

**MS&AD Green Resilience Report 2024
(TCFD•TNFD Report)**

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Climate/Nature-Related Financial Disclosure

● Publication of the “MS&AD Green Resilience” Report 2024 (TCFD・TNFD Report)

In August 2023, the MS&AD Group became the first Japanese company to publish a report integrating climate and nature (Climate/Nature-Related Financial Disclosure- TCFD・TNFD Report). At the time, because the Taskforce on Nature-related Financial Disclosures framework (v1.0) had not yet been published, we referred to the beta version (ver. 0.4).

This report takes an integrated approach to addressing the Group's climate change responses as well as the conservation and restoration of natural capital and biodiversity, in line with the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD) and the Task Force on Nature-related Financial Disclosures (TNFD).

In FY2024, the Group revised the title of the report to “MS&AD Green Resilience Report 2024” (TCFD・TNFD Report).

We would like to provide useful information on the Group's climate/ nature-related risks/opportunities, particularly to investors and analysts. We also hope to clearly communicate our “Green Resilience” initiatives, which aim to achieve a “Resilient and Sustainable Society” and enhance the resilience of the Group's businesses, to our many various stakeholders.

● Green Resilience

As an insurance/financial services group focused on the non-life insurance business, the Group is committed to achieving a resilient and sustainable society by conserving nature, protecting biodiversity, promoting decarbonization, contributing to disaster prevention and mitigation, and revitalizing local communities through our “Green Resilience” initiatives.

[Green Resilience]

- The concept of Nature-based Solutions (NbS), which focuses on conserving and regenerating nature and utilizing its functions for disaster prevention and mitigation, decarbonization, regional revitalization, and mental and physical health, is gaining global attention and is also being incorporated into national policies.
- Since 2015, the Group has adopted the concept of “Green Resilience,” which leverages the benefits of nature to protect biodiversity, promote decarbonization, mitigate damage from natural disasters, and revitalize the region through nature's intrinsic appeal, creating a virtuous cycle. We have been involved in measures to conserve and restore the natural environment, as well as joint initiatives with local governments and universities.
- Starting in FY2022, we launched new environmental conservation activities for wetlands, seaweed beds and satoyama (rural landscapes where human activities and nature coexist harmoniously, promoting biodiversity and sustainable land use) in three locations: Kuma River in Kumamoto Prefecture, Minamisanriku Town in Miyagi Prefecture, and Inbanuma Marsh in Chiba Prefecture.

MS&ADは、リスクソリューションのプラットフォームです。

グリーンレジリエンスで、いい方の未来へ。

蒼天の空、紺碧の海、草青む大地。
日本国では、空も、海も、森も「あな」。
それは、香々しく、みずみずしい、生き生きとした色。
あな、の一言であらわされるほど、日本は昔から自然とともに生き、
その恵みを持続可能な形で使い、心豊かで、安全な暮らしに役立ててきました。
しかし、近年、気候変動による自然災害が激化しています。
「100年に一度の災害」なんて言葉をニュースで聞くことも、めずらしくなくなりました。
自然と、人の暮らしのバランスが、なにかおかしい。
蒼い空の下、青い草の上で、静い海を眺めていた日々。
それを骨髄にしよう前に、MS&ADははじめています。
グリーンレジリエンス。あな、みなさんも一緒に。

「MS&ADグリーンアースプロジェクト」が
本物始動。くわしくはこちらへ

MS&ADは、自然を保全し、生物の多様性を守りながら、
防災・減災に役立て、その魅力で地域を活性化する
「グリーンレジリエンス」に取り組んでいます。

宮城県三陸町
「いのちめぐるまちプロジェクト」
東日本大震災で壊れたアサギの森を再生し、森の生態系の保全と観光振興を促し、防災機能を高める取り組みです。

千葉県印旛郡
「荒山と水循環プロジェクト」
谷津、草原や林が取り残された「荒山」を保全し、美しい水と食料、水質を向上させる水循環の基盤づくりに取り組んでいます。

熊本県阿蘇市
「熊の尾根治水プロジェクト」
熊鷹が暮らしを営む阿蘇市阿蘇郡に、自然と人間の共生、熊鷹の野生環境の向上を図り、防災・減災と地方創生に貢献します。

MS&AD MS&ADインシュアランスグループ

三井住友海上

あいおいニッセイ同和損保

三井ダイレクト損保

三井住友海上あいおい生命

三井住友海上プライマリー生命

CEO Message

● Global Environment and Insurance/Financial Services

According to the World Meteorological Organization, 2023 was the hottest year on record, with natural disasters such as frequent large-scale floods and forest fires causing significant damage across the globe. Despite fewer typhoons, the increased occurrence of hailstorms and other factors has made underwriting profit in the domestic non-life insurance business very challenging in recent years. Overseas, massive forest fires, the largest on record, have occurred in places like Canada and Maui Island in Hawaii, making it a challenge to control the volatility of natural disaster risk in our international operations as well.

Non-life insurance, the core business of the Group, covers various natural disaster risks including typhoons, storm surges, torrential rain, floods, hailstorms, and forest fires to provide compensation to individual and corporate customers. Underwriting and asset management are the two pillars of revenue in our business activities, and like other financial institutions, we generate revenue by managing the funds entrusted to us by our customers. However, natural disasters have a significant impact on revenue from insurance, which is a key feature of the business model. In other words, we believe that non-life insurance is a business that will grow alongside a sustainable society and economy in harmony with the natural environment.



● Group Initiatives

Therefore, with “Symbiosis with the global environment (Planetary Health)” as one of our priority issues and adopting an integrated approach, the Group has been taking “action on climate change” and “improving the sustainability of natural capital” with the aim of enhancing society’s resilience.

In November 2023, we became the first domestic non-life insurance company group to set and announce interim targets for reducing greenhouse gas emissions by FY2030 for our underwriting and investment/loan portfolio companies. Non-life insurance is an integral part of society’s infrastructure. We aim to support the transition to net zero through dialogue with customers in a wide range of industries by proposing solutions and growing in concert with society.

An employee of the Group was appointed as a member of the TNFD (Taskforce on Nature-related Financial Disclosures), which was established in June 2021. This highlights our contribution to the creation of international rules for the disclosure of nature-related information in corporate activities. Viewing nature-related risks as a key business issue, we are committed to working alongside our customers to improve the sustainability of natural capital through leveraging our knowledge and network of consulting services, leading the way ahead of our competitors.

In recent years, “Nature-based Solutions,” which utilize the functions of nature to solve social issues, have been gaining global attention. These include disaster prevention and mitigation utilizing nature, carbon sequestration and storage, and the promotion of primary industries that add value through symbiosis with nature, such as organic farming. The Group is working on initiatives governed by the concept of “Green Resilience,” which creates a virtuous cycle that leverages the benefits of nature, protects biodiversity, mitigates damage from natural disasters, and revitalizes local communities.

The “MS&AD Green Earth Project” the Group has been working on, as part of our “Green Resilience” initiatives, involves working with governments, research institutions, and NPOs on activities to conserve and restore wetlands, satoyama and seaweed beds.

In June 2024, I personally participated in wetland conservation activities in the Kuma River Basin in Kumamoto Prefecture. When you visit a rural area, you gain a clearer idea of what is going on there, the changes affecting local industries, and the challenges faced by the local people. I also feel that the involvement of the Group in the local community is bringing a fresh breeze and perspective from the outside that helps to accelerate collaboration among the various local stakeholders. While there are some issues that we cannot resolve on our own, I hope we can act as catalyst, fostering cooperation with various stakeholders in each region.

● Significance of the MS&AD Green Resilience Report

In response to a business environment increasingly affected by climate change and damage to natural capital, the Group is committed to continually providing value to society by helping to create a healthy global environment. With this vision in mind, we named the report the “Green Resilience Report” and we are conducting various analyses to explore the sustainability of both the Group and society.

An industry-specific analysis of dependencies and impacts on both climate and nature is one example. The analysis revealed that water resource depletion is a major business risk for many companies. As urbanization and land development continue to advance, we expect that the development of facilities such as “rain gardens” to store and absorb rainwater will enhance the sustainability of water resources and help mitigate flood damage in urban rivers.

It goes without saying again that the global environment is the foundation of both society and the economy, and is essential for companies to engage in economic activities that are sustainable. If the importance of an integrated approach to climate and nature becomes a shared understanding across society through the establishment of a method to identify dependencies and impacts on both climate and nature, a framework will be formed to increase corporate value by reducing risks.

We will continue to take on new analytical challenges and present our findings to society, aiming to deepen our dialogue with our corporate clients and the wider community using this report as a foundation. Through these initiatives, we are convinced that the resilience of both our business and society will be enhanced.

Shinichiro Funabiki

Representative Director
President & CEO

Priority Issues in Sustainability

The Group selects social issues that need to be resolved, taking into account common global goals and international guidelines and frameworks. We then evaluate the impact of these issues on stakeholder's evaluations and decision-making as well as the impact on the Group's business. Those with the greatest significance to both parties are identified as our materialities (for the details, see "Identifying Materiality" in the Sustainability Report of the MS&AD Insurance Group). Having determined the priority issues as "Planetary Health (Symbiosis with global environment)," "Resilience (Safe and secure society)," and "Well-being (Happiness of diverse people)", the Group is actively working towards resolving them.

