Musim Mas Holdings Pte Ltd - Water Security 2023

W0. Introduction

W0.1

(W0.1) Give a general description of 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.

W-FB0.1a/W-AC0.1a

(W-FB0.1a/W-AC0.1a) Which activities in the food, beverage, and tobacco and/or agricultural commodities sectors does your organization engage in?

Agriculture
Processing/Manufacturing
Distribution

W0.2

(W0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date
Reporting year	January 1 2022	December 31 2022

W0.3

(W0.3) 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

W0.4

(W0.4) Select the currency used for all financial information disclosed throughout your response.

USD

W0.5

(W0.5) Select the option that best describes the reporting boundary for companies, entities, or groups for which water impacts on your business are being reported.

Companies, entities or groups over which operational control is exercised

W0.6

(W0.6) Within this boundary, are there any geographies, facilities, water aspects, or other exclusions from your disclosure?

Yes

W0.6a

(W0.6a) Please report the exclusions.

Exclusion	Please explain
Water usage in offices, warehouses, and shipping	The water usage in offices, warehouses, and shipping is estimated to be less than 1% of our total group water usage, thus exclusion of these data is not significant for this disclosure. Moreover, water usage in offices, warehouses, and shipping is mainly associated with WASH activities and is not substantial. Currently, we focus primarily on water inputs and outputs related to our upstream and industrial activities.

W0.7

(W0.7) 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

W1. Current state

W1.1

(W1.1) Rate the importance (current and future) of water quality and water quantity to the success of your business.

	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of good quality freshwater available for use	Important	Important	Direct primary use: While our plantations are mostly dependent on rainfall, good quality water is demanded by our palm oil mills and downstream operations (manufacturing sites that produce derivative products from palm oil). In general, water is required for plant utilities, cleaning purposes, and process input in daily productions. Rationale: Since these water usages are demanded by our daily operational, thus, an important rating is set for both the quantity and quality of water. Future water dependency: We expect our dependency on water will continue to be important since our core processes and product line will remain the same. However, improvement measures such as boosting the efficiency of processes and machinery will help in minimizing our water usage. Indirect primary use: Sufficient amounts of good quality freshwater is also important for our suppliers' operations. For example, water is required to produce fertilizers that we purchase to support the operations of our palm oil plantation. Rationale: An important rating is set for this category considering that water is required in our supply chain. Future water dependency: Recognizing that good quality water is a finite global resource, we expect our suppliers' water dependency to decrease in the future.
Sufficient amounts of recycled, brackish and/or produced water available for use	Important	Not very important	Direct primary use: We use treated seawater in our downstream operations. In general, water is required for plant utilities, cleaning purposes, and process input in daily operations. Rationale: Since these water usages are demanded by our daily operational, thus, an important rating is set for both the quantity and quality of water. Future water dependency: Our dependency on recycled, brackish, and/or produced water is expected to increase in the future as we are transitioning to be more sustainable in water use. Indirect primary use: Currently, suppliers' usage of recycled, brackish, and produced water is ranked to be not very important considering these water usages are only applicable to our own operations. Future water dependency: As we are moving forward in our sustainability journey, we expect for our suppliers' dependency on recycled water will increase in the future.

W-FB1.1a/W-AC1.1a

(W-FB1.1a/W-AC1.1a) Which water-intensive agricultural commodities that your organization produces and/or sources are the most significant to your business by revenue? Select up to five.

Agricultural commodities	% of revenue dependent on these agricultural commodities	Produced and/or sourced	Please explain
Palm oil	More than 80%	Both	Musim Mas Group is a fully integrated palm oil corporation, our business activities run the gamut of the palm oil supply chain including: • Managing oil palm plantations to produce fresh fruit bunch (FFB) • Milling oil palm fruits to produce crude palm oil (CPO) and Palm Kernel (PK) • Crushing PK to obtain crude palm kernel oil (PKO) • Refining CPO and PKO • Further processing to produce value-added products such as specialty fats, oleochemicals, biodiesel, soap, palm wax, and functional products such as emulsifiers • Manufacturing consumer goods such as cooking oil and personal care products • Shipping and merchandising value-added products to global destinations Our daily operation requires water for its production. Oil palm plantations, for example, are mostly dependent on rainfall to maintain FFB yields. As for the mills and downstream operations, good quality water is demanded to produce CPO and its derivatives such as biodiesel, soap, palm wax, etc.

W1.2

(W1.2) Across all your operations, what proportion of the following water aspects are regularly measured and monitored?

	% of sites/facilities/operations	Frequency of measurement	Method of measurement	Please explain
Water withdrawals – total volumes	100%	Continuously	Water withdrawn is measured in real-time using flow meters set in each processing unit.	Water is an important input for our operations. Monitoring of water use is regularly conducted in all of our operations which refer to our processing units starting from plantations, mills, refineries, to downstream units such as biodiesel plants, oleochemicals and specialty fats, etc.
Water withdrawals – volumes by source	100%	Continuously	In our operations, water withdrawals data are divided based on its source, e.g. river basin, groundwater, third party, etc. Water withdrawn is measured continuously using flow meters.	Monitoring of water use per withdrawal source is regularly conducted to assess and review our water management in all of our operations.
Entrained water associated with your metals & mining and/or coal sector activities - total volumes [only metals and mining and coal sectors]	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Produced water associated with your oil & gas sector activities - total volumes [only oil and gas sector]	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Water withdrawals quality	100%	Daily	Good quality water is demanded by our operations. For this, water withdrawals quality such as pH and turbidity is directly measured on a daily basis using various tools such as pH meter, turbidity meter, etc.	In our operations, we performed water withdrawals quality tests regularly. For instance, the water withdrawn in our mills is stored in a water pond to sediment any unwanted impurities and solid particles. The water stored in the pond is then sent to a water treatment plant where the water quality is improved to achieve the standard to be used for mill processing (e.g. for boiler, cleaning, etc). Water quality parameters such as pH, turbidity, and total dissolved solids (TDS) are monitored daily by our quality control team.
Water discharges – total volumes	100%	Continuously	Water discharge volume is measured in real-time using flow meters set in each processing units.	100% of our processing units monitor the water discharged from their operations. This figure is used to monitor our water consumption in our operations.
Water discharges – volumes by destination	100%	Continuously	Flow meter is used to continuously measure the volume of water discharge.	All of our operations measure the volume of water discharged by destination including to third party, groundwater, etc. This figure is used to assess and review our water management in our operations.
Water discharges – volumes by treatment method	100%	Continuously	Flow meter is used to continuously measure the volume of water discharge.	Each of our operations could have a different treatment methodology depending on the processes involved. The water discharges by treatment method are monitored in all of our operations. This figure is used to assess and review our water management in our operations.
Water discharge quality – by standard effluent parameters	100%	Monthly	Water discharge quality is evaluated using accredited and independent lab testing.	Our production facilities are required by law to measure the quality of the effluent discharged to municipal treatment plants. Following the applicable regulations, our palm oil mills monthly evaluate the wastewater quality using external lab testing to ensure that the biological oxygen demand (BOD) and chemical oxygen demand (COD) levels do not exceed the threshold set by the regulation and to avoid any adverse impact on the environment.
Water discharge quality – emissions to water (nitrates, phosphates, pesticides, and/or other priority substances)	100%	Monthly	Water pollutants such as nitrates, phosphate, BOD and COD are measured regularly through accredited and independent lab testing to ensure compliance to environmental standards.	In line with our Sustainability Policy, Musim Mas complies with regulations related to emissions to water and establishes procedures in monitoring and managing water discharge quality. For example, our mills operations conduct BOD and COD testing every month whereas our plantation units annually conduct phosphate and nitrates testing in both the inlet and outlet of relevant freshwater ensuring the quality of the freshwater.
Water discharge quality – temperature	Not relevant	<Not Applicable>	<Not Applicable>	Not relevant since the water discharge temperature is already the same temperature as the ambient temperature. This aspect is considered not relevant in the future as the setting of our mills operations have matured.
Water consumption – total volume	100%	Continuously	Water consumption is measured for all of our operations by subtracting water withdrawn with water discharge.	Regular monitoring of water consumption is conducted following our continuous measurement of water withdrawal and discharge.
Water recycled/reused	100%	Continuously	Our plantations reuse water from our palm oil mills as land application. Flow meter is set to measure the volume of water reused continuously.	Wastewater from the palm oil mill namely Palm Oil Mill Effluent (POME) is reused for land application to the plantations. Before being reused for land application, the wastewater is treated to reduce the biological oxygen demand (BOD) and chemical oxygen demand (COD) levels below the regulatory threshold.
The provision of fully-functioning, safely managed WASH services to all workers	100%	Continuously	We use an Excel tool to properly document our WASH services for employees.	We provide free clean water to all our employees and their households. Through our water allocation system, we ensure that every individual receives 120 litres of water per day which – goes beyond recommended requirements by the Indonesian government and the World Health Organization (of 50-100 litres). We also have drilled wells for communities to gain access to water in their vicinity for general-purpose use and not for consumption because drinking water has been provided by the government through a public company. We partner with public health officials to monitor the quality of the water from wells to track the potential risk of contamination or other issues. There have been no cases of contamination. We have also built toilets for communities and conducted 'socialization workshops' to raise the importance of hygiene and proper sanitation.

W1.2b

(W1.2b) What are the total volumes of water withdrawn, discharged, and consumed across all your operations, how do they compare to the previous reporting year, and how are they forecasted to change?

