

TCFD Scenario Analysis of the Maruha Nichiro Group

The Maruha Nichiro Group operates in a broad value chain centered on marine products, from production and procurement to tables around the world. Climate change affects the Group's business through its impact on marine resources and raw material procurement, as well as the suspension of business activities due to large-scale natural disasters. For this reason, we conducted a scenario analysis based on the TCFD recommendations as follows, covering the entire marine products value chain.

Target Units :

>Aquaculture Business (Conducted in FY2021)

>Fisheries Business, Marine Products Trading, Overseas Business, Processed Foods Business, Foodstuff Distribution Business (Conducted in FY2023)

*Refer to pages 2-3 for illustrations of the value chain and characteristics of each unit.

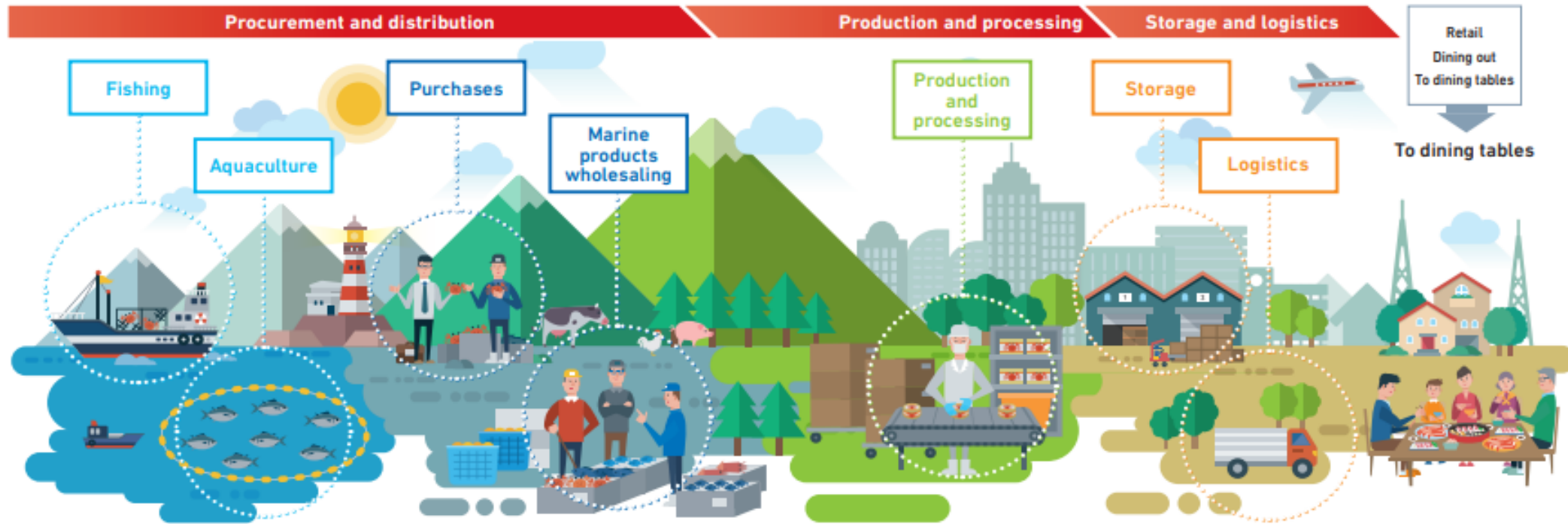
Participating Departments :

Business Planning and Management Team of each Unit, Legal Affairs & Risk Management Department, Finance Department, Accounting Department, Business Planning Department, Production Management Department, etc.

(Secretariat) Sustainability Group of Corporate Planning Department

Assumptions for Strategy / Scenario Analysis (Targeted Business)

Position of the Target Units in the Entire Value Chain



Marine Products Business

- Fisheries Biz Unit
- Aquaculture Biz Unit
- Overseas Biz Unit
- Marine Products Trading Unit

Processed Foods Business and Foodstuff Distribution Business

- Processed Foods Biz Unit
- Foodstuff Distribution Biz Unit

Assumptions for Strategy / Scenario Analysis (Target Projects)