Obviously, "Happiness of diverse people" is supported by a "Safe and secure society" and a "Safe and secure society" is dependent on "Symbiosis with the global environment," as indicated by the Wedding Cake Model, in which 17 SDGs are organized into three layers: "Nature," "Society," and "People." As the three goals are closely related, we need to work on them in an integrated manner. As an insurance company, we are working in cooperation with our stakeholders to promote the initiatives in order to establish a nature-positive, safe and secure society that is conscious of the importance of coexistence with the global environment and to foster the happiness that is generated by such a society.

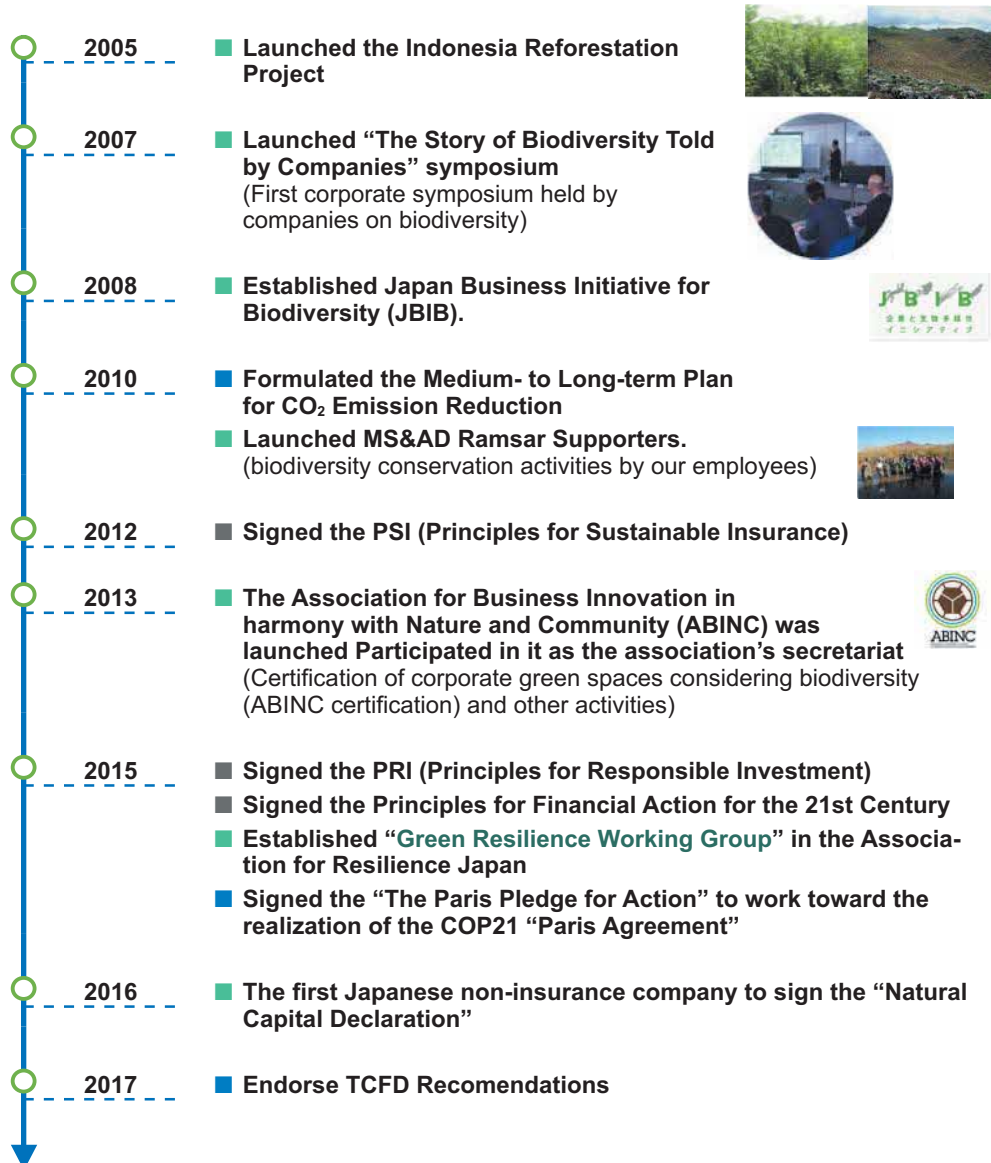
We believe that the materiality included in "Planetary Health (Symbiosis with the global environment)" is directly connected to the response to climate change and the conservation and restoration of natural capital and biodiversity, and this is the foundation which supports both "Resilience (Safe and secure society)," and "Well-being (Happiness of diverse people),"

The Group pledges in its Mission (social mission) "to contribute to the development of a vibrant society and help secure a sound future for the planet by enabling safety and peace of mind through the global insurance and financial services business." It is essential for us to work together with our business partners in all industries to support the transition to a society that coexists in harmony with the global environment so that we can continue to provide sustainable coverage in a world where natural disaster risks are increasing due to the progression of climate change and damage to natural capital.

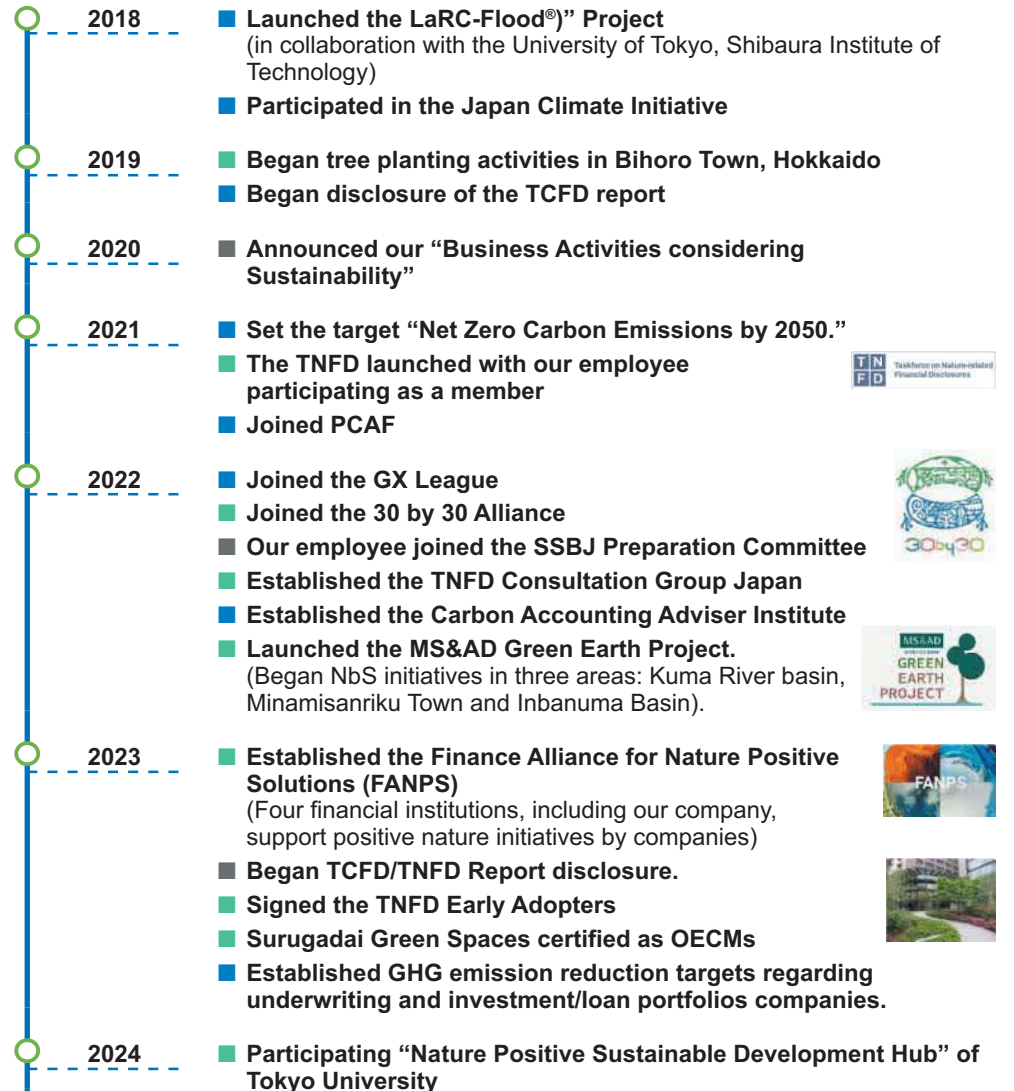


Priority Issues	Major Initiatives
	Well-being <ul style="list-style-type: none"> Customer well-being Promotion of respect for human rights Employee well-being
	Resilience <ul style="list-style-type: none"> Measures to address new risks Loss prevention/mitigation Creation of a resilient and inclusive society (Regional revitalization)
	Planetary Health <ul style="list-style-type: none"> Action on climate change Improvement of sustainability of natural capital

Climate/Nature-related Initiatives of MS&AD Insurance Group



■ Related to climate change ■ Related to natural capital ■ Sustainability in general



TNFD General Requirements

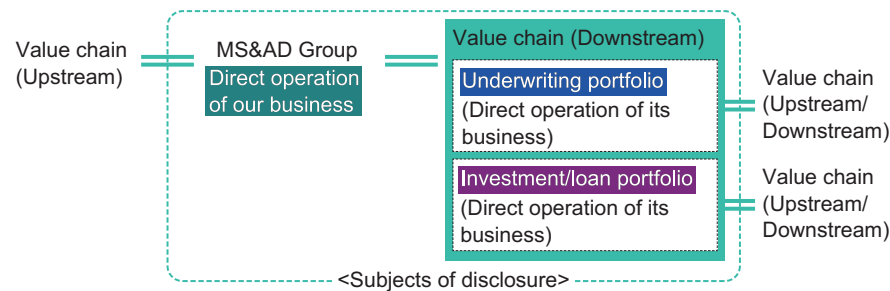
(i) The application of materiality

The Group evaluates the impact on stakeholder's evaluation and decision-making and the impact on the Group's business, and identifies our materialities. Based on the materialities identified, determining "Planetary Health (Symbiosis with the global environment)," "Resilience (Safe and secure society)," and "Well-being (Happiness of diverse people)" as priority issues, the Group has been working to resolve them.