	Volume (megaliters/year)	Comparison with previous reporting year	Primary reason for comparison with previous reporting year	Five-year forecast	Primary reason for forecast	Please explain
Total withdrawals	26881	About the same	Other, please specify (Similar operational setting)	Lower	Increase/decrease in efficiency	Methodology: To calculate the total water withdrawals, we add up the water usage from all of our operations. This data is obtained from flow meter readings installed in each processing unit. Changes: The volume of water remains stable as the activities do not differ from the past year. Future trend: Following our sustainability policy which outlines our commitment to managing water efficiently, the water withdrawal from our operations should reduce over time (five-year forecast). On that note, the figure may also fluctuate depending on the upstream activities such as replanting and seedling.
Total discharges	9722	Lower	Other, please specify (Improvement in data collection)	Lower	Increase/decrease in efficiency	Methodology: Water discharges from all of our operations are added up to form the total volume. Changes: The total discharges reported this year decreased from last year's reporting due to improvements in our data collection. The volume was collected from flow meter readings in 2022. Future trend: Following our sustainability policy which outlines our commitment to managing water efficiently, the water discharge from our operations should reduce over time (five-year forecast) following the anticipation of installing a closed-loop recycling system.
Total consumption	17159	About the same	Other, please specify (Similar operational setting)	Lower	Increase/decrease in efficiency	Methodology: Following the guidance, the figure is derived from Withdrawal (W) minus Discharge (D). Changes: The volume of water remains consistent as there have been no significant differences in activities compared to the previous year. Future trend: Through our sustainability policy which outlines our commitment to managing water efficiently, we expect to reduce our water consumption over time (five-year forecast).

W1.2d

(W1.2d) Indicate whether water is withdrawn from areas with water stress, provide the proportion, how it compares with the previous reporting year, and how it is forecasted to change.

	Withdrawals are from areas with water stress	% withdrawn from areas with water stress	Comparison with previous reporting year	Primary reason for comparison with previous reporting year	Five-year forecast	Primary reason for forecast	Identification tool	Please explain
Row 1	No	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>	WRI Aqueduct	DESCRIPTION OF THE TOOL USED WRI Aqueduct is used to determine whether the commodity produced is from water-stressed countries. WRI Aqueduct provides a Water Risk Atlas which maps water risks such as water stress, floods, and droughts using open-source and peer-reviewed data. DEFINITION AND IDENTIFICATION OF WATER STRESS Water stress is defined as the ratio of total water withdrawals to the available renewable surface and groundwater supplies (WRI Aqueduct, 2019). Areas with a ratio of more than 40% are classified as high water stress. All Musim Mas upstream operations are located in the Sumatra and Kalimantan regions of Indonesia. Using the Water Risk Atlas provided by the WRI Aqueduct, it can be seen that the water withdrawn for our upstream operations is sourced from areas free from water stress.

W-FB1.2e/W-AC1.2e

(W-FB1.2e/W-AC1.2e) For each commodity reported in question W-FB1.1a/W-AC1.1a, do you know the proportion that is produced/sourced from areas with water stress?

Agricultural commodities	The proportion of this commodity produced in areas with water stress is known	The proportion of this commodity sourced from areas with water stress is known	Please explain
Palm oil	Yes	Yes	Our upstream operations and suppliers are located in Indonesia, especially in Sumatra and Kalimantan. Using the WRI Aqueduct Water Risk Atlas tool, we assess our production and sourcing area to check whether they are located in water stress areas. From our assessment, these locations are free from water stress.

W-FB1.2f/W-AC1.2f

(W-FB1.2f/W-AC1.2f) What proportion of the produced agricultural commodities reported in W-FB1.1a/W-AC1.1a originate from areas with water stress?

Agricultural commodities	% of total agricultural commodity produced in areas with water stress	Please explain
Palm oil	0%	FUTURE TREND All Musim Mas upstream operations are located in Sumatera and Kalimantan regions which are free from water stress. Taking the business-as-usual scenario, the WRI Aqueduct Water Risk Atlas estimated that the water stress in those regions is likely to increase 1-1.4x in 2030. HOW THE METRIC IS USED To anticipate this future trend, Musim Mas has developed a Sustainability Policy which encompasses our commitment to safeguarding water quality and quantity in all of our operations. Moreover, we also set a target to reduce our mills' water use intensity to be below 1.2 m3/MT FFB processed. In 2022, we have achieved our target of 1.17 m3/MT FFB processed. We will continue to meet our annual target of maintaining water use intensity at a maximum of 1.2 m3/MT FFB processed or below.

W-FB1.2g/W-AC1.2g

(W-FB1.2g/W-AC1.2g) What proportion of the sourced agricultural commodities reported in W-FB1.1a/W-AC1.1a originate from areas with water stress?

Agricultural commodities	% of total agricultural commodity sourced from areas with water stress	Please explain
Palm oil	0%	FUTURE TREND Our suppliers are located in Sumatra and Kalimantan of Indonesia which are free from water stress. Taking the business-as-usual scenario, the WRI Aqueduct Water Risk Atlas estimated that the water stress in those regions is likely to increase 1-1.4x in 2030. HOW THE METRIC IS USED To anticipate the future trend, Musim Mas sets several measures such as socialization of our Sustainability Policy to our suppliers, and providing training on good agricultural practices to suppliers. We also encourage and support smallholders to obtain sustainability certification schemes such as ISPO and RSPO which cover water aspects in their sustainability standards. As of 2022, we have trained more than 40,000 independent smallholders with 3,537 and 1,600 smallholders achieving RSPO and ISPO certifications respectively in 2022.

W1.2h

(W1.2h) Provide total water withdrawal data by source.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Primary reason for comparison with previous reporting year	Please explain
Fresh surface water, including rainwater, water from wetlands, rivers, and lakes	Relevant	10687	Lower	Other, please specify (Improvement in data collection)	The total withdrawal from fresh surface water is lower than the last year's reporting due to improvement in our data collection. The withdrawal figures were collected from direct measurements of flowmeter readings in 2022.
Brackish surface water/Seawater	Relevant	6375	Lower	Increase/decrease in business activity	The total withdrawal from brackish surface water/seawater is lower than the last year's reporting following downtime in the water treatment plant in one of our processing facilities.
Groundwater – renewable	Relevant	1244	Much lower	Other, please specify (Improvement in data collection)	Some of our operations are using groundwater for daily operations. In 2022, the figure is much lower due to improvement in our data collection where the total water withdrawn is directly measured using flow meters.
Groundwater – non-renewable	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	We do not use non-renewable groundwater for our operations.
Produced/Entrained water	Relevant	1311	About the same	Other, please specify (Stable production)	The volume of produced/entrained water is calculated from the water content of our raw materials. The productions remained stable in 2022, thus the volume is about the same as the previous reporting year.
Third party sources	Relevant	7264	Higher	Other, please specify (Improvement in data collection)	Our operations sourced water from third party and the volume is measured. In 2022, the volume is higher due to improvement in our data collection where the total water withdrawn is directly measured using flow meters.

W1.2i

(W1.2i) Provide total water discharge data by destination.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Primary reason for comparison with previous reporting year	Please explain
Fresh surface water	Relevant	2302	Much lower	Other, please specify (Improvement in data collection)	The total discharge from fresh surface water is much lower than the last year's reporting due to improvement in our data collection. The discharge figures were collected from direct measurements of flowmeter readings in 2022.
Brackish surface water/seawater	Relevant	3780	Much higher	Other, please specify (Improvement in data collection)	The total discharge from brackish surface water/seawater is much higher than the last year's reporting due to improvement in our data collection where some of our processing facilities have disclosed full-year figures.
Groundwater	Relevant	2867	Lower	Other, please specify (Improvement in data collection)	In 2022, the figure is lower due to improvement in our data collection. The discharge figures were collected from direct measurements of flowmeter readings.
Third-party destinations	Relevant	773	Lower	Other, please specify (Improvement in data collection)	In 2022, the water discharged to third-party has decreased due to improvement in our data collection. The discharge figures were collected from direct measurements of flowmeter readings.

W1.2j

(W1.2j) Within your direct operations, indicate the highest level(s) to which you treat your discharge.

	Relevance of treatment level to discharge	Volume (megaliters/year)	Comparison of treated volume with previous reporting year	Primary reason for comparison with previous reporting year	% of your sites/facilities/operations this volume applies to	Please explain
Tertiary treatment	Relevant	249	Much lower	Other, please specify (Improvement in data collection)	31-40	Rationale: We add chemicals such as chlorine in our wastewater treatment plant (WWTP) to remove harmful contaminants/chemicals/germs/bacteria, along with other dissolved inorganic substances from the discharge water. The treated water is then discharged for domestic use. Compliance: All discharge volumes were subject to strict water quality controls before being released to receiving water bodies to ensure compliance with the relevant regulatory standards. In 2022, there are no cases of non-compliance.
Secondary treatment	Relevant	4165	Much higher	Other, please specify (Improvement in data collection)	41-50	Rationale: Our mills' facilities treat wastewater, namely palm oil mill effluent (POME), through a series of anaerobic digestion systems to reduce the biological oxygen demand (BOD) and chemical oxygen demand (COD) levels. Compliance: Regular monitoring is conducted internally and externally to ensure the discharged water is well below the regulatory threshold. In 2022, there are no cases of non-compliance.
Primary treatment only	Relevant	954	Much higher	Other, please specify (Improvement in data collection)	31-40	Rationale: Primary treatment is carried out in a clarifier tank so that there is less contamination/suspended solid from the water discharged. Compliance: Through primary treatment, the treated water discharge is discharged within the regulatory standards. In 2022, there are no cases of non-compliance.
Discharge to the natural environment without treatment	Relevant	3757	Much higher	Other, please specify (Improvement in data collection)	31-40	Rationale: The figure is referring to water used for backwash. Compliance: The quality of discharge water is considered to be non-polluting since no significant pollutants and contaminants are present in the process of backwashing.
Discharge to a third party without treatment	Relevant	597	Much lower	Other, please specify (Improvement in data collection)	31-40	Rationale: Some of our facilities discharge water to a third party. Compliance: The discharge water is then treated by a third party before being discharged to the final destination within regulatory compliance.
Other	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>	There are no other treatment types considered.