Characteristics of the Target Units

Target Unit	Characteristics
Fishery Biz Unit	Catch and produce sustainably managed marine products in fisheries around the world, supplying high-quality, healthy ingredients to global markets, including Japan.
Aquaculture Biz Unit	Expanding efforts to reduce the environmental impact on natural marine resources, including obtaining various international certifications for aquaculture of species such as Bluefin Tuna, Yellowtail, and Amberjack, and using formulated feeds with reduced fishmeal content. Launched an Atlantic Salmon land-based aquaculture venture in 2022 in collaboration with Mitsubishi Corporation.
Overseas Biz Unit	Expanding business globally including procurement and processing of wild marine resources in Alaska, sales of marine products in Europe, pet food manufacturing in Thailand, and marine products processing and frozen food sales in China and Vietnam
Marine Products Trading	We have a procurement network for marine products both domestically and internationally, allowing us to meet the needs of markets not only in Japan but also in various countries worldwide by ensuring the safe and reliable procurement as well as stable supply of marine products. We also have the capability to process procured marine products within the Group and have strong domestic collection capabilities.
Processed Foods Biz	We sell high value-added products by combining our technological capabilities with stable procurement of raw materials and product development. Our product range includes commercial frozen foods, canned goods, fish sausages, cup jellies, retort pouch foods, seasonings, etc.
Foodstuff Distribution Biz	Combining the Group's capabilities in raw material procurement, product development, and processing technology, we sell products that meet the needs of a wide variety of business categories to mass retailers, restaurants, convenience stores, home delivery co-ops, and nursing care foods, etc. We also have numerous specialized facilities for commercial frozen foods and marine products processing.

Assumptions for Strategy / Scenario Analysis

Adopted scenarios and analysis targets, time horizon

A scenario analysis based on TCFD recommendations was conducted on what business risks could emerge due to climate change, as a result of the transition to a decarbonized society, with the Aquaculture Business Unit analyzed in FY2021 and the five units of Fishery Business, Marine Products Trading, Overseas Business, Processed Foods Business, and Foodstuff Distribution Business in FY2023. The entire value chain, including raw material procurement, was extensively analyzed in the 1.5°C worldview, where decarbonization efforts are advancing, and in the 4°C worldview, where global warming is advancing without any specific mitigation measures.

Predicted temp. increase	Adopted Scenario	Assumed Environment	Analysis Targets	Analysis Time Horizon
1.5°C (2°C scenario for Aquaculture Unit)	【Transition】 IEA NZE 2050	Pathway to stabilize global average temperature at 1.5°C above pre-industrial levels. A scenario in which clean energy policies and investments surge and developed countries reach net zero emissions by 2050, ahead of other countries.	Fishery Business Unit, Aquaculture Business Unit, Marine Products Trading Unit, Overseas Business Unit, Processed Foods Business Unit, Foodstuff Distribution Business Unit	Short-term: 0 ~ 5 years
	【Physical】 SSP1-1.9	Climate policy to limit temperature increase to 1.5°C above pre-industrial levels under sustainable development. Projected net zero GHG emissions in the second half of the 21st century. Steady-state scenario.		Medium term: 5 ~ 10 years
4°C	【Transition】 IEA STEPS	Scenarios reflecting specific policies that countries have already announced at this stage. Assumption that temperature rise will exceed 2°C.		Long term: 10~ years
	【Physical】 SSP5-8.5	High Reference Scenario without Climate Policies under Fossil Fuel-Dependent Development.		

