develop the Agriculture Sector Roadmap to 1.5°C. The Agriculture Sector Roadmap to 1.5°C, released at COP27 in Egypt, represents a sector-wide plan for addressing forest loss in supply chains and accelerating collaboration with others to achieve that goal. It commits the companies to implement time-bound plans and report publicly on their progress towards the targets on an annual basis. It also outlines how signatories will engage and collaborate with other stakeholders, namely governments, supply chain actors, and financial institutions, for wider support of the roadmap's commitments. This includes strengthening policies and regulations and incentivizing farmers and ranchers to protect natural resources. Together with other world's largest agri-commodity traders and processors, Musim Mas has signed up to the COP 27 Agriculture sector roadmap in 2022.

Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

C12.3a

(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?

Specify the policy, law, or regulation on which your organization is engaging with policy makers

Agriculture Sector Roadmap to 1.5°C

Category of policy, law, or regulation that may impact the climate

Climate change adaptation

Focus area of policy, law, or regulation that may impact the climate

International agreement related to climate change adaptation

Policy, law, or regulation geographic coverage

Global

Country/area/region the policy, law, or regulation applies to

<Not Applicable>

Your organization's position on the policy, law, or regulation

Support with no exceptions

Description of engagement with policy makers

Following the commitments made at COP26, over the past year, the Tropical Forest Alliance, hosted by the World Economic Forum, with support from the World Business Council for Sustainable Development, has facilitated the process for the agricultural commodity companies to develop the Agriculture Sector Roadmap to 1.5°C. The Agriculture Sector Roadmap to 1.5°C, released at COP27 in Egypt, represents a sector-wide plan for addressing forest loss in supply chains and accelerating collaboration with others to achieve that goal. It commits the companies to implement time-bound plans and report publicly on their progress towards the targets on an annual basis. It also outlines how signatories will engage and collaborate with other stakeholders, namely governments, supply chain actors, and financial institutions, for wider support of the roadmap's commitments. This includes strengthening policies and regulations and incentivizing farmers and ranchers to protect natural resources. Together with other world's largest agri-commodity traders and processors, Musim Mas has signed up to the COP 27 Agriculture sector roadmap.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation

<Not Applicable>

Have you evaluated whether your organization's engagement on this policy, law, or regulation is aligned with the goals of the Paris Agreement?

Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?

<Not Applicable>

C12.4

(C12.4) Have you published information about your organization’s response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In mainstream reports

Status

Underway – previous year attached

Attach the document

Musim-Mas-SR2021.pdf

Page/Section reference

Pillar 2: Deliver Positive Environmental Impacts - pg 39

Content elements

- Governance
- Strategy
- Risks & opportunities
- Emissions figures
- Emission targets

Comment

Musim Mas annually published our sustainability report. The upcoming 2022 Sustainability Report has not been published at the time of CDP submission.

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization’s role within each framework, initiative and/or commitment
Row 1	International Sustainability & Carbon Certification (ISCC) UN Global Compact	Since September 2022, Musim Mas is a member of the UN Global Compact (UNGC). Moreover, we actively participate in the ISCC Working Group where our operations are also in compliance with the ISCC certifications.

C13. Other land management impacts

C-AC13.1/C-FB13.1/C-PF13.1

(C-AC13.1/C-FB13.1/C-PF13.1) Do you know if any of the management practices implemented on your own land disclosed in C-AC4.4a/C-FB4.4a/C-PF4.4a have other impacts besides climate change mitigation/adaptation?

Yes

C-AC13.1a/C-FB13.1a/C-PF13.1a

(C-AC13.1a/C-FB13.1a/C-PF13.1a) Provide details on those management practices that have other impacts besides climate change mitigation/adaptation and on your management response.

Management practice reference number

MP1

Overall effect

Positive

Which of the following has been impacted?

Biodiversity

Description of impact

We have established high conservation value (HCV) areas to protect and preserve biodiversity and as a part of the certification processes. The establishment of HCV areas imparts a positive impact on the biodiversity of the area compared to areas without HCV. As of 2022, approximately 28,000 hectares have been set aside for conservation in our own operations and more than 9 million hectares are monitored daily covering most of our supplier's concessions. Through these monitoring systems, if our supplier is found to be non-compliant with the NDPE policy, we will engage with the supplier in question and implement our Controlled Purchase Protocol (CPP). In 2021, no supplier was excluded due to NDPE commitment breaches.

Have you implemented any response(s) to these impacts?

Yes

Description of the response(s)

Following our sustainability policy, Musim Mas's commitment to conserve and preserve both biodiversity and the environment has been long-standing and will only continue to become our utmost priorities. As a member of the Palm Oil Innovation Group (POIG), the Roundtable on Sustainable Palm Oil (RSPO), Indonesian Sustainability Palm Oil (ISPO), and International Sustainability and Carbon Certification (ISCC), Musim Mas pledge to No Deforestation of High Carbon Stock (HCS) forests, No Conversion of High Conservation Value (HCV) areas, No Developments on Peatlands regardless of depth, and No Burning policy. Through combination methods such as the Earthqualizer platform, RADD partnership, ground-truthing, and satellite, we monitor more than 9 million hectares. Furthermore, we also monitor hotspots and extreme weather on daily basis using data obtained from NOAA, MODIS and VIIRS to mitigate fire risk and floods in our concession and surroundings. For more information, please refer to <https://www.musimmas.com/sustainability/environmental-protection/>.

Management practice reference number

MP2

Overall effect

Positive

Which of the following has been impacted?