W1.2k

(W1.2k) Provide details of your organization's emissions of nitrates, phosphates, pesticides, and other priority substances to water in the reporting year.

	Emissions to water in the reporting year (metric tonnes)	Category(ies) of substances included	List the specific substances included	Please explain
Row 1	5.42	Nitrates Phosphates	<Not Applicable>	Oil palms require mineral fertilizers to support their growth and fresh fruit bunch yields. Both phosphates and nitrogen are the most potent pollutants elements in fertilizer. Phosphate is extremely reactive and binds strongly with aluminum, iron, manganese, calcium, and other elements present in soils. Nitrogen fertilizers are water-soluble and a significant portion is lost through leaching. Hence, we monitor phosphate and total nitrogen levels in watercourses. The total nitrogen includes nitrate because, in water, nitrogen can be both inorganic nitrogen (nitrate (NO3), nitrite (NO2), and ammonia (NH3)) and organic nitrogen (proteins, amino acids, and urea). In line with regulatory standards, the phosphate and total nitrogen levels are monitored on a concentration basis (milligrams per liter). Based on the 2022 monitoring, a maximum of 0.09 mg/liter of phosphate and 5.33 mg/liter of total nitrogen in the rivers were passing by our oil palm plantations located in Indonesia. Following the environmental quality standards set by the Indonesian Government (PP No. 22 Tahun 2021), the threshold limit for phosphate and total nitrogen in water are 0.2 and 15 mg/liter respectively. Hence, there is no adverse impact on watercourses from our oil palm plantations. For the purpose of this reporting, a sample of one billion cubic meters (10^9 m3) of water is taken as the assumption to convert the value from mg/liter into metric tonnes.

W1.3

(W1.3) Provide a figure for your organization's total water withdrawal efficiency.

	Revenue	Total water withdrawal volume (megaliters)	Total water withdrawal efficiency	Anticipated forward trend
Row 1	10800000000	26881	401770.767456568	For the past three years, our revenues are ranging between $10-7 billion with water withdrawal volume fluctuating between 25,000-30,000 megaliters. Hence, we expect the water withdrawal efficiency to be similar in the upcoming years given that no other condition arises.

W-FB1.3/W-AC1.3

(W-FB1.3/W-AC1.3) Do you collect/calculate water intensity for each commodity reported in question W-FB1.1a/W-AC1.1a?

Agricultural commodities	Water intensity information for this produced commodity is collected/calculated	Water intensity information for this sourced commodity is collected/calculated	Please explain
Palm oil	Yes	No, not currently but we intend to collect/calculate this data within the next two years	Musim Mas Group is a fully integrated palm oil corporation. Our palm oil comes from both our own production and third-party suppliers. In our mills' operations, we monitor and compile our daily water usage and processed Fresh Fruit Bunch (FFB) data into our in-house program. The water usage is continuously measured using flow meters while the processed FFB data is continuously measured using weighbridges. Through these collected data, we can calculate the water use intensity (m3 water use/ton of fresh fruit bunch). As for our third-party suppliers, we are currently collecting information regarding our suppliers' compliance with our Sustainability Policy which includes water-related aspects through Musim Mas Self-Assessment Tool (SAT).

W-FB1.3a/W-AC1.3a

(W-FB1.3a/W-AC1.3a) Provide water intensity information for each of the agricultural commodities identified in W-FB1.3/W-AC1.3 that you produce.

Agricultural commodity
Palm oil

Water intensity value (m3/denominator)
1.17

Numerator: water aspect
Total water withdrawals

Denominator
Tons

Comparison with previous reporting year
About the same

Please explain
In 2022, the water intensity value is about the same as in 2021 which was 1.13 m3/MT FFB processed (4% difference). The water intensity is about the same considering our processing mills have reached maturity stage. The water intensity value is monitored year-on-year and used internally to set a mill water usage intensity target. We expect the trend will be about the same as we have set the target to maintain water usage intensity at a maximum of 1.2 m3/MT FFB processed. To manage water intensity, we conduct routine checks to ensure there is no leakage or flow meter error as well as implement and socialize water-saving campaigns to the workers. We will continue to explore best practices to improve mills' efficiency further.

Note:
The numerator corresponds to the total water withdrawals for processing in our palm oil mills and it is measured using flow meters.
The denominator corresponds to the total FFB processed by our palm oil mills.
Hence, the inputted water intensity value is calculated by dividing the total water withdrawal volume by the total FFB processed.

W1.4

(W1.4) Do any of your products contain substances classified as hazardous by a regulatory authority?

	Products contain hazardous substances	Comment
Row 1	No	Musim Mas is fully compliance with relevant regulations.

W1.5

(W1.5) Do you engage with your value chain on water-related issues?

	Engagement	Primary reason for no engagement	Please explain
Suppliers	Yes	<Not Applicable>	<Not Applicable>
Other value chain partners (e.g., customers)	Yes	<Not Applicable>	<Not Applicable>

W1.5a

(W1.5a) Do you assess your suppliers according to their impact on water security?

Row 1

Assessment of supplier impact
Yes, we assess the impact of our suppliers

Considered in assessment
Basin status (e.g., water stress or access to WASH services)
Supplier dependence on water
Supplier impacts on water availability
Supplier impacts on water quality
Procurement spend

Number of suppliers identified as having a substantive impact
0

% of total suppliers identified as having a substantive impact
None

Please explain
Our suppliers are palm oil producers whose operations are water dependent. Assessment is conducted for our suppliers (FFB, CPO, and PK) from Indonesia which account for most of our procurement spend.

Approach to assess suppliers' impact:
1. Basin Status: from our assessment using WRI Aqueduct Water Risk Atlas, no suppliers are located in the water stress area
2. Supplier impacts on water availability and quality: assessed through compliance against our Sustainability Policy which outlines commitment to protecting water resources

The threshold to identify suppliers as having a substantive impact:
Breach of our Sustainability Policy.

In 2022, no suppliers breached our Sustainability Policy. Furthermore, we adopt a proactive approach to encourage our suppliers' compliance with our Sustainability Policy. We believe that active engagement by providing our suppliers with appropriate support is essential for driving change and enhancing supplier performance toward full compliance.

W1.5b

(W1.5b) Do your suppliers have to meet water-related requirements as part of your organization's purchasing process?

	Suppliers have to meet specific water-related requirements	Comment
Row 1	Yes, water-related requirements are included in our supplier contracts	<Not Applicable>

W1.5c

(W1.5c) Provide details of the water-related requirements that suppliers have to meet as part of your organization's purchasing process, and the compliance measures in place.

Water-related requirement
Substituting hazardous substances with less harmful substances

% of suppliers with a substantive impact required to comply with this water-related requirement
100%

% of suppliers with a substantive impact in compliance with this water-related requirement
100%

Mechanisms for monitoring compliance with this water-related requirement
Supplier self-assessment

Response to supplier non-compliance with this water-related requirement
Retain and engage

Comment
In the purchasing agreement, suppliers are asked to sign a commitment letter to comply with our Sustainability Policy. As stipulated in our Sustainability Policy of Pillar 2, we and suppliers are committed to implementing integrated pest management to maximize natural control of pests and diseases, and to reduce the use of toxic pesticides which can be harmful to watercourse. To track suppliers' compliance against our Sustainability Policy, we developed an exhaustive set of questions namely Musim Mas Self-Assessment Tool (SAT). In terms of non-compliance, our Controlled Purchase Protocol (CPP) is available to resolve issues, secure remedy and remediation, and exclude errant suppliers as the last resort. This protocol is based on three principles: suppliers' willingness to engage, positivity to act, and proof of progress against agreed-upon milestones and criteria.

W1.5d

(W1.5d) Provide details of any other water-related supplier engagement activity.

Type of engagement
Innovation & collaboration

Details of engagement
Educate suppliers about water stewardship and collaboration

% of suppliers by number
100%

% of suppliers with a substantive impact
100%

Rationale for your engagement
We engage suppliers through socialization, training, and workshop to educate suppliers on water stewardship. This covers all our FFB suppliers (Tier 1) which account for the majority of our mills' procurement spend. The rationale for this engagement is that they are suppliers with whom we can collaborate on long-term initiatives and share knowledge and best practices. Engaging these suppliers will support our journey towards a sustainable palm oil industry.

Impact of the engagement and measures of success
OUTCOMES
Since our Sustainability Policy was published in 2014, we have gained a wide range of experience in implementing our policy as well as engaging our suppliers for achieving impact. We conduct stakeholder consultations with our suppliers to discuss and develop programs to enhance water stewardship within and outside the concession. The program includes but is not limited to implementing best management practices (BMP) on fertilizer usage, pest and diseases management, repairing and constructing terracing, cover crop planting, frond stacking, culvert construction, and road maintenance. From the environmental aspect, implementing BMP is of paramount importance to protect and maintain the hydrological and ecological function of the riparian zone which serves as water catchment areas. Furthermore, the construction of terracing can reduce the length of the slope surface area and then reduce erosion and prevent the leaching of nutrients from that particular area. Minimum erosion level and preservation of the nutrient reduce sedimentation on the rivers and maintain the soil fertility in slope areas respectively. Regular monitoring and water quality testing are also conducted to evaluate the effectiveness of the programs and to make sure the water quality of rivers are maintained. It is inevitable that water management within the concession is essential in order to provide water supply and shared responsibility for water stewardship in the vicinity and downstream areas.