Strategy / Risks and Opportunities

Climate-related risks												
Risk Classification		Risk Description	Indicator	Target Business Units						Impact	Affected period	Scenario
				Fishery	Aquaculture	Overseas	Marine Products Trading	Processed Foods	Foodstuff Distribution			
Transition risk	Policy/Regulation	In-house cost increase due to carbon pricing	cost increase	●	●	●	●	●	●	▼▼▼	medium/long	1.5℃
		Increase in in-house costs due to introduction and switchover to energy-saving and CFC-free equipment	cost increase			●		●	●	▼▼	short/medium	1.5℃
		Increase in storage and logistics costs due to stricter CFC regulations	cost increase			●	●	●	●	▼▼	short/medium	1.5℃
		Increase in operating costs due to stricter regulations on fishing vessels, such as refrigerant regulations and mandatory installation of fishmeal equipment	cost increase			●				▼▼	medium/long	1.5℃
		Fewer fishing vessels and lower catches due to tighter environment-related regulations	net sales decrease	●		●				▼▼▼	medium/long	1.5℃
	Industry/Market	Increase in material procurement costs for alternative plastic raw materials	cost increase		●	●	●	●	●	▼▼	medium/long	1.5℃
		Increase in operating costs in the fishing industry due to higher fuel prices	cost increase	●		●				▼▼▼	short/medium/long	4℃
		Decrease in marine product consumption due to dietary changes caused by rising temperatures	net sales decrease			●	●		●	▼▼	medium/long	4℃
		Increase in room temperature control, cold storage costs, insect control costs, etc. at production sites due to higher average temperatures	cost increase			●	●	●	●	▼▼	medium/long	4℃
	Reputation	Reputation damage and sales decline due to delays in addressing climate-related issues and inability to meet customers' needs for environmentally friendly products	net sales decrease	●			●	●	●	▼▼	medium/long	1.5℃
Physical risk	Acute	Decrease in sales and increased recovery costs due to disasters at own plants, partner plants, and procurement sources, causing production and logistics stoppages	cost increase /net sales decrease		●	●	●	●	●	▼▼	short/medium/long	4℃
	Chronic	Decrease in catches and sales due to changes in fish species and fishing grounds caused by rising sea water temperatures	net sales decrease	●	●	●	●	●	●	▼▼▼	short/medium/long	1.5℃ / 4℃
	Chronic	Increase in costs due to difficulty in procuring crops due to drought	cost increase					●	●	▼▼▼	medium	4℃
	Chronic	Increase in marine products procurement costs due to rising sea water temperatures	cost increase		●		●	●	●	▼▼▼	medium	4℃

Strategy / Risks and Opportunities

Climate-related opportunities

Opportunity Classification	Opportunity Description	Target Business Units						Impact	Affected period
		Fishery	Aquaculture	Overseas	Marine Products Trading	Processed Foods	Foodstuff Distribution		
Resource efficiency	Increase in sales due to effective use of waste materials (residues) for meal (fishmeal)	●	●		●			▲▲	short/long
Energy source	Cost reductions through the use of renewable energy and promotion of energy conservation					●		▲▲	short/long
Products & Services	Increase in sales of environmentally friendly products such as low-carbon products and certified products	●	●	●	●	●	●	▲▲	short/long
	Increase in catch and sales through rapid response to changes in fishing grounds			●	●	●	●	▲▲	short/long
	Increase in sales in alternative protein raw materials due to changes in fish species caused by rising sea water temperatures	●	●		●	●		▲▲▲	short/long
	Increase in sales through development of new products such as disaster food to meet the needs of extreme weather conditions, cool menus, and room-temperature meals that are not affected by temperatures					●	●	▲▲	short/long

- : Risks and opportunities identified as having medium or greater impact in each business unit
- Impact: Risks: Risks ▼▼=medium (Impact on ordinary income 1% to less than 10), ▼▼▼=large (over 10%)
Opportunities ▲▲=medium (Impact on ordinary income 1% to less than 10), ▲▲▲=large (over 10%)

Strategy / Business Impact Assessment based on 1.5°C scenario

Impact of Introducing Carbon Pricing

Risk Classification		Risk Description	Indicator	Target Business Units						Impact	Affected period	Scenario
				Fishery	Aquaculture	Overseas	Marine Products Trading	Processed Foods	Foodstuff Distribution			
Transition risk	Policy/Regulation	In-house cost increase due to carbon pricing	cost increase	●	●	●	●	●	●	▼▼▼	medium/long	1.5°C

The introduction of carbon pricing would have a significant impact across the entire Company. In 2030, **under the 1.5°C scenario**, assuming that CO₂ emissions remain at the current levels (FY2022) without any mitigation measures, **it is estimated that there will be an increase in costs of approximately 4.6 billion yen for the domestic Group. However, if mitigation measures are implemented, achieving a 30% reduction compared to the FY2017 baseline, as stipulated in the Medium-term Management Plan's KPI, it is expected to result in cost savings of slightly more than 1 billion yen.** Assuming a world view in which carbon neutrality is implemented in 2050, Scope 2 emissions, such as electricity, are assumed to be zero because the shift to renewable energy is progressing, and Scope 1 emissions are assumed to continue at the FY2022 level, an increase in costs of approximately 3 billion yen is expected.

Potential Financial Impact	2030	2050	(Billion JPY)
Cost burden of not implementing carbon pricing	4.6	3.0	
Cost burden of carbon pricing implementation	3.6	-	
Reduction amount in carbon pricing due to implementation	1.0	-	

*Calculated based on the NZE scenario published in the World Energy Outlook (WEO) of the International Energy Agency (IEA).