* For the details, refer to "Identifying Materiality" in the Sustainability Report of the MS&AD Insurance Group.

(ii) The scope of disclosures

This report analyzes climate/ nature-related risks/opportunities for the Group's domestic and overseas activities (direct operation of our business, underwriting and investments/loans), and also provides a risk analysis of climate/ nature-related risks for each industry sector among our underwriting and investment/loan portfolio clients.



(iii) The location of nature-related issues

Although we have begun analyzing regional nature-related risks associated with the direct operation of our business and downstream in the value chain (underwriting portfolio companies and investment/loan portfolio companies), as the number of underwriting portfolio companies is very small, we will continue research on analysis tools and databases to further expand the scope of our analyses.

(iv) Integration with other sustainability-related disclosures

As stated at the beginning, the Group is working on initiatives, taking an integrated approach to action on climate changes, enhancement of sustainability of natural capital, and preservation/ recovery of biodiversity. Following the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD) and the Task Force on Nature-related Financial Disclosures (TNFD), we provide disclosures on both factors in an integrated manner.

Initiatives related to sustainability other than climate/nature-related issues are disclosed in the MS&AD Sustainability Report.

* Access our Sustainability Report at the URL below:

<https://www.ms-ad-hd.com/ja/csr.html>

(v) The time horizons considered

The time horizons for the disclosures in this report are as follows:

Short-term: 2025 (End of the Medium-Term Management Plan); Medium-term: 2030 (Target year for the interim targets); Long-term: 2050

(vi) The engagement of Indigenous Peoples, Local Communities and affected stakeholders in the identification and assessment of the organization's nature-related issues

With regard to underwriting, we provide insurance to companies and individuals throughout Japan. Together with our insurance agencies, we actively engage with local stakeholders including municipalities and local businesses in various regions on climate/ nature-related risks, particularly in the context of adaptation to climate change for disaster prevention and mitigation. We are also promoting collective action toward a nature-positive transition by involving local stakeholders and research institutions, aiming to mitigate damage caused by natural disasters, recharge water resources, conserve biodiversity, and revitalize primary industries. (For details, see page 40)

We have just begun analyzing the regional climate/ nature-related risks associated with the direct operations and value chains of individual companies in our underwriting, investment and financing, and have not yet reached the level of precise assessment needed for effective engagement. We will continue to work hard to identify the issues.

We will continue to engage in dialogue with NPOs/NGOs about what risks may be associated with the local natural environment, although they are not specific local stakeholders, and will consider how risk assessment should be conducted. In addition, we are exchanging opinions with relevant organizations on the topics of greenhouse gas ("GHG") emissions and loss of biodiversity, which may pose significant risks to the local climate and environment.

I. Governance

As a company with an Audit & Supervisory Board, the Group has been endeavoring to improve governance by ensuring that independently appointed Audit & Supervisory Board Members appropriately act in their auditing functions, in addition to ensuring that the Board of Directors appropriately acts in its oversight functions, while strengthening the functions of each and actively disclosing information.

In the area of sustainability, our governance structure, including climate/ nature-related matters, consists of the Board of Directors, the Group Management Committee, and Task-Specific Committees.

[Board of Directors]

The Board of Directors discusses and makes decisions on important matters regarding management policies, management strategies and capital policy, including climate/ nature-related issues, and also oversees the execution of duties by directors and executive officers.

[Group Management Committee]

The Group Management Committee discusses management policies, management strategies, and other matters that are priority issues to the Group management, including those related to climate/nature, and also monitors specific business operations.

Sustainability-related issues and initiatives are reported to both the Board of Directors and the Group Management Committee for determination after discussion by, primarily, the Sustainability Committee and the ERM Committee, which are Task-Specific Committees

[Sustainability Committee]

The Sustainability Committee, headed by the Group CSuO (Chief Sustainability Officer), discusses policies, plans, and strategies, etc. for addressing sustainability issues, including KPI setting for climate/ nature-related risks/opportunities. In FY 2023, the committee met four times under the chairmanship of the Group CSuO. The main topics of discussion included FY2023 sustainability initiatives, equity initiatives of DE&I, Group initiatives for respecting human rights, climate change, natural capital-related disclosures, GHG emissions reduction targets for our business partners and the Group's initiatives, external collaboration in the areas of natural capital and climate change, and sustainability initiatives of the Group's medium-term management plan stage 2. These discussions were reported to the Board of Directors.

[ERM Committee]

The ERM Committee, headed by the Group CFO and the Group CRO, discusses and coordinates important matters concerning ERM, as well as monitoring the status of risk, return, and capital and the status of risk management, including climate/ nature-related risks and other matters. It was held nine times in FY 2023. At the meeting held in February 2024, discussions included the subject of "intensifying conflicts within and between countries, political, economic, and social divisions and polarization, and security crises" as a Group Material Risk, which should be handled by management, and risk management with ongoing attention to "climate change," and the Board of Directors determined the Group Material Risk. In addition, the ERM Committee discusses such issues as improving handling of natural catastrophic events including climate change and continuing monitoring of "depletion of natural capital (exhaustion of resources, deterioration of and

crises of ecosystems, and human-induced pollution and accidents that cause major damage to the environment)" as examples of risk events which could adversely affect medium- to long-term Group management and management should also be conscious of (Group Emerging Risks). Details of the discussion are reported to the Board of Directors.

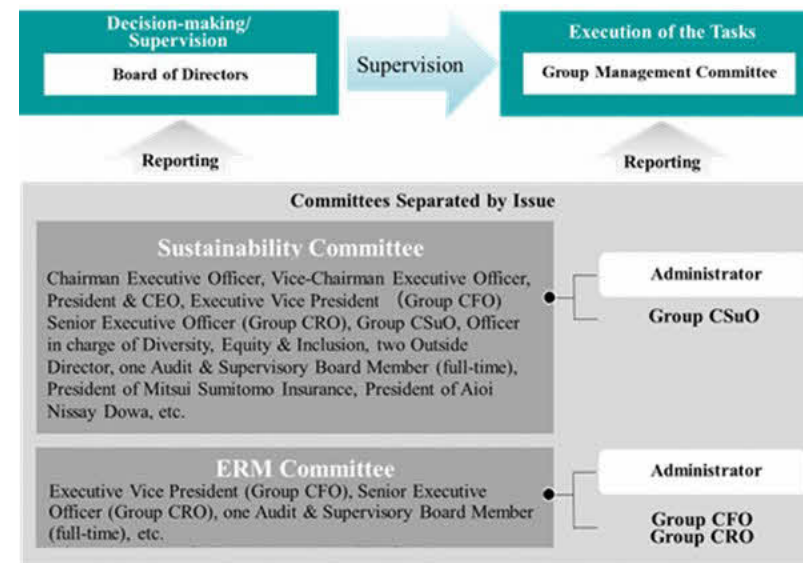
<Main Roles>

Sustainability Committee

- Discusses policies, plans, and strategies for addressing sustainability issues.
- Sets KPIs for climate/ nature-related risks/opportunities etc.

ERM Committee

- Discusses and coordinates important matters concerning ERM.
- Monitors the status of risk/return/capital and the status of risk management, including climate/ nature-related risks and other matters.



Internal control (<https://www.ms-ad-hd.com/en/group/value/group.html>)

● Setting KPIs

In its medium-term management plan, aiming to become a “Group which supports a resilient and sustainable society,” the Group has set KPIs for not only financial indicators such as profitability and soundness, but also non-financial indicators for sustainability-related items, and monitors them on a regular basis.

KPIs for non-financial indicators have been set for each of the three priority issues determined based on our materialities. Major KPIs include GHG emissions reduction rates, rate of increase in the number of accepted policies for products which help improve the resilience of society, and number of policies in force for products which help solve health-related social issues, which are reflected to the remuneration of directors.

● Skills Matrix of Officers

In order to promote debate from diverse viewpoints in our efforts to reach the goal of achieving growth strategy for the Group, the Nomination Committee as an internal committee of the Board of Directors deliberates and decides regarding skills necessary to assure the effectiveness of the Board of Directors (knowledge, experience, and capability) from the standpoint of supervising the decisions made and execution of duties on important matters required for management strategy, etc.