SUCCESS OF ENGAGEMENT
The success of our suppliers' engagement is measured through compliance with our Sustainability Policy along with the RSPO certification and POIG verification which cover water aspects and stewardship. To monitor our suppliers' progress in adherence to our Sustainability Policy, we conduct internal audits. In 2022, no suppliers breached our Sustainability Policy. We also promote and assist our suppliers in achieving RSPO certification which gives beneficial water-related outcomes as the RSPO requires certification unit to maintain the quality and availability of surface and groundwater. We also encourage and guide our suppliers in setting and implementing water management plans to minimize water use and eliminate water pollution as these are part of the POIG Verification Indicator. Ultimately, we have found this collaboration has helped us and our suppliers to arrive at an equitable and sustainable use of shared water resources.

Comment
We believe that close cooperation and constructive dialogue with suppliers is necessary to integrate sustainable development principles with current business practices.

W1.5e

(W1.5e) Provide details of any water-related engagement activity with customers or other value chain partners.

Type of stakeholder
Customers

Type of engagement
Education / information sharing

Details of engagement
Share information about your products and relevant certification schemes

Rationale for your engagement
With the growing international agreements concerning water, deforestation, GHG, biodiversity as well as labor and human rights topics, more customers are now demanding sustainability commitments integrated into our operations. To that end, we refreshed our Musim Mas Group Sustainability Policy (2020-2025) to address our stakeholders' concerns including customers. Through the Policy, we take commitment to water accountability, with respect to water quantity and quality, as well as equity (extraction, use, treatment and discharge, and management of riparian areas and water sources according to best practices).

Impact of the engagement and measures of success
OUTCOMES
To communicate our sustainability commitments to our customers, we publish our sustainability progress, milestones, and targets through an annual Sustainability Report which covers water-related aspects such as water use intensity, water management, and water footprint. This increases our brand value and at the same time increases our sales and revenue. In all, we take 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 world.

In line with the Policy, we also annually audited and certified under various sustainability schemes such as RSPO and POIG which consider water-related standards and criteria. These sustainability schemes are preferred by our customers and thus become our priority of engagements with customers. As such, our mills' operations set a target to achieve a water use intensity of 1.2 m3/MT FFB processed or below. The achievement of the target is audited annually by an external auditor to ensure credibility. Our 2022 integrated mills' water use intensity is undergoing a verification process at the time of the submission.

SUCCESS OF ENGAGEMENT
We measured the success of the engagement through customers' KPI scorecards. We maintain an open dialogue with our stakeholders, welcome constructive feedback to improve our operations, and strive to be transparent by keeping stakeholders informed on Group-wide matters.

W2. Business impacts

W2.1

(W2.1) Has your organization experienced any detrimental water-related impacts?

No

W2.2

(W2.2) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for water-related regulatory violations?

	Water-related regulatory violations	Fines, enforcement orders, and/or other penalties	Comment
Row 1	No	<Not Applicable>	Musim Mas is committed to complying with all relevant regulatory standards.

W3. Procedures

W3.1

(W3.1) Does your organization identify and classify potential water pollutants associated with its activities that could have a detrimental impact on water ecosystems or human health?

	Identification and classification of potential water pollutants	How potential water pollutants are identified and classified	Please explain
Row 1	Yes, we identify and classify our potential water pollutants	INDICATORS - Nutrients: High levels of nutrients such as phosphates and nitrates can lead to eutrophication and algae blooms - Biochemical Oxygen Demand (BOD): High BOD levels indicate organic pollution - Chemical Oxygen Demand (COD): High COD levels can reduce dissolved oxygen and harm aquatic life POLICY AND PROCESS Align with our Sustainability Policy, Musim Mas is committed to water quantity and quality. Below are some descriptions to identify potential water pollutants in our upstream operations: - Plantations: Oil palms require mineral fertilizers to support their growth and yields. Of the fertilizer elements, phosphates and nitrates are the most potent pollutants. Hence, we annually monitor phosphate and nitrates levels in watercourses. - Mills: The wastewater from mills (POME) contains high BOD and COD levels which will negatively impact the watercourses if discharged without treatment. Hence, we treat all POME prior to discharge and monitor the quality of POME through accredited and independent lab testing. STANDARDS We adhere to regulatory standards and certification schemes to ensure water-related compliance and quality. For example: - RSPO P&C 2018: Mill effluent is treated to be in compliance with national regulations. The discharge quality of mill effluent, especially BOD, is regularly monitored - PP No 22 Tahun 2021 on Implementation of Environmental Protection and Management: regulating the water quality standards including phosphates and nitrates threshold	<Not Applicable>

W3.1a

(W3.1a) Describe how your organization minimizes the adverse impacts of potential water pollutants on water ecosystems or human health associated with your activities.

Water pollutant category
Other nutrients and oxygen demanding pollutants

Description of water pollutant and potential impacts
The wastewater from mills, namely Palm Oil Mill Effluent (POME), contains high BOD (Biochemical Oxygen Demand) and COD (Chemical Oxygen Demand) levels which will negatively impact the watercourses if discharged without treatment.

BOD and COD are measures of the amount of oxygen required to oxidize organic substances present in water. Both BOD and COD levels provide valuable information about the level of organic pollutants and the potential for oxygen depletion in aquatic environments.

High BOD levels in water indicate a large quantity of organic matter that microorganisms need to decompose. The decomposition process consumes a significant amount of dissolved oxygen, which can lead to oxygen depletion in water bodies. As a result, aquatic life and water quality can be adversely affected.

High COD levels are often associated with nutrient-rich water, which can lead to eutrophication. Eutrophication is the excessive growth of algae and aquatic plants due to an abundance of nutrients like nitrogen and phosphorus. Algal blooms can block sunlight and reduce oxygen availability, further contributing to oxygen depletion and impacting aquatic life.

Value chain stage
Direct operations

Actions and procedures to minimize adverse impacts
Discharge treatment using sector-specific processes to ensure compliance with regulatory requirements

Please explain
RISK MANAGEMENT
To manage the risks of the potential impacts, we strictly manage BOD and COD levels and keep them below regulatory thresholds to avoid impacting groundwater and nearby water sources. The Indonesian government regulated the BOD and COD limit for POME discharge as 100 milligrams per litre (mg/L) and 350 mg/L respectively. As such, we treat all POME before discharging them. On a monthly basis, we assess the BOD and COD levels of our mills through independent and accredited lab testing. Moreover, we provide quarterly reports to the relevant environmental services agency on our wastewater quality.

SUCCESS MEASUREMENT
As the measured of success, there were no instances of non-compliance regarding BOD and COD at our upstream operations to date. In 2022, our BOD levels for our operations in Sumatra and Kalimantan are 52.56 and 47.61 mg/L respectively which are 50% below the regulatory threshold (100 mg/L). As for the COD levels in 2022, the value for our operations in Sumatra and Kalimantan are 165,32 and 149,39 mg/L respectively which are also 50% below the regulatory threshold (350 mg/L). This indicates our commitment on compliance with regulatory requirements. We also published the BOD and COD figures in our annual sustainability reporting where the figures are verified by third-party assurance. Additionally, Musim Mas' palm oil mills practice zero discharge at which the POME is utilized and applied as land application in our plantations.

W3.3

(W3.3) Does your organization undertake a water-related risk assessment?
Yes, water-related risks are assessed

W3.3a

(W3.3a) Select the options that best describe your procedures for identifying and assessing water-related risks.

Value chain stage
Direct operations
Supply chain

Coverage
Full

Risk assessment procedure
Water risks are assessed as part of other company-wide risk assessment system

Frequency of assessment
Annually

How far into the future are risks considered?
More than 6 years

Type of tools and methods used
Tools on the market

Tools and methods used
Water Footprint Network Assessment tool
WRI Aqueduct

Contextual issues considered
Water availability at a basin/catchment level
Water quality at a basin/catchment level
Stakeholder conflicts concerning water resources at a basin/catchment level
Impact on human health
Implications of water on your key commodities/raw materials
Water regulatory frameworks
Status of ecosystems and habitats
Access to fully-functioning, safely managed WASH services for all employees

Stakeholders considered
Customers
Employees
Investors
Local communities
NGOs
Regulators
Suppliers
Water utilities at a local level
Other water users at the basin/catchment level

Comment
Water-related risks are assessed at Musim Mas direct operations and supply chain using the tools on market annually.

W3.3b

(W3.3b) Describe your organization's process for identifying, assessing, and responding to water-related risks within your direct operations and other stages of your value chain.

	Rationale for approach to risk assessment	Explanation of contextual issues considered	Explanation of stakeholders considered	Decision-making process for risk response
Row 1	Application of tools: We utilize the Water Risk Atlas provided by the WRI Aqueduct to analyze whether the water withdrawn for our upstream operations is sourced from water stress areas. The results show that all our upstream operations are free from water stress. Moreover, The Water Footprint Methodology is used to evaluate the water balance of our upstream operations to analyze the vulnerability of water scarcity in surrounding areas. We start by categorizing and quantifying our water use and water consumption using the Water Footprint methodology. Following that, we conduct a water balance study to compare the water consumption with the water available from rainwater.	1. Since we operate our own plantations and mills, the availability of sufficient water resources is important. To monitor and assess the water availability of our plantations and mills, we produce a water accountability report annually. This report covers a range of topics starting from water usage to water management plans. 2. Water quality is included in our risk assessment to ensure continual adherence to government water quality standards. For instance, we monitor the N & P levels in watercourses. 3. Water sharing is included in our risk assessment process. Being POIG verified, a water stewardship assessment is undertaken involving relevant stakeholders to address water equity topics. 4. Oil palm commodity is dependent on water, thus, the implication of water is included in our risk assessment. Based on the WRI atlas, our sourcing areas are free from water stress. 5. We understand that the riverbed ecosystem plays an important role in the quality of the river. Thus, we are committed to protecting those areas especially HCV 4 in riparian areas. Additionally, we also conduct risk assessments of the HCV areas as well as monitoring and management of the HCV areas (i.e. riparian areas management). 6. To maintain the well-being of our employees, we provide fully functioning and safely managed WASH services for all employees. Additionally, we install handwashing stations at entrance areas of all plantations and mills.	1. Changes in consumer preferences may affect our business performance. Method of engagement includes but is not limited to one-on-one communications and the annual sustainability report 2. Following stricter policies on environmental protection, some investors require sustainability assessment as one of their funding criteria. Among many, water-related issues are considered. Method of engagement includes one-on-one communications and sustainability report 3. The Social and Environmental Impact Assessment which includes the water aspects is conducted to ensure the water availability for surrounding communities. Method of engagement includes consultation with community groups and representatives and community programs 4. NGOs play an important role to advance our sustainability progress. Method of engagement includes landscape initiatives (e.g. Sedagho Siak NGO in Siak District conservation project) and sustainability platforms (e.g. HCSA) 5. We pledge to fully comply with local, national, and international laws and guidelines. Method of engagement includes landscape program meetings 6. We also considered suppliers near riparian areas to manage riparian zones which act as buffers between natural waterways and land use for agricultural development 7. The availability and quality of water for our operations also depend on other water users in our areas. Method of engagement includes water stewardship assessment involving relevant stakeholders to address water equity topics	Outcomes: The risk assessment results are used to formulate water management plans in our operations in order to manage and mitigate the risks. The relevant information will be discussed with relevant departments to draw out necessary action plans. These action plans will be reported to the board level before embarking on the plan.