Strategy / Business Impact Assessment based on 4°C scenario

Impact of shutdowns due to flooding

Risk Classification		Risk Description	Indicator	Target Business Units						Impact	Affected period	Scenario
				Fishery	Aquaculture	Overseas	Marine Products Trading	Processed Foods	Foodstuff Distribution			
Physical risk	Acute	Decrease in sales and increased recovery costs due to disasters at own plants, partner plants, and procurement sources, causing production and logistics stoppages	cost increase /net sales decrease		●	●	●	●	●	▼▼	short/ medium/ long	4°C

If our own plants and other manufacturing facilities were to be damaged by flooding and shut down under the 4°C scenario, the impact would be enormous, especially on the Processed Foods Business Unit.

Flood risks at each of the Group's major domestic plants were assessed using the "Water Risk Filter" provided by the World Wide Fund for Nature (WWF).

For the six high-risk and high-importance business sites (*1), the impact of a two-month suspension of operations at each plant due to torrential rain disaster was estimated to be between 400 million yen and 1.8 billion yen.

*1: Oe Plant, Utsunomiya Plant, Gunma Plant, Shimonoseki Plant, Shirataka Plant, Maruha Nichiro Kyushu

Strategy / Business Impact Assessment based on 1.5°C and 4°C scenarios

Business Impact of Marine Resources

Risk Classification		Risk Description	Indicator	Target Business Units						Impact	Affected period	Scenario
				Fishery	Aquaculture	Overseas	Marine Products Trading	Processed Foods	Foodstuff Distribution			
Physical risk	Chronic	Decrease in catches and sales due to changes in fish species and fishing grounds caused by rising sea water temperatures	net sales decrease	●	●	●	●	●	●	▼▼▼	short/medium/long	1.5°C/4°C

Changes in fish species and fishing grounds associated with rising sea water temperatures, in other words, the business impact on marine resources, could have a significant impact on many of our business units.

We calculated the increase and decrease in wild marine products handled by our Group in 2021 based on the FAO (World Food Organization) POTENTIAL FISHERIES AND AQUACULTURE SCENARIOS TO 2050, and found that **in the 1.5°C scenario, production would increase everywhere except in Asia, but in the 4°C scenario, production would decrease worldwide** (see table on the right).

In the 1.5°C scenario, production in Asia is forecasted to decrease, and since Japan already exhibits a noticeable decreasing trend, it is assumed that the entire Asian region will experience a decrease.

	Wild marine resources (2050)		
	2021 Survey (thousand M/T)	1.5°C Scenario	4°C Scenario
Asia	479	↘	↘↘
North and South America	470	↗↗	↘
Europe	223	↗	↘
Oceania	68	↗↗	↘
Others	122	→	→
Total	1362	↗	↘

↗ or ↘ 10% to 20% increase or decrease

↗↗ or ↘↘ Increase or decrease of 20% or more

※ FAO POTENTIAL FISHERIES AND AQUACULTURE SCENARIOS TO 2050

※ The 2021 survey is based on the results of the Group's second marine resources survey.

Strategy / Business Impact Future (Response) Measures

* ●: Risks, ○: Opportunities

Risk/Opportunity Factors		Business Impact	Future measures
Introduction of new regulations	●	Carbon pricing (carbon tax)	Regarding the increase in our own costs: <ul style="list-style-type: none"> • Promotion of renewable energy and energy conservation Improving production efficiency through the optimization of manufacturing facilities • Gaining customer understanding about price adjustments • Investigation into the introduction of natural refrigerant facilities • Investment in energy-efficient equipment (conversion to non-CFC devices, reducing electricity consumption, etc.) • Obtaining carbon-neutral certification from Austral Fisheries and offsetting activities through participation in the Climate Active NETWORK, including tree planting
	●	Cost increase due to installation of energy-saving and CFC-free equipment	
	○	Cost reductions through the use of renewable energy and promotion of energy conservation	
	●	Decrease in fishing vessels and catches due to tighter environment-related regulations	Regarding the increase in supplier costs: <ul style="list-style-type: none"> • Monitoring regulatory policies and trends related to storage fees and logistics costs, and responding promptly and appropriately
Introduction of new regulations	●	Responding to stricter special regulations for fishing vessels	<ul style="list-style-type: none"> • Establishment of investment criteria and processes for new ships (considering internal carbon pricing, etc.) • Measures through discussions and collaborations with various national governments
Resource optimization	○	Expand effective use of waste materials (residues)	
Market Changes	●	Introduction of environmentally friendly materials	<ul style="list-style-type: none"> • Promotion of the introduction of fish meal devices on fishing vessels [Fishery] • Establishment of in-house recycling of waste materials using domestically leftover or unused fish as residual resources. • Effective utilization of feeds for farming species like Yellowtail, Greater Amberjack, and Bluefin Tuna [Aquaculture]
	●	Soaring fuel prices	<ul style="list-style-type: none"> • Collaboration with suppliers for sourcing alternative materials to plastic. • Keep an eye on regulations and technological innovations and respond accordingly • Promotion of recycling across the entire value chain through collaboration with customers • Resource efficiency in container packaging
	●		<ul style="list-style-type: none"> • Monitoring of fuel price trends • Research on alternative fuels