The skills are categorized as follows: (1) Base skills that are generally required: “Corporate management,” “human resources and human asset development,” “legal affairs and compliance,” “risk management,” and “finance and accounting,” (2) Skills complementing the fact that the core business of the MS&AD Group is insurance, and that we engage in business globally: “Insurance business” and “internationality,” and (3) Skills that take into account our current business environment and that are necessary to address business reform and issues considered important by the market: “IT and digital” and “sustainability.”

● Officer Remuneration System

As part of the initiatives contributing to medium- to long-term performance, we have non-financial indicators reflected in the performance-linked remuneration for directors excluding external directors.

As evaluation items for non-financial indicators, “Basic strategies” and “Platforms” that support the basic strategies have been selected in order to realize “A corporate group that supports a resilient and sustainable society,” which is an aspiration of the Group’s Medium-Term Management Plan (2022-2025). Countermeasures against climate change and initiatives related to the improvement of the sustainability of natural capital are included in the evaluation of the Platform (Sustainability).

	Evaluation item
Basic strategies	○ Value (creating value)
	○ Transformation (business transformation)
	○ Synergy (demonstrating Group synergy)
Platforms	○ Sustainability
	○ Quality
	○ Human resources
	○ ERM

➤ Policies for determining the content of individual remuneration for Directors, etc.
(<https://www.ms-ad-hd.com/en/group/value/corporate.html#015>)

[Skills Matrix of Directors, Audit & Supervisory Board Members, and Executive Officers]

Officer	Corporate management	International	IT/digital	Sustainability	Personnel affairs/HR development	Legal affairs/Compliance/Internal audit	Risk management	Finance/Accounting	Insurance business
Director Hara	●	●		●	●	●	●		●
Director Kanaugi	●	●		●	●	●			●
Director Funabiki	●	●	●	●	●	●			●
Director Higuchi	●	●	●	●	●	●	●	●	●
Director Shimazu		●	●	●	●	●	●		●
Director Shirai				●		●	●		●
Outside Director Bando	●	●		●	●	●			
Outside Director Tobimatsu		●				●			
Outside Director Kopp	●	●		●	●				
Outside Director Ishiwata				●					
Outside Director Suzuki	●	●		●	●				
Auditor Sato							●	●	●
Auditor Suzuki							●	●	●
Outside Auditor Uemura						●			
Outside Auditor Kunii	●							●	

In addition, we have installed an executive officer system. The skills for Executive officers who are not Directors are as follows.

Officer	Corporate management	International	IT/digital	Sustainability	Personnel affairs/HR development	Legal affairs/Compliance/Internal audit	Risk management	Finance/Accounting	Insurance business
Executive Officer Tamura		●	●	●	●	●	●	●	●
Executive Officer Motojima	●			●	●				●
Executive Officer Niino	●	●		●	●				●
Executive Officer Hayakawa	●	●						●	●
Executive Officer Tsuda	●	●	●		●				●
Executive Officer Owada		●		●	●			●	●
Executive Officer Arakawa	●			●					●
Executive Officer Tatehata									●
Executive Officer Motoyama			●		●				●
Executive Officer Sato				●		●			●
Executive Officer Hori		●				●	●		●
Executive Officer Morimoto	●	●			●				●

II. Strategy

Non-life insurance is a business where natural disasters have a significant impact on underwriting profitability. Therefore, in addition to the direct operations of the Group, it is important to clarify how the business activities of our underwriting and investment/loan portfolio companies, which are our business partners, depend on and impact the climate and nature, and the kinds of risks and opportunities they may pose to the Group and our business partners in the medium- to long-term, and to provide risk solutions to enhance the resilience of society as a whole, including the Group. To this end, with “Symbiosis with the global environment (Planetary Health)” as one of our priority issues and adopting an integrated approach, the Group has been taking “action on climate change” and “improving the sustainability of natural capital” with the aim of enhancing society’s resilience.

● Importance of integrated initiatives for climate and nature

Under the Paris Agreement, countries agreed to limit the temperature increase from pre-Industrial Revolution levels to as close to 1.5°C as possible. Unfortunately, however, the average global temperature in 2023 is 1.45°C higher than the level (according to the World Meteorological Organization), making it the hottest year on record. Natural disasters such as frequent large-scale floods and forest fires caused significant damage across the globe. Massive forest fires, the largest on record, have occurred in places like Canada, Greece, and Maui Island in Hawaii. These fires were due to heat waves and abnormally high temperatures, resulting in approximately 185,000 km² lost in Canada, making it the largest area ever burned. It is reported that approximately 500 million tons of carbon dioxide (CO₂) were emitted, setting the worst ever record for the highest level of emissions.

Forests absorb CO₂ from the atmosphere through photosynthesis, effectively storing carbon for long periods. However, when fires burn trees, the stored carbon is released back into the atmosphere. The loss of the original vegetation and ecosystems also reduces the sources that absorb CO₂, which has greenhouse effects. As a result, the average global temperature continues to rise, leading to more frequent and intense forest fires, creating a vicious cycle due to high temperatures and arid conditions. Thus, rising temperatures and forest fires may trigger a “feedback loop” in a negative chain reaction.

Forests are also called “green dams,” with the function of storing rainwater in the soil and slowly releasing it into rivers. In addition to preventing drought, they mitigate sudden increases in river water volume, which can prevent floods and landslides. A decline in these natural functions may lead to an increase in losses from natural disasters.

It goes without saying that efforts to reduce GHG emissions, which make a major contribution to global warming, are vital to achieving the goal of Net Zero by 2050. Thus, the Group believes that in order to reduce the damage caused by extreme weather events resulting from climate change, it is important to take an integrated approach that includes both adaptation to climate change and the conservation and restoration of natural capital.

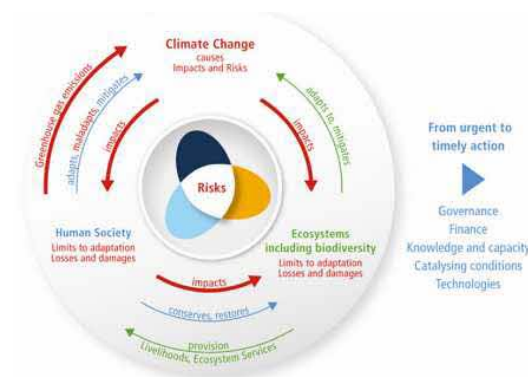
The international target “Kunming-Montreal Biodiversity Framework” was adopted at the 15th Conference of the Parties to the Convention on Biological Diversity (“COP15”), held in December 2022. This framework sets out a so-called “Nature Positive” direction with the aim of “halting and reversing biodiversity loss and putting nature on a recovery path by 2030,” and sets forth a vision of “a world in harmony with nature” by 2050. In addition to resolving climate change-related issues

such as decarbonization and disaster prevention and mitigation, our lives and business activities are supported by the diverse benefits from nature, referred to as ecosystem services. The risks that damage to natural capital poses to business are far greater than we had previously supposed, and this is the background that has led to the publication of the TNFD Recommendations to appropriately assess and disclose nature-related risks.

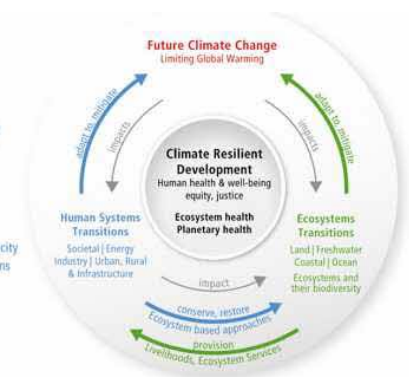
In order to cope with the increasing severity of the unavoidable disasters that will be caused by global warming, and to fulfill our mission “To contribute to the development of a vibrant society and help secure a sound future for the planet, by enabling safety and peace of mind,” the MS&AD Group is committed to facilitating the transition to a society and business model that simultaneously achieves Net Zero and Nature Positive.

From Climate Risk to Climate Resilient Development: Climate, ecosystems (including biodiversity), and human society as interdependent systems

(a) Major Interactions and Trends



(b) Options to reduce climate-related risks and build resilience



Risk propellers indicate that risks arise from a combination of the following factors:

● Climate hazard ● Vulnerability ● Exposure

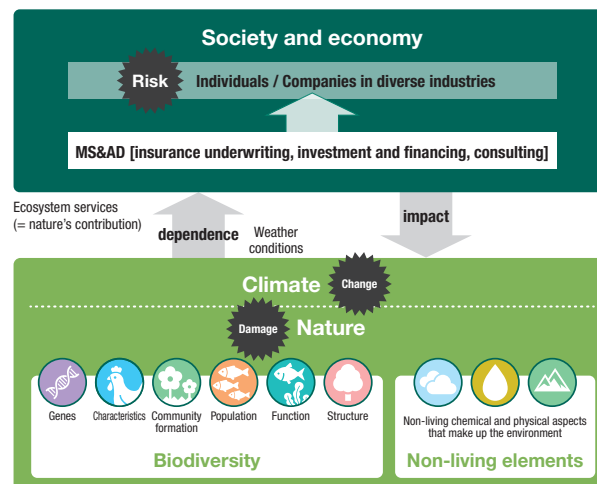
Source: Created based on Working Group II contribution to the Sixth Assessment Report of IPCC

1. Climate/Nature-related dependencies/impacts

(1) What are climate/nature-related dependencies and impacts?