W4. Risks and opportunities

W4.1

(W4.1) Have you identified any inherent water-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes, both in direct operations and the rest of our value chain

W4.1a

(W4.1a) 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, water accounting, water accountability, with respect to water quantity and quality, waste management, traceability to plantations, etc.

W4.1b

(W4.1b) What is the total number of facilities exposed to water risks with the potential to have a substantive financial or strategic impact on your business, and what proportion of your company-wide facilities does this represent?

	Total number of facilities exposed to water risk	% company-wide facilities this represents	Comment
Row 1	1	26-50	The number of facilities filled represents aggregated own mills' activities.

W4.1c

(W4.1c) By river basin, what is the number and proportion of facilities exposed to water risks that could have a substantive financial or strategic impact on your business, and what is the potential business impact associated with those facilities?

Country/Area & River basin

Indonesia	Other, please specify (Sumatra and Kalimantan)

Number of facilities exposed to water risk
1

% company-wide facilities this represents
26-50

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
<Not Applicable>

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
1-10

Comment
River is an important aspect as the source of water for the operations as well as for the surrounding communities as they depend on the river as well. Prior to the establishment of the operational units, the source of water or river is assessed through a series of assessments, such as the Environmental Impact Assessment, High Conservation Value assessment as well as Social Impact Assessment. Through these assessments, the company identifies the river basins surrounding the operational units, the impact of the companies' existence on the river basins and surrounding communities, and the methodology to maintain and enhance the river basins. Furthermore, the company conducted annual stakeholder consultations together with the local government and the surrounding communities to brainstorm and identify any issues, if any, and efforts for monitoring and management of river and riparian buffer zone. During stakeholder consultation, we emphasized and socialized the importance of the river area, prohibiting littering in the river and buffer zone area by installing signboards, and prohibiting the use of poison or explosives to catch fish. Similarly, companies have policies to avoid chemical run-off to the water body and we also pledge to zero wastewater discharge to the water body. As instructed by the regulation, the company conducted regular tests to ensure that the company's activities do not harm the environment and the water body. The company's effort also aims to avoid and minimize the occurrence of extreme weather such as drought and flood which 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 agricultural crops including oil palm crops. A prolonged drought can lower the 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. With the lower yield, this may cause disruption in the supply chain.

W4.2

(W4.2) Provide details of identified risks in your direct operations with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Country/Area & River basin

Indonesia	Other, please specify (Sumatra and Kalimantan)

Type of risk & Primary risk driver

Acute physical	Drought

Primary potential impact
Reduced revenues from lower sales/output

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.

Timeframe
More than 6 years

Magnitude of potential impact
Medium-high

Likelihood
Likely

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
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

Primary response to risk
Adopt water efficiency, water reuse, recycling and conservation practices

Description of response
In line with our sustainability policy (covering 2020-2025), Musim Mas carries out best management practices and operating procedures to alleviate the impacts of extreme weather such as drought, the practices with respective timescales are as follows:

- Operate 100% zero waste mills utilizing dried decanter solid, boiler ash, and POME to be repurposed as organic fertilizer and land application respectively which improves moisture retention capability to ameliorate the drought effects (no end date)
- Construction of water ponds in our upstream operations areas as water reserves to mitigate the risk of a long drought
- Restoration and management of riparian areas and water sources according to RSPO guidelines (no end date)
- Implement and socialize water saving campaign to the workers (no end date)
- Monitoring of water use in estate and mill operations as well as in domestic use (no end date)
- Implement water efficiency in mill operations (no end date). For example, since 2020, our mills have implemented pressure-based methodology instead of time-based methodology for the backwash systems leading to 5-10% water savings in backwash water use.
-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). In 2022, we conducted 127 fire training in 74 villages covered by the FFVP. These initiatives are still ongoing in 2022.

Following the GRI reporting standard, we also publicly communicate our annual sustainability progress through Sustainability Report (https://www.musimmas.com/sustainability-report/).

Cost of response
30000

Explanation of 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.

W4.2a

(W4.2a) Provide details of risks identified within your value chain (beyond direct operations) with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Country/Area & River basin

Indonesia	Other, please specify (Sumatera and Kalimantan)

Stage of value chain
Supply chain

Type of risk & Primary risk driver

Acute physical	Drought

Primary potential impact
Supply chain disruption

Company-specific description
The occurrence of extreme weather such as drought may impact the supply chain activity as well as productivity, which in turn, disrupts our supply chain arrangement and supply of raw materials. For example, 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 and fire incidents for agricultural crops including oil palm crops. A prolonged drought can lower the FFB yield by approximately 15%. Furthermore, approximately 90% of our CPO processed originated from third-party suppliers where the sourcing areas are located in Indonesia. For this, our suppliers' yield can also be affected by the occurrence of extreme weather, thus, posing risks to Musim Mas as it may create a disruption to the supply of raw materials needed in our production. Moreover, this situation may also affect the ability of the suppliers to get back to the normal condition as they will require more time and resources to recover from the prolonged drought effects that may last up to 2 to 3 years.

Timeframe
More than 6 years

Magnitude of potential impact
Medium

Likelihood
Likely

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)
2000

Potential financial impact figure - maximum (currency)
2300

Explanation of financial impact
Our mills have a Fresh Fruit Bunch (FFB) intake target to keep the production running based on the mill capacity that are ranging from 45 tons to 90 tons FFB / hour. Thus, it is important to meet the FFB intake target to fulfil the production capacity. The constraint in FFB supply due to extreme weather will trigger the need to find another source of FFB to fulfil the target.

The financial impact corresponds to the estimated cost needed to find other alternative suppliers and to make sure they are aligned with our sustainability commitment before we can decide to include them in our supply chain. The cost includes finding new suppliers, engagement with suppliers, training, and socialization about our NDPE as well as other Sustainability commitments that must be adhered to prior to sending the raw materials to Musim Mas. Thus, the financial impact is estimated at around $2000-2300 per engagement event.

Primary response to risk

Supplier engagement	Other, please specify (Engage and educate suppliers on Best Management Practices (BMP))

Description of response
In line with our Sustainability Policy - Pillar 1, Musim Mas is committed to maintaining good relations with our suppliers (no end date). Engagement with smallholders can lead to an increase in yields, better access to national and international markets, improvement in livelihoods, and a reduction in the risk of land conversion. 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 Best Management Practices (BMP) including Good Agricultural Practices (GAP) and 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 and trained over 40,000 independent smallholders. We will continue to educate and provide training to our smallholders (no end date).

To ensure credibility that Musim Mas's supply chain is in full and beyond compliance with the highest sustainability standards, Musim Mas encourages smallholders to obtain certification schemes such as RSPO and ISPO. We aim to achieve 100% ISPO certification for our scheme smallholders by 2025. As of 2022, approximately 25% of scheme smallholders have obtained ISPO certification with 3,537 and 1,600 independent smallholders having been RSPO and ISPO certified respectively. We will continue to engage and socialize the importance of sustainability certification to relevant smallholders (no end date).

Cost of response
500

Explanation of cost of response
The cost of the response corresponds to training and workshop on Good Agricultural Practices (GAP) which is estimated to be around $500 per training event. The cost can vary depending on the number of participating suppliers.

W4.3

(W4.3) Have you identified any water-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes, we have identified opportunities, and some/all are being realized

W4.3a

(W4.3a) Provide details of opportunities currently being realized that could have a substantive financial or strategic impact on your business.

Type of opportunity

Efficiency

Primary water-related opportunity

Improved water efficiency in operations

Company-specific description & strategy to realize opportunity

All water withdrawn from the water source (i.e. river) will be sent to the water treatment plant and the water volume is recorded and monitored using flow meter. Furthermore, the volume of water is then input into the company program system. The verification is conducted by the PIC to check whether the data has been inputted correctly. Other improvement measures include but are not limited to enhancing the efficiency of the unit's processes and machines to maintain the quality of water. For instance, since 2020, we have applied a pressure-based methodology instead of a time-based methodology for the backwash system in our mills' operations, leading to an estimated 5-10% savings in our backwash water usage. With these improvement measures, we are to increase our operations' water efficiency.