Strategy / Business Impact Future (Response) Measures

* ●: Risks, ●: Opportunities

Risk/Opportunity Factors		Business Impact	Future measures
Products & Services	●	Decrease in marine product consumption due to dietary changes associated with rising temperatures	• Strengthening product lineups of products preferred even in rising temperatures (to complement declining demand for hot pots)
	●	Increased sales of environmentally friendly products such as low-carbon products and certified products	• Promote MSC and ASC certifications • Expand carbon offset and carbon footprint products
	●	Increased sales of new products to meet extreme weather needs	• Expansion of disaster food, cool menus, and room temperature meals that are not affected by temperatures
Reputation	●	Loss of reputation and sales decline due to delayed response to climate-related issues and lack of response to ethical consumption	• Expanded disclosure of climate change initiatives • Expand dialogue with investors • Promote PR for cooking methods and products with low GHG emissions • Promote PR of products through LCA and carbon footprinting
Intensifying natural disasters	●	Damage to own plants, partner plants, or suppliers, production or logistics stoppage	• Optimization and reorganization of factory locations • Diversification of production and logistics • Inventory management with highly accurate weather forecasts • Business Continuity Plan (BCP) • Participation in mutual aid and insurance programs • Introduction of floating and sinking fish tanks [Aquaculture]
Temperature increase	●	Room temperature control, refrigeration costs, and insect control at production sites	• Thorough temperature control of the work environment • Promote energy conservation and insulation
	●	Higher crop procurement costs due to drought	• Identification of procurement sources with high drought risk • Seek alternative procurement routes and alternative raw materials (e.g., replace wheat flour with rice flour + gluten, rice with wheat, etc.) • Search for heat-tolerant crops

Strategy / Business Impact Future (Response) Measures

* ●: Risks, ●: Opportunities

Risk/Opportunity Factors		Business Impact	Future measures
Changes in Marine Environment	●	Decrease in catch and sales due to changes in fish species and fishing grounds	<ul style="list-style-type: none"> • Actively working and gathering information in the SeaBOS Task Force • Securing access to fishing rights in northern markets [Overseas] • Alliance with partners with fishing rights [Overseas] • Reduction of marine pollution risk (e.g., optimization of feeding amounts through introduction of AI-tracking fish counting machines) [Aquaculture]
	●	Increased sales due to rapid response to changes in fishing grounds	<ul style="list-style-type: none"> • Increased production of artificial seedlings (Complete aquaculture of Bluefin Tuna, hatched Yellowtail, hatched Greater Amberjack) = supplementation and replacement of natural seedlings [Aquaculture]. • Reinforcement of R&D system for aquaculture technology [Aquaculture]
	●	Expansion of alternative protein sources due to changes in fish species	<ul style="list-style-type: none"> • Establishment of fish cell culture technology (in collaboration with Integriculture) • Technology development for the implementation of alternative protein sources, commercialized production of cultured fish meat and food processing
	●	Increase in marine product procurement costs due to rising sea water temperatures	<ul style="list-style-type: none"> • Rapid changes in procurement sources [Fishery Trading] [Processed Foods] • Seek alternative raw materials (change fish species) • Research and development of fish and aquaculture methods that are resistant to typhoons, red tide, and other external factors [Aquaculture] • Development of compound feed (to stabilize feed cost and quality, and to design and transfer optimal nutrients for growth) [Aquaculture] • Active use of fish meal [Aquaculture]

Future response measures to business impacts in line with the scenario analysis results will be reflected in our business plans, starting with the Medium-term Management Plan "For the ocean, for life MNV 2024."

These responses, prioritized by urgency, will be integrated into subsequent management plans to ensure alignment with our overall business strategy.