Our society and economy are sustained by various benefits conferred by nature (ecosystem services). According to the World Economic Forum, more than half of the world's GDP is dependent on nature. On the other hand, through our daily lives and business activities, we place a heavy burden on nature. Damage to natural capital and changes in climate systems are having various adverse impacts on society and the economy.

The Group supports the business activities of our customers in all industries through the provision of insurance products and services, investments and loans. Therefore, we believe it is important to understand over the medium- to long-term time horizon how the business activities of our business partners depend on and impact the climate and nature, and how they will affect society and the economy in the future, leading to risks in our customers' business activities.



Source: Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review (London: HM Treasury). (2021.2)
Modified by the Company.

(2) Heat map of dependencies/impacts on nature/climate caused by our clients

Underwriting **Investment/Loan**

The Group, which conducts insurance business, believes that analyzing degrees of dependencies/impacts on nature of our clients (our underwriting and investment/loan portfolio companies) is more important than direct operation of our business. Therefore, we have organized, by industry, into two types of heat maps the situation of dependencies /impacts on nature and our ownership ratio. We have organized each of the dependencies on ecosystem service and the impacts of impact-driver*1 in five stages: Very High (VH), High (H), Medium (M), Low (L) and Very Low (VL). Through this process, we have been able to deepen our understanding of the respective relationships between dependencies /impacts on nature and risks/opportunities in specific industries.

Through the heat mapping process, we found that a number of industries depend on ecosystem services such as "climate adjustment*2," "flood/storm prevention," "groundwater," and "surface water," which exerted significant impacts on "utilization of terrestrial ecosystems," "water use," and "GHG emissions." In particular, water resources, which include "groundwater" and "surface water," represent the highest overall dependence, and the depletion of water resources may lead to business risks for many companies. For the Group, given the significant increase in the occurrence of water-related disasters, partly due to climate change, we recognize the need to consider addressing the degradation of ecosystem services for "flood and storm prevention."

In addition, the Group carefully determines the conduction of a transaction with any industry that exerts major impact on nature due to modification of land and/or water areas (agriculture, forestry, and fisheries involving hydroelectric power generation and large-scale new development) and for business activities in areas that are rich in biodiversity (UNESCO World Natural Heritage Sites and Ramsar Convention-registered wetlands, etc.), based on environmental considerations, etc. of our underwriting and investment/loan portfolio companies.

*1: Factors that exert impacts on nature

*2: A function that regulates the environment and atmosphere on earth's surface and maintains climate conditions in a state suitable for human and biological activities

<Dependency Heat Map>

Ecosystem Service	Animal-based energy	Bio remediation	Buffering and attention	Climate regulation	Dilution by atmosphere	Disease control	Fibres and other materials	Filtration	Flood and storm protection/floods/storms	Genetic materials	Ground water	Maintain nursery habitats	Mass stabilization and erosion control	Mediation of sensory impact	Pest control	Pollination	Soil quality	Surface water	Ventilation	Water flow maintenance	Water quality
Communication Services				M					VH												
Consumer Discretionary		L			L		M	L	M		VH		L					H		M	L
Consumer Staples	VL	M	VH	VH	M	H	VH	M	VH	M	VH	VH	VH	L	H	H	H	VH	M	H	VH
Energy		M		M				M	H		VH		M					H			H
Financials													L								
Health Care		VL						VL		M	M		L					H		M	L
Industrials													M								
Information Technology				L				L			M							M			
Materials	VL	M		VH		H	VH	VL	VH		VH	VH	VH		H	H	H	VH		H	
Real Estate		L						VL	VL		M		L	L				H			
Utilities		VL		VH				L	H		M		H					VH		VH	L

VH H M L VL

It has become clear that there is a high dependence on water resources, and the depletion of water resources may lead to business risks for many companies.

<Impact Heat Map>

Sector	Impact-drivers	Terrestrial ecosystem use	Freshwater ecosystem use	Marine ecosystem use	Water use	Other resource use	GHGs emissions	Non-GHG air pollutants	Water pollutants	Soil pollutants	Solid waste	Disturbance	Biological alterations species
Communication Services	H						H	M	L	L	M	M	H
Consumer Discretionary	H	M	M	VH			VH	H	M	M	M	M	
Consumer Staples	VH	VH	VH	VH	H		VH	H	H	H	H	M	H
Energy	VH	VH	VH	VH			VH	H	M	M	H	H	
Financials	VL			VL			L	VL	VL		H		
Health Care				H			H	M	H	H	H		
Industrials	VH	H	VH	H			VH	H	M	H	M	H	M
Information Technology	L	VL	L	M			VH	M	H	H	M	M	
Materials	VH	H	H	VH			VH	H	H	H	H	H	M
Real Estate	VH	VL	VL	H			H	M	M	M	H	M	M
Utilities	VH	VH	H	VH			VH	H	H	H	H	H	H

It has become clear that terrestrial ecosystem use and water use have a high impact, following GHG emissions, across industries

<Analytical Method for Dependencies/Impacts on Nature and Risks Related to Business Types of Our Underwriting and Investment/Loan Portfolio Companies>

In the heat maps, we organized dependencies and impacts on nature, utilizing “ENCORE*1” and “SBTN Sectorial Materiality Tool for Step 1a*2.” (For terms, see Appendix: Terms in Heat Maps, on page 51.

- Based on the ENCORE analysis results (as of 2023), we have identified business activities that depend on ecosystem services.
- Based on the results of analysis using SBTN Sectorial Materiality Tool for Step 1a, we have identified business activities that have a significant impact on natural capital.
- Insurance retentions cover 73% of premiums written on corporate policies as of March 31, 2023.
- The percentages of investments and loans held covers domestic and foreign listed stocks, domestic and foreign corporate bonds, and domestic and foreign corporate loans in the investment and loan portfolios as of the end of March 2022.

*1: Nature-related risk management analysis tools provided by Natural Capital Finance Alliance and others

*2: A tool provided by SBTs for Nature to screen, by industry, degrees of environmental impact

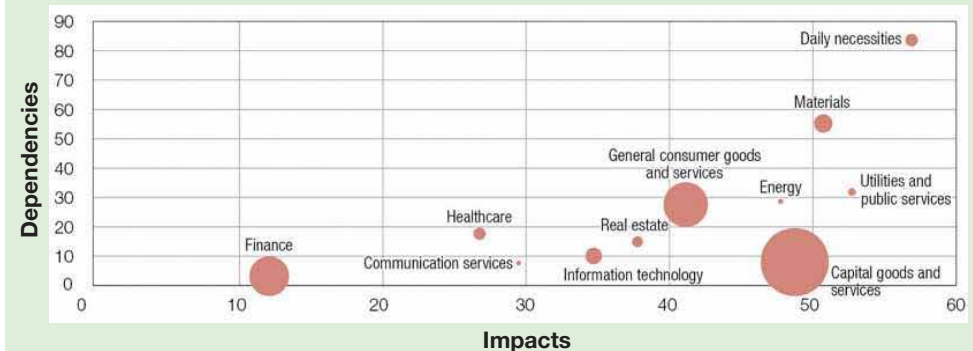
(3) Identifying key industries related to climate and nature in the Group's business activities

Underwriting Investment/Loan

The impact of climate/ nature-related physical risks, such as heat waves and water resource depletion, varies greatly depending on the industry. Transition risks, including technological innovations and changes in policies, laws and regulations, also involve industry-specific societal changes. Therefore, industry-specific analysis is crucial for properly assessing climate/ nature-related risks. For this reason, the Group has identified six key industry sectors, based on the degree of dependencies and impact of our business partners on climate and nature, as well as the percentage of the Group's underwriting and investments/loans held by these industries. In the chapter “Climate/Nature-Related Risks/Opportunities” (page 29) we analyzed the risks and opportunities for these six key industries.

Dependency/Impact and Exposure by Industry

Dependencies, impacts, and exposure by industry



[Method used to identify 6 key industries]



- Extract business activities that depend on ecosystem services and those that have a major large impact on natural capital, and then aggregate add up the evaluations for each item of dependencies and impact (with the impact of GHG emissions impact are calculated with double weighting of other items)
- Combine the percentage of insurance that accounts for 73% of premiums written for contracts with corporates as of March 31, 2023 with the percentage of investments and loans in force covering domestic and foreign listed stocks, domestic and foreign corporate bonds, and domestic and foreign corporate investments/loans as of March 31, 2023.
- Multiply the two combined values to identify the top 6 industries

(4) Mitigation of Dependencies and Impacts on Nature through Insurance Products and Services of the Group **Underwriting**

In order to specifically identify nature-related opportunities for the Group, we believe it is important to understand the dependencies and impacts on nature in individual and corporate business activities that the Group's insurance products and services target. We have analyzed how these activities in the upstream and downstream of the value chain depend on various ecosystem services and how our insurance products and services can mitigate the negative impacts they have on nature. The results are shown in the table below.

In recent years, in fire insurance, which accounts for the majority of premiums written, there has been a significant increase in claims settlements for water-related disasters. This is closely tied to "flood and storm prevention," an ecosystem service that affects coverage for water damage. We will continue to examine how individual and corporate business activities targeted by our insurance products and services interact with nature, and how we can contribute to mitigating negative impacts on the environment. Based on these insights, we will further develop our products and services."