Estimated timeframe for realization

Current - up to 1 year

Magnitude of potential financial impact

Low

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)

2

Potential financial impact figure – maximum (currency)

4

Explanation of financial impact

Prior to the pressure-based methodology, we demanded approximately 200 tonnes of water for mills' backwashing purposes daily. Utilising the pressure-based methodology, we can save approximately 5-10% of the backwash water used or 10-20 tonnes of water per day. The financial impact is derived from the amount of water savings (10-20 tonnes/day) multiplied by the domestic pricing of water per tonne (~$0.2/tonne) resulting in $2 - 4/day per mill.

W5. Facility-level water accounting

W5.1

(W5.1) For each facility referenced in W4.1c, provide coordinates, water accounting data, and a comparison with the previous reporting year.

Facility reference number
Facility 1

Facility name (optional)
N/A

Country/Area & River basin

Indonesia	Other, please specify (Sumatra dan Kalimantan)

Latitude
-0.056

Longitude
102.08

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
<Not Applicable>

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
3850

Comparison of total withdrawals with previous reporting year
About the same

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
3850

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
2808

Comparison of total discharges with previous reporting year
Higher

Discharges to fresh surface water
249

Discharges to brackish surface water/seawater
0

Discharges to groundwater
2559

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
1042

Comparison of total consumption with previous reporting year
About the same

Please explain
Water stress: Using the Water Risk Atlas provided by the WRI Aqueduct, it can be seen that the water withdrawn for this facility is sourced from areas free from water stress.
Method of measurement: Water consumption is calculated using withdrawals minus discharges.
Changes from last year: In 2022, the water consumption is about the same compared to 2021 as the operational settings are similar.

W5.1a

(W5.1a) For the facilities referenced in W5.1, what proportion of water accounting data has been third party verified?

Water withdrawals – total volumes

% verified
76-100

Verification standard used
ISAE 3000 is used as the standard verification for the water withdrawals and water discharge volume and quality. Moreover, the facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as sources of the river basin of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water withdrawals – volume by source

% verified
76-100

Verification standard used
ISAE 3000 is used as the standard verification for the water withdrawals and water discharge volume and quality. Moreover, the facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as sources of the river basin of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water withdrawals – quality by standard water quality parameters

% verified
76-100

Verification standard used
Our unit facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as the quality of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water discharges – total volumes

% verified
76-100

Verification standard used
ISAE 3000 is used as the standard verification for the water withdrawals and water discharge volume and quality. Moreover, the facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as sources of the river basin of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water discharges – volume by destination

% verified
76-100

Verification standard used
ISAE 3000 is used as the standard verification for the water withdrawals and water discharge volume and quality. Moreover, the facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as sources of the river basin of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water discharges – volume by final treatment level

% verified
76-100

Verification standard used
ISAE 3000 is used as the standard verification for the water withdrawals and water discharge volume and quality. Moreover, the facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as sources of the river basin of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water discharges – quality by standard water quality parameters

% verified
76-100

Verification standard used
ISAE 3000 is used as the standard verification for the water withdrawals and water discharge volume and quality. Moreover, the facilities are annually verified by the Palm Oil Innovation Group (POIG). The verification indicators include but are not limited to the volume of water withdrawal and water consumption as well as water quality such as phosphorus and nitrogen level in water courses. Furthermore, parameters such as sources of the river basin of the water withdrawn are verified by the Environmental Impact Assessment for each unit facility.

Please explain
<Not Applicable>

Water consumption – total volume

% verified
Not verified

Verification standard used
<Not Applicable>

Please explain
Musim Mas will consider third-party verification when ready.

W6. Governance

W6.1

(W6.1) Does your organization have a water policy?
Yes, we have a documented water policy that is publicly available

W6.1a

(W6.1a) Select the options that best describe the scope and content of your water policy.

	Scope	Content	Please explain

	Scope	Content	Please explain
Row 1	Company-wide	Description of the scope (including value chain stages) covered by the policy Description of business dependency on water Description of business impact on water Commitment to align with international frameworks, standards, and widely-recognized water initiatives Commitment to prevent, minimize, and control pollution Commitment to reduce or phase-out hazardous substances Commitment to safely managed Water, Sanitation and Hygiene (WASH) in the workplace Commitment to safely managed Water, Sanitation and Hygiene (WASH) in local communities Commitment to water stewardship and/or collective action Commitment to the conservation of freshwater ecosystems Commitments beyond regulatory compliance Reference to company water-related targets Acknowledgement of the human right to water and sanitation Recognition of environmental linkages, for example, due to climate change	Our Sustainability Policy encompasses all our operations worldwide from oil palm plantations to facilities involved in processing, refining and trading of palm oil products, thus it is applicable company-wide. The overview of the Policy includes but is not limited to our commitment to water accountability, commitment beyond regulatory compliance, water quality, and commitment to water stewardship. Progress towards the implementation of the Policy is annually reported through our Sustainability Report which gives a description of our business dependency and impact on water, as well as water-related performance standards for direct operations. For more information on our sustainability policy, please refer to: https://www.musimmas.com/wp-content/uploads/2020/09/Musim-Mas-Sustainability-Policy-2020-2025.pdf Musim-Mas-SR2021.pdf Musim-Mas-2020-Sustainability-Policy-1.pdf

W6.2

(W6.2) Is there board level oversight of water-related issues within your organization?

Yes

W6.2a

(W6.2a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for water-related issues.

Position of individual or committee	Responsibilities for water-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 water-related risks and opportunities such as HCV, HCS, riparian zones as well as peat management. Approaching the dry season, for example, the management would plan and decide to construct more water ponds for some units in preparation for the dry season. 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 such as maintaining and enhancing riparian buffer strips along rivers and water bodies.

W6.2b

(W6.2b) Provide further details on the board's oversight of water-related issues.

	Frequency that water-related issues are a scheduled agenda item	Governance mechanisms into which water-related issues are integrated	Please explain
Row 1	Scheduled - all meetings	Monitoring implementation and performance Monitoring progress towards corporate targets Overseeing acquisitions, mergers, and divestitures Overseeing and guiding public policy engagement Overseeing and guiding scenario analysis Overseeing major capital expenditures Overseeing the setting of corporate targets Overseeing value chain engagement Providing employee incentives Reviewing and guiding annual budgets Reviewing and guiding business plans Reviewing and guiding corporate responsibility strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding strategy Reviewing innovation/R&D priorities Setting performance objectives	During the meeting, our Director of Sustainability will brief the Board on the state of sustainability of the industry including water-related issues and the progress of Musim Mas sustainability initiatives such as RSPO, ISPO, ISCC certification, POIG verification and supply chain traceability. The Director will also bring up any outstandings, complaints, and grievances concerning sustainability to discuss potential paths to resolution. Additionally, the Board and the Director discusses potential new sustainability initiative(s) that can be undertaken with other stakeholders.

W6.2d

(W6.2d) Does your organization have at least one board member with competence on water-related issues?

	Board member(s) have competence on water-related issues	Criteria used to assess competence of board member(s) on water-related issues	Primary reason for no board-level competence on water-related issues	Explain why your organization does not have at least one board member with competence on water-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>

W6.3

(W6.3) Provide the highest management-level position(s) or committee(s) with responsibility for water-related issues (do not include the names of individuals).

Name of the position(s) and/or committee(s)
Other C-Suite Officer, please specify (Director of Sustainability)

Water-related responsibilities of this position
Assessing future trends in water demand
Assessing water-related risks and opportunities
Managing water-related risks and opportunities
Conducting water-related scenario analysis
Setting water-related corporate targets
Monitoring progress against water-related corporate targets
Managing public policy engagement that may impact water security
Managing value chain engagement on water-related issues
Integrating water-related issues into business strategy
Managing annual budgets relating to water security
Managing major capital and/or operational expenditures related to low water impact products or services (including R&D)
Managing water-related acquisitions, mergers, and divestitures
Providing water-related employee incentives

Frequency of reporting to the board on water-related issues
More frequently than quarterly

Please explain
In the sustainability governance structure, the Director of Sustainability is reporting to the Board of Directors. The Director of Sustainability is responsible to assess and manage key ESG issues including water-related risks and opportunities such as future trends in water demand. The Director and the Board meet more frequently than quarterly to review our ESG performance and are involved in decision-making pertaining to our water-related risks and opportunities. Monthly reports are also provided to the Board. The reported water-related issues include but are not limited to the annual water accountability report that covers a range of topics starting from water usage to water management plans. In all, the objectives are to address ESG-related issues including water and manage environmental strategies at the core of our business.

W6.4

(W6.4) Do you provide incentives to C-suite employees or board members for the management of water-related issues?

	Provide incentives for management of water-related issues	Comment
Row 1	Yes	Yes, we do provide incentives for the board members.

W6.4a

(W6.4a) What incentives are provided to C-suite employees or board members for the management of water-related issues (do not include the names of individuals)?