Water

Description of impact

Our usage of N-fertilizer is decreased due to usage of organic fertilizer substitute. Therefore, this would reduce the eutrophication impact.

Have you implemented any response(s) to these impacts?

Yes

Description of the response(s)

In all plantation and mill processes, we implement the '4Rs' to manage waste: reduce, reuse, recycle, and recover. At our plantations, old palm tree fronds and trunks are mulched and applied as organic fertilizer. Additionally, dried decanter solids and boiler ash are applied at plantations as organic fertilizer and POME is treated and applied to land as irrigation.

Management practice reference number

MP3

Overall effect

Positive

Which of the following has been impacted?

Soil

Description of impact

The implementation of Integrated Pest Management (IPM) to reduce reliance on pesticides and herbicides, thus, contributes to a lower soil ecotoxicity.

Have you implemented any response(s) to these impacts?

Yes

Description of the response(s)

We track the use of pesticides at our estates and monitor toxicity levels. We have found that our current range of 400 -600 toxicity units per hectare is closely aligned with best practices in the palm oil industry.

C-AC13.2/C-FB13.2/C-PF13.2

(C-AC13.2/C-FB13.2/C-PF13.2) Do you know if any of the management practices mentioned in C-AC12.2a/C-FB12.2a/C-PF12.2a that were implemented by your suppliers have other impacts besides climate change mitigation/adaptation?

Yes

C-AC13.2a/C-FB13.2a/C-PF13.2a

(C-AC13.2a/C-FB13.2a/C-PF13.2a) Provide details of those management practices implemented by your suppliers that have other impacts besides climate change mitigation/adaptation.

Management practice reference number

MP1

Overall effect

Positive

Which of the following has been impacted?

Soil

Water

Description of impacts

Through sharing knowledge of best Agriculture practices, our suppliers become more efficient in the usage of fertilizer, pesticides, etc. The reduction in both fertilizers and pesticides would not only lower the eutrophication and ecotoxicity impact but also be financially beneficial to our suppliers.

Have any response to these impacts been implemented?

Yes

Description of the response(s)

We are collecting suppliers' usage data. These data will be used as a basis to effectively socialise toward suppliers to achieve higher production rates, efficient usage of fertilizer, etc. Using our own plantations as a case study, we share that it is not necessary to use higher usage (i.e. fuel, water, fertilisers, pesticides, etc.) as long as good agricultural practices are implemented. The reduction in these usages will directly result in lower direct cost, which would be favourable by our suppliers. Method of engagement includes but is not limited to training and workshops on NDPE commitments, Musim Mas Self-Assessment Tool. For more information, please refer to <https://www.musimmas.com/sustainability/third-party-suppliers/>.

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	Yes, both board-level oversight and executive management-level responsibility	The board, senior management, and relevant sustainability teams meet quarterly to assess and review key ESG issues including overseeing and monitoring climate-related risks and opportunities such as deforestation, landscape restoration, conservation, biodiversity, and wildlife protection. Our NDP Risk Management Framework report was published detailing the approach used in addressing the risks of deforestation and peat development on existing concession areas of our operations and those of our suppliers in 2021. We conduct traceability exercise where we achieved 97% traceability to plantation (up from 94% in 2021) to mitigate NDPE risk. We are on track to reach 100% traceability to plantation by 2025. In 2022, we published the Biodiversity and Climate Resiliency Action Plan outlining our efforts and targets within our own operations and global supply chain to address biodiversity conservation that is linked to the context of global climate change.	<Not Applicable>

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Commitment to not explore or develop in legally designated protected areas Commitment to respect legally designated protected areas Commitment to avoidance of negative impacts on threatened and protected species Commitment to no conversion of High Conservation Value areas Commitment to secure Free, Prior and Informed Consent (FPIC) of Indigenous Peoples Commitment to no trade of CITES listed species	SDG

C15.3

(C15.3) Does your organization assess the impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment

No, but we plan to within the next two years

Value chain stage(s) covered

<Not Applicable>

Portfolio activity

<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity

<Not Applicable>

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)

<Not Applicable>

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment

No, but we plan to within the next two years

Value chain stage(s) covered

<Not Applicable>

Portfolio activity

<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity

<Not Applicable>

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)

<Not Applicable>

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity- sensitive areas in the reporting year?

No

C15.5

(C15.5) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Species management Education & awareness Law & policy Livelihood, economic & other incentives

C15.6

(C15.6) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	Yes, we use indicators	State and benefit indicators Response indicators

C15.7

(C15.7) Have you published information about your organization’s response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments Impacts on biodiversity Details on biodiversity indicators Biodiversity strategy	1. Biodiversity and Climate Resiliency Action Plan 2. Sustainability Report Musim-Mas-SR2021.pdf Musim-Mas-Biodiversity-and-Climate-Resiliency-Action-Plan-2022.pdf

C16. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

N/A

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Director of Sustainability	Director on board

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

Dear Customers,

Please refer to our website (www.musimmas.com) for latest update of our business. Most the information requested in supply chain module are available in our Sustainability Report, Sustainability Policy, Sustainability Journal, and many different sections on our website that can be accessed publicly. We herewith encourage you to check our website to get latest information and updates on business and development.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	10800000000

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

N/A

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Diversity of product lines makes accurately accounting for each product/product line cost ineffective	We are in the progress to conduct Life Cycle Analysis (LCA) study up to downstream operations to meet customers' inquiries.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

We would need to engage our customers and obtain necessary information on their business and product lines.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

Please select

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

No, I am not providing data

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below

I have read and accept the applicable Terms