Insurance Type	Individual and Corporate Business Activities	Dependencies upon Nature in Activities	Negative Impact on Nature	The Group's Insurance Products and Services That Mitigate Negative Impacts on Nature
Automobile	• Vehicular travel	<ul style="list-style-type: none"> ◆ Land ◆ Mineral/ energy resources ◇ Prevention of floods/storms ◇ Stabilization/Erosion prevention 	(i) Times of normalcy (no accidents): <ul style="list-style-type: none"> ● GHG emissions ● Air pollution ● Land use change (ecosystem fragmentation by roads) ● Noise, light pollution (ii) In the event of an accident: <ul style="list-style-type: none"> ● Pollution due to accident or damage (iii) After an accident: <ul style="list-style-type: none"> ● Utilization of resources for repairs ● Pollution due to waste generation 	(i) Times of normalcy (no accidents): <ul style="list-style-type: none"> ○ Reduction of GHG emissions through promotion of safe driving by using Telematics technology such as dashcams ○ Prevention of roadkill with animal attention alert function (ii) In the event of an accident: Nothing in particular
Fire/ Facility owners (managers) Liability/ Erection All Risks	• Operation of business bases • Residence • Construction	<ul style="list-style-type: none"> ◆ Land, ocean or freshwater area ◇ Textiles and other materials ◇ Prevention of floods/storms ◇ Stabilization/Erosion prevention ◇ Water cycle 	(i) Times of normalcy (no accidents): <ul style="list-style-type: none"> ● GHG emissions ● Air pollution, water pollution / ocean pollution ● Use change of land, Ocean, freshwater area ● Utilization of resources (ii) In the event of an accident: <ul style="list-style-type: none"> ● Air pollution, water pollution ● Ocean pollution ● Pollution due to disaster-related waste generation (iii) After an accident: <ul style="list-style-type: none"> ● Utilization of resources for repairs, waste generation 	(i) Times of normalcy (no accidents): <ul style="list-style-type: none"> ○ Reduction in GHG emissions through support for carbon- neutral initiatives ○ Mitigation of pollution and utilization of resources by proposing accident prevention measures ○ Water resources conservation through basic evaluation service for water-related risks ○ Conservation of biodiversity through biodiversity-conscious land-use consulting (ii) In the event of an accident: <ul style="list-style-type: none"> ○ Reduction in GHG emissions through offering the Carbon Neutral Support Endorsement ○ Preservation and restoration of ecosystems such as forest resources through rapid forest rehabilitation under the "Forest Keeper," Endorsement for forestry business operators, which covers reforestation costs ○ Endorsement for Extended Compensation for Pollution Damage for facility owners (managers) Liability Insurance (iii) After an accident: <ul style="list-style-type: none"> ○ Resource conservation through utilizing recycled parts and rebuilding
Hull/Cargo	• Land and ship transportation of cargo	<ul style="list-style-type: none"> ◆ Land ◆ Ocean or freshwater area (river, lake) ◇ Mass flow rate mitigation ◇ Dilution by the atmosphere and ecosystem ◇ Prevention of floods/storms ◇ Stabilization/Erosion prevention ◇ Mitigation of sensory impacts 	(i) After an accident: <ul style="list-style-type: none"> ● GHG emissions ● Air pollution, water pollution ● Ocean pollution ● Introduction of alien species ● Undersea noise, light pollution (ii) In the event of an accident: <ul style="list-style-type: none"> ● Pollution due to accident or damage ● Pollution due to waste generation (iii) After an accident: <ul style="list-style-type: none"> ● Utilization of resources for repairs 	(i) Times of normalcy (no accidents): <ul style="list-style-type: none"> ○ Mitigation of pollution and utilization of resources by proposing accident prevention measures (ii) In the event of an accident: <ul style="list-style-type: none"> ○ Preservation and restoration of ecosystems through early removal of ocean pollution under Endorsement for Compensation of Additional Costs for Ocean Pollution (iii) After an accident: Nothing in particular
Life	• Healthy life	<ul style="list-style-type: none"> ◆ Climate adjustment (mitigation of heat environment) ◇ Filtration ◇ Mitigation of sensory impacts ◇ Water quality 	—	—

(5) Interface with sensitive locations based on TNFD

In this section, based on the TNFD Recommendations and Guidance for Financial Institutions*, we have conducted an analysis of the sensitive locations (high-risk areas requiring attention) in the downstream value chain, focusing on our investments/loans portfolio companies, which are important for financial institutions, and the Group's own operational sites. Analyzing the extent to which a company's business operates in locations with significant nature-related issues and/or in areas with high biodiversity vulnerabilities is useful not only for improving a company's resilience to nature-related issues, but also for considering initiatives towards becoming nature-positive.

Note: Strategy D of the TNFD Disclosure Recommendation states: "Disclose the locations of assets and activities which meet the criteria for priority locations in an organization's direct operations and, if possible, in the organization's upstream and downstream value chain." The analysis of high-risk areas requiring attention corresponds to L4 of Locate (Discovering interface with nature) of the LEAP approach proposed by TNFD. L4 requires identification of points of contact with sensitive locations in the value chain that have medium to high levels of dependency and impact.

(i) Assessment of TNFD sensitive locations for in our top 500 investment/loan portfolio companies

Investment/Loan

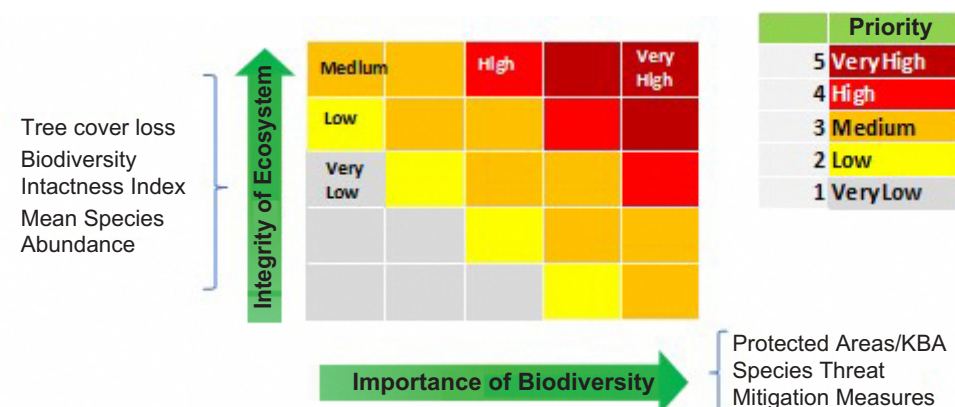
In order to investigate points of contact with sensitive locations in the downstream value chain of the Group, MS&AD InterRisk Research & Consulting, one of the Group companies, conducted an analysis, using the location data (108,600 locations) of the direct operating bases of the 500 companies which are globally distributed companies. This assessment is based on four themes: "Importance of Biodiversity," "Integrity of Ecosystem," which looks at the degree of integrity of an ecosystem (integrity refers to a complete and intact state), "Importance of Ecosystem Service Provision," which looks at the attributes of stakeholders who depend on nature, and "Water-related Physical Risks," which looks at risks associated with water resources in the areas.

Going forward, we will focus on investigating points of contact with sensitive locations in the sectors that have significant contact points with these locations and each of our investment/loan portfolio companies, identify risks arising from such contacts, and provide support for nature-positive initiatives by our investment/loan portfolio companies.

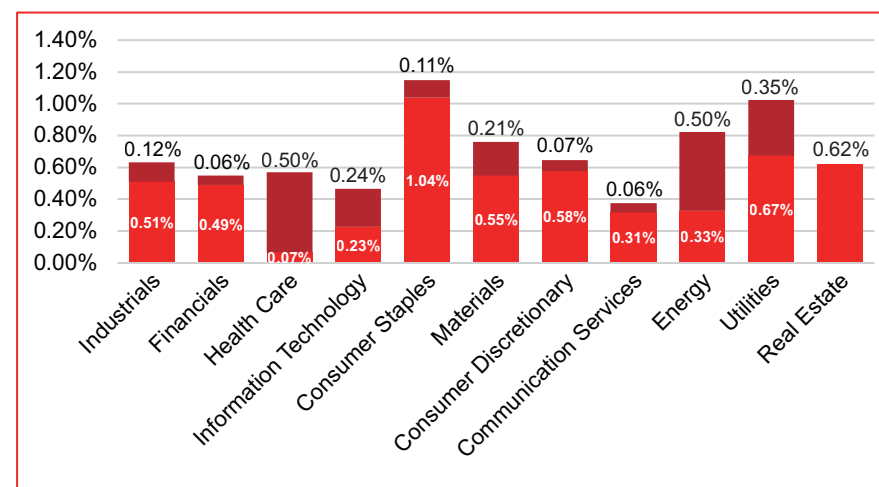
a. Percentage of sensitive locations by sector for each theme

(a) "Importance of Biodiversity" × "Integrity of Ecosystem"

In order to analyze the "Importance of Biodiversity," we rated the direct operation sites of our investment/loan portfolio companies on a 5-point scale from 5 (Very High) to 1 (Very Low) in descending order of the number of operations in areas such as KBAs (Key Biodiversity Areas), protected areas, areas with a high presence of endangered species, areas that have significant socioeconomic functions for many businesses. In order to analyze the "Integrity of Ecosystem," we also rated areas where deforestation is occurring, biodiversity is deteriorating, and species are being lost on the same 5-point scale. The results of these two analyses are then placed in a matrix as shown in the figure below, and areas with 4 (High) or higher in both two ratings are designated as sensitive locations. We calculated the percentage of operation sites in sensitive locations by company, and the average percentage of companies was computed by industry. (Please refer to page 14 for the calculation method and evaluation indicators.)