	Role(s) entitled to incentive	Performance indicator	Contribution of incentives to the achievement of your organization's water commitments	Please explain

	Role(s) entitled to incentive	Performance indicator	Contribution of incentives to the achievement of your organization's water commitments	Please explain
Monetary reward	Director on board	Reduction of water withdrawals – direct operations Improvements in water efficiency – direct operations Improvements in wastewater quality – direct operations Reduction of water pollution incidents Reduction or phase-out of hazardous substances Other, please specify (Certification, Standards and Compliance)	As stipulated in our Sustainability Policy, Musim Mas is committed to water accountability, with respect to water quantity and quality, as well as equity. We adhere to relevant regulatory standards and sector-specific sustainability certification schemes to ensure water-related compliance. 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 progress in 2022: 1. Water use intensity To ensure water efficiency in our mills, we set a target to achieve water use intensity to be below 1.2 m3/MT FFB processed. In 2022, our mills' water use intensity is 1.17 m3/MT FFB processed in line with the set target. 2. Wastewater quality We strictly manage BOD and COD levels below the regulatory thresholds. We treat all palm oil mill effluent (POME) before discharging them. On a monthly basis, we assess the BOD and COD levels of our mills through independent and accredited lab testing. To date, there were no instances of non-compliance regarding BOD and COD at our upstream operations. 3. Sustainability certification schemes We will continue to achieve and maintain 100% certification schemes in our operations such as POIG and RSPO where water-related aspects are integrated within its standards and principles. To date, all of our integrated mills continue to maintain the respective schemes.	Our Director on board oversees and resolves any sustainability matter including water-related issues such as management of riparian areas. Additionally, the Director on board develops water management programs and action plans related to conservation initiatives at the group level. Our Director on Board works and is evaluated annually based on the Key Performance Indicator (KPI) where compensation and benefits are awarded accordingly. Examples of performance indicators include but are not limited to reduction of water intensity and/or full compliance with regulations and certification schemes such as POIG where water-related issues are discussed. Others include awards and recognitions related to sustainability such as the SPOTT ranking, CDP scorecard, and Ecovadis scorecard. 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 forest management. 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. For example, year-on-year mill water use intensity is to be below 1.2 m3/MT FFB processed. Other examples of performance indicators include but are not limited to full compliance with regulations and certification schemes such as POIG where water-related issues are discussed.
Non-monetary reward	Director on board	Reduction of water withdrawals – direct operations Improvements in water efficiency – direct operations Improvements in wastewater quality – direct operations Reduction of water pollution incidents Reduction or phase-out of hazardous substances Other, please specify (Certification, Standards and Compliance)	As stipulated in our Sustainability Policy, Musim Mas is committed to water accountability, with respect to water quantity and quality, as well as equity. We adhere to relevant regulatory standards and sector-specific sustainability certification schemes to ensure water-related compliance. 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 progress in 2022: 1. Water use intensity To ensure water efficiency in our mills, we set a target to achieve water use intensity to be below 1.2 m3/MT FFB processed. In 2022, our mills' water use intensity is 1.17 m3/MT FFB processed in line with the set target. 2. Wastewater quality We strictly manage BOD and COD levels below the regulatory thresholds. We treat all palm oil mill effluent (POME) before discharging them. On a monthly basis, we assess the BOD and COD levels of our mills through independent and accredited lab testing. To date, there were no instances of non-compliance regarding BOD and COD at our upstream operations. 3. Sustainability certification schemes We will continue to achieve and maintain 100% certification schemes in our operations such as POIG and RSPO where water-related aspects are integrated within its standards and principles. To date, all of our integrated mills continue to maintain the respective schemes.	Our Director on board oversees and resolves any sustainability matter including water-related issues such as management of riparian areas. Additionally, the Director on board develops water management programs and action plans related to conservation initiatives at the group level. Our Director on Board works and is evaluated annually based on the Key Performance Indicator (KPI) where compensation and benefits are awarded accordingly. In complement to the monetary reward, non-monetary reward such as special assignment is also given to those who perform. They are given the authority to form, develop, and budget projects/teams/action plans to improve the performance indicators. 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 water management. 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. For example, year-on-year mill water use intensity is to be below 1.2 m3/MT FFB processed. Other examples of performance indicators include but are not limited to full compliance with regulations and certification schemes such as POIG where water-related issues are discussed.

W6.5

(W6.5) Do you engage in activities that could either directly or indirectly influence public policy on water through any of the following?

Yes, direct engagement with policy makers

Yes, other

W6.5a

(W6.5a) What processes do you have in place to ensure that all of your direct and indirect activities seeking to influence policy are consistent with your water policy/water commitments?

Musim Mas has been a member of the RSPO since 2004 to develop and implement global standards for sustainable palm oil. Among others, we are a substantive member of the RSPO P&C Review Task Force as well as a substantive member of many Working Groups: Smallholders, Biodiversity and HCV, and GHG. Following our participation in the Working Group, the RSPO endorsed a report on River and Riparian Management in 2022. The report is a technical review as a basis for compiling a guide for companies and smallholders for the determination and management of river borders whose width has not been determined by the government. Through the implementation of the RSPO P&C and Riparian BMP, the RSPO is in line with the government's goal of protecting rivers and rivers border. Moreover, Musim Mas is a member of the Palm Oil Innovation Group (POIG), a multi-stakeholder initiative focused on responsible palm oil. Aligned with the RSPO and POIG standards, we have committed to water accountability, with respect to water quantity and quality, as well as equity (extraction, use, treatment and discharge, and management of riparian areas and water sources) through our Sustainability Policy.

Action if inconsistency:

If inconsistencies arise, we will take steps to address and escalate the issue to the association's board or higher-level policymakers. We will present a comprehensive analysis of our perspectives and suggest resolution or corrective action plans to effectively resolve these inconsistencies.

W6.6

(W6.6) Did your organization include information about its response to water-related risks in its most recent mainstream financial report?

Yes (you may attach the report - this is optional)
Musim-Mas-SR2021.pdf
Musim-Mas-2020-Sustainability-Policy-1.pdf

Musim Mas is a private company, and we do not publish financial reports. However, we do include information about our response to water-related risks in our Sustainability Report and Sustainability Policy.

W7. Business strategy

W7.1

(W7.1) Are water-related issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are water-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, water-related issues are integrated	21-30	Water-related issues such as water availability and precipitation can affect our production yield which may disrupt our supply chain. To anticipate the risks of the potential impact, we refreshed our Sustainability Policy (2020-2025) which outlines our sustainability commitments such as water and NDPE commitments. Toward the climate transition of net zero by 2050, we looked at scenario analysis on our operations' risk exposure to various physical risks such as drought, sea level rise, and flood in a timeframe of 2001-2050 using the Climate Change Knowledge Portal by Worldbank. Moreover, we used the WRI Aqueduct Water Risk Atlas tool to assess the water stress up to the 2040 timeframe. Through our policy, we take commitment to water accountability, with respect to water quantity and quality, as well as equity (extraction, use, treatment, and discharge, and management of water sources according to best practices). To monitor our adherence, we are annually audited and certified against various sustainability schemes such as POIG and RSPO which consider water aspects. Moreover, water management plans are socialized among relevant stakeholders ensuring awareness of water aspects including managing riparian buffer zones, fertilizer application management, and water efficiency. We annually publish our sustainability progress through Sustainability Report including water use intensity and water consumption.
Strategy for achieving long-term objectives	Yes, water-related issues are integrated	21-30	As stipulated in our Sustainability Policy, water-related issues are integrated into Musim Mas operations with respect to water quantity and quality, as well as equity. We adhere to regulatory standards and sector-specific sustainability certification schemes. In 2022, we implemented the following practices: - Utilize scenario analysis tools such as Climate Change Knowledge Portal and WRI Aqueduct Water Risk Atlas tool to look at our operations' risk exposure to physical risks (drought, sea level rise, and flood) and water stress in a timeframe of 2001-2050 and 2040 respectively - We set a target to achieve water use intensity to be below 1.2 m3/MT FFB processed. In 2022, our mills' water use intensity is 1.17 m3/MT FFB processed in line with the set target. - We continue to achieve and maintain 100% certification schemes in our operations such as POIG and RSPO where water-related aspects are integrated within its standards and principles. To date, all of our integrated mills continue to maintain their respective schemes. - We strictly manage BOD and COD levels and keep them below regulatory thresholds. We treat all POME before discharging them. On a monthly basis, we assess the BOD and COD levels of our mills through lab testing. To date, there were no instances of non-compliance regarding BOD and COD at our upstream operations. Moreover, we monitor the N & P levels in watercourses. - We are committed to protecting those areas especially HCV 4 in riparian areas.
Financial planning	Yes, water-related issues are integrated	11-15	Water-related issues are also included in our financial planning since water is an important resource for our operations. Toward the climate transition of net zero by 2050, we utilize scenario analysis tools such as Climate Change Knowledge Portal and WRI Aqueduct Water Risk Atlas tool to look at our operations' risk exposure to various physical risks (drought, sea level rise, and flood) and water stress in a timeframe of 2001-2050 and 2040 respectively. Depending on the likelihood and exposure of the risk to our operations, the management would budget in preparation for the current and upcoming action plans/projects. For example, we would budget to construct more water ponds for some units in preparation for the dry season. Realizing the possible water shortages in the future, we are seeking for alternatives to increase water efficiency. This is included in our financial planning. The time horizon of 11-15 years was selected as it aligned with our definition of long-term. As Musim Mas is not a public company, thus, internal figures relating to budget, sales, and profits are not shared externally.

W7.2

(W7.2) What is the trend in your organization's water-related capital expenditure (CAPEX) and operating expenditure (OPEX) for the reporting year, and the anticipated trend for the next reporting year?

Row 1

Water-related CAPEX (+/- % change)
0

Anticipated forward trend for CAPEX (+/- % change)
0

Water-related OPEX (+/- % change)
0

Anticipated forward trend for OPEX (+/- % change)
0

Please explain
N/A

W7.3

(W7.3) Does your organization use scenario analysis to inform its business strategy?

	Use of scenario analysis	Comment
Row 1	Yes	Scenario analysis is used to inform Musim Mas business strategy. Details on the scenario analysis are provided in W7.3a

W7.3a

(W7.3a) Provide details of the scenario analysis, what water-related outcomes were identified, and how they have influenced your organization's business strategy.

	Type of scenario analysis used	Parameters, assumptions, analytical choices	Description of possible water-related outcomes	Influence on business strategy
Row 1	Water-related Climate-related	Our main operations are located in Indonesia. Hence, scenario analysis of the physical risks is assessed for our operations in Indonesia. 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). Moreover, 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. In relation to the water-related scenario, we used the WRI Aqueduct Water Risk Atlas tool to assess the water stress up to the 2040 timeframe.	Our upstream operations of plantations and mills are all located in Indonesia specifically in Sumatra and Kalimantan regions. These operations require water for plant growth and production processes respectively. According to the WRI Aqueduct Water Risk Atlas, the water stress risk is likely to increase by 1-1.4x in 2040 compared to the baseline. 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.	As stipulated in our Sustainability Policy, water-related issues are integrated into Musim Mas operations with respect to water quantity and quality, as well as equity. In 2022, Musim Mas implemented the following practices: -To ensure water efficiency in our mills, we set a target to achieve water use intensity to be below 1.2 m3/MT FFB processed (no end date). In 2022, our mills' water use intensity is 1.17 m3/MT FFB processed in line with the set target. - We adhere to relevant regulatory standards (no end date). - We continue to achieve and maintain certification schemes in our operations such as POIG and RSPO where water-related aspects are integrated within its standards and principles (no end date). To date, all of our integrated mills continue to maintain their respective schemes. - We strictly manage BOD and COD levels and keep them below regulatory thresholds (no end date). We treat all effluents before discharging them and assess the BOD and COD levels of the effluents monthly. To date, there were no instances of non-compliance regarding BOD and COD at our upstream operations. Moreover, we monitor the N & P levels in watercourses. - We are committed to protecting those areas especially HCV 4 in riparian areas (no end date) - Operate 100% zero waste mills utilizing dried decanter solid, boiler ash, and POME to be repurposed as organic fertilizer and land application respectively which improves soil nutrition and moisture retention capability (no end date)

W7.4

(W7.4) Does your company use an internal price on water?

Row 1

Does your company use an internal price on water?

Yes

Please explain

Aligned with the sustainability policy and SDG 6, we provide adequate free clean water to all our employees and their households. Through our water allocation system, we ensure that every individual receives 120 litres of water per day (more than national and WHO's recommendations of 50-100 litres). We also partner with public health officials to monitor the quality of the water from wells to track the potential risk of contamination or other issues. On that note, we installed flow meter in our housing areas to monitor our water consumption. We have internal pricing on water for individuals who need more water. This is to ensure that our operations are in line with our water savings commitment.

W7.5

(W7.5) Do you classify any of your current products and/or services as low water impact?

	Products and/or services classified as low water impact	Definition used to classify low water impact	Primary reason for not classifying any of your current products and/or services as low water impact	Please explain
Row 1	Yes	- Product: CPO - Value chain stage: Production - Water aspects considered: Water intensity and quality Impact indicators: 1. Water use (m3) per ton FFB processed 2. BOD and COD levels of the POME from CPO production Threshold and criteria used to define as low water impact: 1. Below 1.2 m3/MT FFB processed 2. BOD below 100 mg/liter and COD below 350 mg/liter Standards considered: 1. SDG 12-15: Responsible consumption and production, Climate action, Life below water, Life on land 2. Regulation of The Minister of Environment of the Republic of Indonesia No. 5 2014 where sectoral standards for wastewater quality are regulated	<Not Applicable>	Crude palm oil (CPO) is one of Musim Mas key products. The waste from CPO production namely Palm Oil Mill Effluent (POME) contains a high amount of biological oxygen demand (BOD) levels and chemical oxygen demand (COD) levels which will negatively impact the watercourses if discharged without treatment. Hence, Musim Mas treats all POME prior to discharging it. The BOD and COD levels are strictly managed and kept below regulatory thresholds to avoid any adverse impact on groundwater and nearby water sources. The BOD and COD values are monthly tested through independent external parties. Moreover, we have set water use intensity target in our mills to achieve 1.2 m3/MT FFB processed or below. As a result, CPO is classified as our low water impact product.

W8. Targets

W8.1

(W8.1) Do you have any water-related targets?

Yes

W8.1a

(W8.1a) Indicate whether you have targets relating to water pollution, water withdrawals, WASH, or other water-related categories.

	Target set in this category	Please explain
Water pollution	Yes	<Not Applicable>
Water withdrawals	Yes	<Not Applicable>
Water, Sanitation, and Hygiene (WASH) services	Yes	<Not Applicable>
Other	No, and we do not plan to within the next two years	n/a

W8.1b

(W8.1b) Provide details of your water-related targets and the progress made.

Target reference number
Target 1

Category of target
Water withdrawals

Target coverage
Business activity

Quantitative metric
Reduction in withdrawals per unit of production

Year target was set
2019

Base year
2019

Base year figure
1.23

Target year
2022

Target year figure
1.2

Reporting year figure
1.2

% of target achieved relative to base year
100

Target status in reporting year
Achieved

Please explain
To ensure water efficiency in our mills, we set a target to achieve water use intensity to be below 1.2 m3/MT FFB processed. In 2022, we achieved our mills' water use intensity of 1.17 m3/MT FFB processed (rounding to 1.2).

Target reference number
Target 2

Category of target
Water pollution

Target coverage
Business activity

Quantitative metric
Substitution of hazardous substances with less harmful substances

Year target was set
2018

Base year
2018

Base year figure
0

Target year
2022

Target year figure
6

Reporting year figure
6

% of target achieved relative to base year
100

Target status in reporting year

Achieved

Please explain
In 2018, we issued a pesticide phase-out plan after an independent review of their use at one of our Riau plantations against Palm Oil Innovation Group (POIG) requirements. We work to achieve our milestones year-on-year and successfully phased out six pesticides as of 2022. The six pesticides are Brodifacoum, Permethrin, Benomyl, Glufosinate-ammonium, Cypermethrin, and Mancozeb.

Target reference number
Target 3

Category of target
Water, Sanitation and Hygiene (WASH) services

Target coverage
Site/facility

Quantitative metric
Other, please specify (Number of wells constructed to provide clean water for employees)

Year target was set
2021

Base year
2021

Base year figure
0

Target year
2022

Target year figure
3

Reporting year figure
3

% of target achieved relative to base year
100

Target status in reporting year
Achieved

Please explain
In line with the target set in 2021, we have constructed three wells for one of our sites in 2022. We drill wells for the workers living in plantations to gain access to clean water.

Find more about our actions on WASH at https://www.musimmas.com/wp-content/uploads/2021/05/Musim-Mas-CSR-Social-Impact-Report_Final.pdf

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W9. Verification

W9.1

(W9.1) Do you verify any other water information reported in your CDP disclosure (not already covered by W5.1a)?
Yes

W9.1a

(W9.1a) Which data points within your CDP disclosure have been verified, and which standards were used?

Disclosure module	Data verified	Verification standard	Please explain
W1 Current state	Water intensity value (W-AC 1.3a)	ISAE 3000	To ensure credibility and transparency, we conduct third-party verification on our mills' water use intensity. The water intensity value of 1.13 m3/MT FFB processed has been verified using ISAE 3000 standards. The latest figure of 1.17 m3/MT FFB processed is currently undergoing verification process at the time of submission.

W10. Plastics

W10.1

(W10.1) Have you mapped where in your value chain plastics are used and/or produced?

	Plastics mapping	Value chain stage	Please explain
Row 1	Not mapped – and we do not plan to within the next two years	<Not Applicable>	N/A

W10.2

(W10.2) Across your value chain, have you assessed the potential environmental and human health impacts of your use and/or production of plastics?

	Impact assessment	Value chain stage	Please explain
Row 1	Not assessed – and we do not plan to within the next two years	<Not Applicable>	N/A

W10.3

(W10.3) Across your value chain, are you exposed to plastics-related risks with the potential to have a substantive financial or strategic impact on your business? If so, provide details.

	Risk exposure	Value chain stage	Type of risk	Please explain
Row 1	Not assessed – and we do not plan to within the next two years	<Not Applicable>	<Not Applicable>	N/A

W10.4

(W10.4) Do you have plastics-related targets, and if so what type?

	Targets in place	Target type	Target metric	Please explain
Row 1	No – and we do not plan to within the next two years	<Not Applicable>	<Not Applicable>	N/A

W10.5

(W10.5) Indicate whether your organization engages in the following activities.

	Activity applies	Comment
Production of plastic polymers	No	Musim Mas is an integrated palm oil company.
Production of durable plastic components	No	Musim Mas is an integrated palm oil company.
Production / commercialization of durable plastic goods (including mixed materials)	No	Musim Mas is an integrated palm oil company.
Production / commercialization of plastic packaging	No	Musim Mas is an integrated palm oil company.
Production of goods packaged in plastics	No	Musim Mas is an integrated palm oil company.
Provision / commercialization of services or goods that use plastic packaging (e.g., retail and food services)	No	Musim Mas is an integrated palm oil company.

W11. Sign off

W-FI

(W-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

W11.1

(W11.1) Provide details for the person that has signed off (approved) your CDP water response.

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

SW. Supply chain module

SW0.1

(SW0.1) What is your organization's annual revenue for the reporting period?

	Annual revenue
Row 1	10800000000

SW1.1

(SW1.1) Could any of your facilities reported in W5.1 have an impact on a requesting CDP supply chain member?

Please select

SW1.2

(SW1.2) Are you able to provide geolocation data for your facilities?

	Are you able to provide geolocation data for your facilities?	Comment
Row 1	No, this is confidential data	n/a

SW2.1

(SW2.1) Please propose any mutually beneficial water-related projects you could collaborate on with specific CDP supply chain members.

SW2.2

(SW2.2) Have any water projects been implemented due to CDP supply chain member engagement?

No

SW3.1

(SW3.1) Provide any available water intensity values for your organization's products or services.

Product name

Crude Palm Oil (CPO)

Water intensity value

1.17

Numerator: Water aspect

Water withdrawn

Denominator

Amount of FFB processed

Comment

n/a

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 indicate your consent for CDP to share contact details with the Pacific Institute to support content for its Water Action Hub website.

Yes, CDP may share our Main User contact details with the Pacific Institute

Please confirm below

I have read and accept the applicable Terms