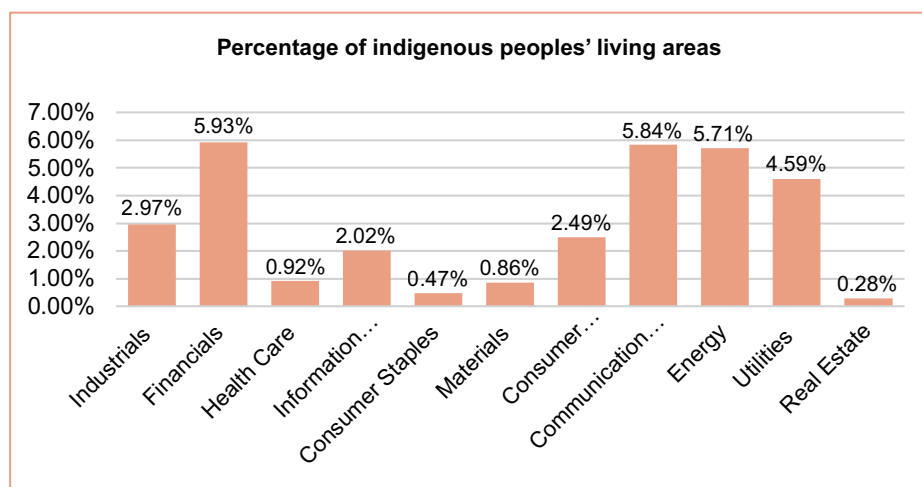
For a given company, when averaging the percentage of sites operating in sensitive locations in terms of "Importance of Biodiversity" and "Integrity of Ecosystem" by industry, the percentage is small, with even the highest industries barely exceeding 1%. We, however, found that the industries such as "consumer staples," "utilities," "energy" and "materials" tend to have higher percentages. Please see the chapter "Climate/ Nature-Related Risks and Opportunities" (page 29) for details on our risks and opportunities related to these industries.



(b) Importance of ecosystem service provision

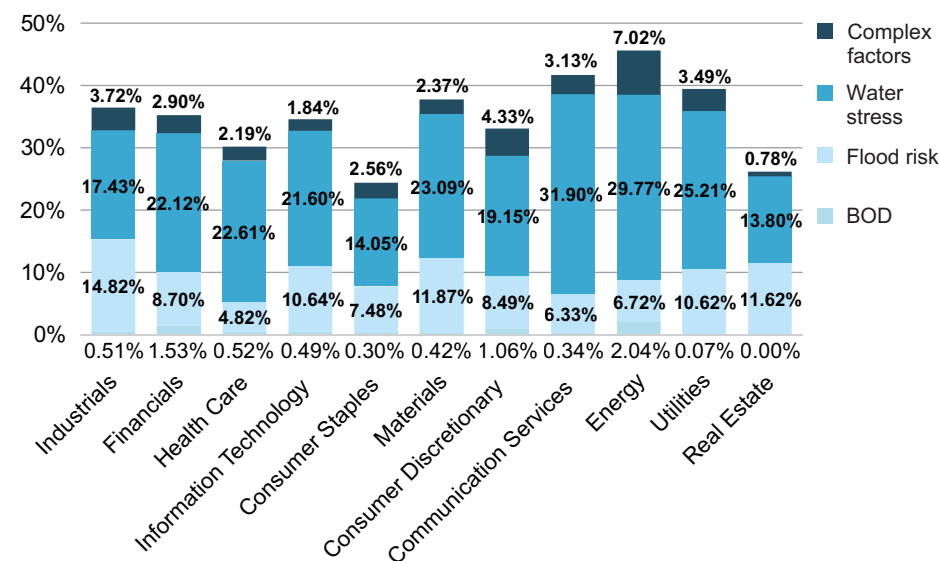
Local residents and businesses are in some way dependent on the ecosystem services in the location, but indigenous peoples, in particular, often lead self-sufficient lives closely tied to the local natural environment, making the importance of ecosystem service provision significantly greater for them compared to the general local people and businesses. Therefore, in this theme, in order to analyze the negative impacts on local stakeholders related to nature, we calculated the percentage of companies with indigenous communities located within 500 meters of operation sites and averaged them by industry.

The result shows that the sectors with high percentages were “Finance,” which operates worldwide, and “Communication Services,” which has communication bases in various regions, followed by “Energy” and “Utilities,” which also had high percentages in the result for (a).

**(c) Water-related physical risks**

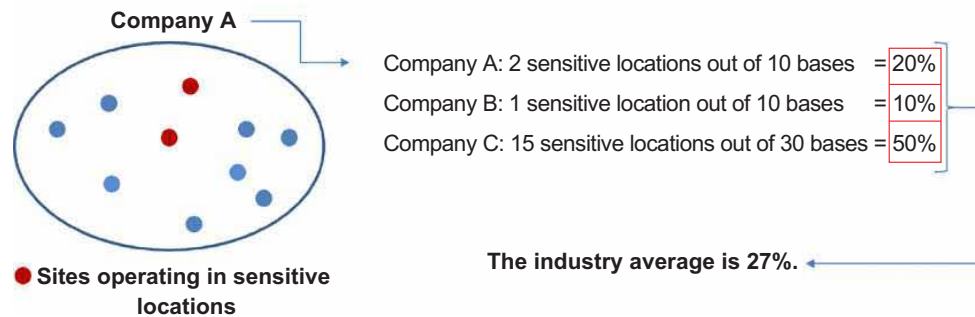
For this theme, water-related physical risks are analyzed using three indicators (water stress, flood risk, and BOD-water pollution index). Bases rated 4 or 5 out of 5 for each of the three indicators, or bases rated 4 or 5 for multiple risks (combined factors), are designated as sensitive locations.

The water-related physical risk exceeded 20% for all industries, indicating that it is a high priority.

**b. Summary of overall indicators**

For each of the above themes, the following table provides a summary of the sector-averaged figures for the percentage of companies operating in sensitive locations.

Industry	Importance of Biodiversity	Integrity of Ecosystem	Importance x Integrity	Indigenous peoples' living areas	Water-related Physical Risk
Industrials	5.10%	9.29%	0.63%	2.97%	36.48%
Financials	1.46%	14.05%	0.55%	5.93%	35.25%
Health Care	2.16%	9.07%	0.57%	0.92%	30.14%
Information Technology	2.42%	9.21%	0.47%	2.02%	34.58%
Consumer Staples	1.46%	7.91%	1.15%	0.47%	24.39%
Materials	3.17%	7.99%	0.76%	0.86%	37.75%
Consumer Discretionary	3.67%	13.07%	0.64%	2.49%	33.03%
Communication Services	2.59%	8.93%	0.37%	5.84%	41.69%
Energy	1.38%	14.84%	0.82%	5.71%	45.56%
Utilities	1.50%	13.75%	1.02%	4.59%	39.39%
Real Estate	1.64%	7.91%	0.62%	0.28%	26.20%

[Calculation Method]**Type of Industry: Healthcare****[Evaluation Indicator]**

Evaluation Indicator	Theme	Name of Indicator	Data Source
	Importance of Biodiversity	Protected Areas/KBA (Key Biodiversity Area)	IBAT
		Species Threat Abatement and Restoration Matrix (STAR_t)	IBAT
	Integrity of Ecosystem	Tree cover loss	Global Forest Watch
		Mean Species Abundance	GLOBIO
		Biodiversity Intactness Index	Natural History Museum
	Importance of Ecosystem Service Provision	Indigenous and Community Lands	Land Mark
	Water-related Physical Risk	Water Stress (Baseline Water Stress)	WRI (Aqueduct)
		Flood Risk	Flood Risk Finder
		BOD Index (water pollution)	World Bank Group Data Catalog

(ii) Assessment of TNFD sensitive locations in the Group business**– LEAP Approach Analysis for Urban Real Estate – Our operation**

We conducted a priority evaluation of the Group-owned properties, incorporating the characteristics of “urban biodiversity” in accordance with the “Locate: Discovering Interface with Nature” concept of the LEAP approach. Among the properties owned by the Group, we identified the top 70 sites in terms of area that are considered to have a major impact due to the “utilization of terrestrial ecosystems,” and targeted them for evaluation. In addition, since the targets of this evaluation are all urban areas within Japan, we utilized sophisticated data and evaluation methods that capture the natural characteristics of Japan's urban areas.

Based on the results of the model evaluations conducted through this LEAP approach analysis, we will carry out more detailed analyses, such as field surveys, and consider appropriate counter-measures moving forward.

[Priority Evaluation of our operational sites as sensitive locations/priority locations]

We conducted a priority evaluation of 70 properties owned by the Group companies, assessing them as sensitive locations/priority locations based on five evaluation criteria. However, since no sites were identified as related to the category of “Relationship with Indigenous Peoples and Local Communities” category, we evaluated the sites from the perspective of the remaining four evaluation axes and organized them as shown in the diagram below.

Marker Color: Priority grading in terms of “Proximity to Protected Areas/KBA/AZE Sites”				
VERY HIGH	HIGH	MEDIUM	LOW	VERY LOW

Marker Size: Priority grading in terms of “Water-related Physical Risk”				
VERY HIGH	HIGH	MEDIUM	LOW	VERY LOW

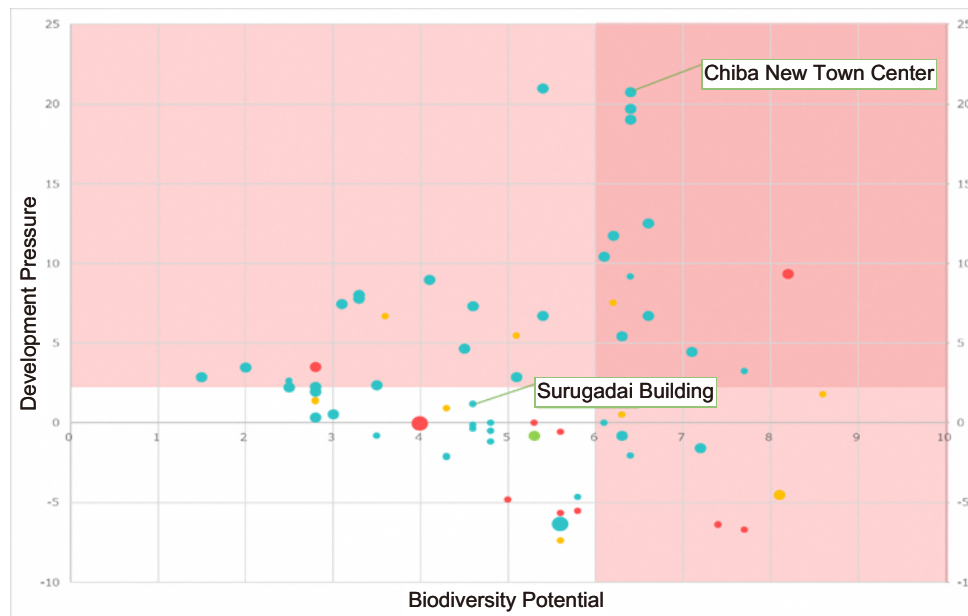
Horizontal axis: Score out of 10 obtained in the evaluation of “Biodiversity Potential”

Vertical axis: Value derived from the analysis of “Development Pressure”

Marker Color: Evaluation results indicating “Proximity to Protected Areas/KBA/AZE Sites”

Marker Size: Evaluation results of “Water-related Physical Risk”

The sites with high priority from the “Biodiversity Potential” and “Development Pressure” perspectives are displayed in the dark red frame in the upper right. These sites have high biodiversity potential, but are also facing significant development pressures due to recent changes in land use. Therefore, it can be said that there is high risk of biodiversity loss. The results of the evaluation confirmed a trend toward higher scores for sites located in the suburbs of Tokyo.



Among these sites, we found that some are located within 100 meters of IUCN (International Union for Conservation of Nature and Natural Resources) categories IV to VI protected areas or KBAs, making them high priority from the perspective of “proximity to protected areas/KBAs/AZE sites.” The sites have abundant water resources, including rivers, wetlands, riverbeds, ponds and reservoirs with vegetation, springs, and wand, and were evaluated as having extremely high potential to contribute to the development of regional ecosystem networks. On the other hand, because of the significant development pressure caused by the recent land-use changes from high integrity ecosystems to lower integrity uses, this also makes these locations priority sites for conservation and management.

We have identified some sites with high priority from the “Development Pressure” and “Proximity to Protected Areas/KBA/AZE Sites” perspectives and with high priority from the “Biodiversity Potential” and “Proximity to Protected Areas/KBA/AZE Sites.”

The group company building, Mitsui Sumitomo Insurance’s Surugadai Building, has had over 40% green space since its completion in 1984, and since then has been managed in consideration of living species, for example by ceasing the simultaneous spraying of pesticides. With the completion of the new building in 2012, we improved the quantity and quality of greenery that contributes to the creation of an ecological network in the center of Tokyo, and, as a result, the building was certified as a “Nationally Certified Sustainably Managed Natural Site” in 2022. Although in this evaluation the building does not have high “Biodiversity Potential” or high “Development Pressure”, it is making a significant contribution to the local ecosystem.

Sites identified as high priority in this evaluation can bring positive results to the local ecosystem by improving the state of green space at their sites. For example, Chiba New Town Center, which

received a high development pressure indicator, is located in the Inbanuma Basin (page 41), one of the sites of the Group’s Green Earth Project, an environmental conservation and restoration activity. Consideration of green spaces that are in line with the ecosystem of the entire region may have a positive impact on the biodiversity of the region.

Based on the results of this evaluation, we will conduct on-site surveys of priority areas, analyze the degree of dependence on ecosystem services and the impact on the local environment, and then consider measures that can contribute to biodiversity conservation in the region.

Five evaluation criteria		Correspondence to Sensitive Location Criteria
Proximity to KBA/AZE Sites	Whether or not the site is in close proximity to protected areas (areas designated as protected areas under international treaties and other regulations), KBA sites (Key Biodiversity Areas: important areas as a key for biodiversity conservation, selected according to international criteria), or AZE sites (sites designated as a growth and habitat site of critical importance for the survival of an endangered species)	Importance of Biodiversity
Biodiversity Potential	How much potential the area have to contribute to building a regional ecological network, based on the status of natural resources (green spaces and water systems) in the surrounding area, including the target site	Importance of Biodiversity, Integrity of Ecosystem (high) Importance of ecosystem service supply
Development Pressure	To what extent there has been a shift from land use with high ecological integrity to land use with low ecological integrity in recent years (between 2011 and 2022) in the surrounding area, including the target sites	Integrity of Ecosystem (rapidly declining)
Relationship with Indigenous Peoples and Local Communities	Whether or not the site is in close proximity to indigenous lands, local community lands, or areas associated with rights to natural resources by local communities	Importance of Biodiversity
Water stress	Whether the site is in the area under high water stress, calculated by the percentage of total water demand to surface water and groundwater supply	Water-related Physical Risks
Flood risk	Whether the area is expected to be inundated deep in the event of a flood with reproduction period of 100 years (1% likelihood of occurrence)	
BOD	Whether the area has low water quality, calculated based on the predicted annual average of biological oxygen demand in the river	

<Evaluation Method>

Specifically, the evaluation is carried out in accordance with the "Locate" steps of the LEAP approach, and is based on the following concepts

- [STEP1] Scope of the business model and value chain (L1): 70 owned real estates were targeted.
- [STEP2] Dependency and impact screening (L2): As the negative impact of the "Land ecosystem use," the impact driver specified by the TNFD, is considered to be particularly large, we carried out an evaluation focusing on this impact.
- [STEP3] Interface with nature (L3): The natural environment was confirmed following the concept of the "Natural Environment Classification," as shown in the "Guide for Enhancing the Quality of Greenery in Consideration of Biodiversity and Ecological Network Map" published by the Bureau of Environment, Tokyo Metropolitan Government in 2022, which classifies natural environments in mainland Tokyo that have the potential to become habitats for living species into 17 categories based on topography and vegetation information.
- [STEP4] Interface with sensitive locations/priority locations (L4): We evaluated the priority of sensitive locations/priority locations based on five evaluation criteria; "Proximity to Protected Areas/KBA/AZE Sites," "Biodiversity Potential," "Development Pressure," "Relationship with Indigenous Peoples and Local Communities" and "Water-related Physical Risk"
- Note: "Water-related Physical Risk" and "Biodiversity Potential" concepts were based on research from the Eco-Asset™ Consortium. Eco-Asset™ Consortium is a joint business operated by four companies: MS&AD InterRisk Research & Consulting, Inc., Regional Environmental Planning Inc., Sumitomo Forestry Landscaping Co., Ltd. and Sumitomo Forestry

2. Climate/Nature-Related Risks and Opportunities

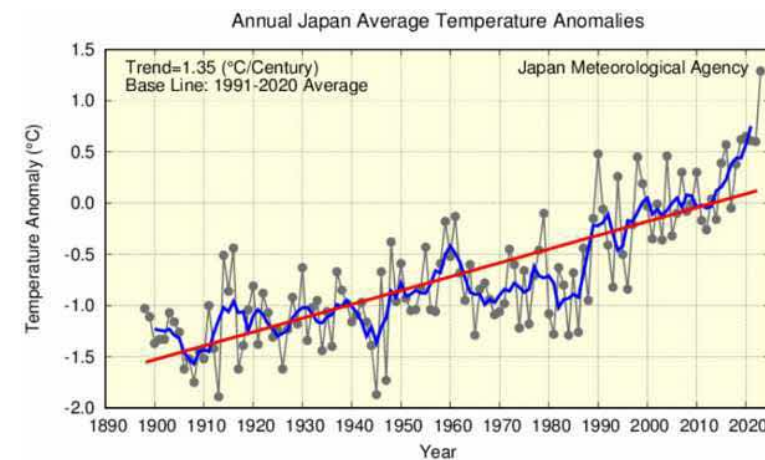
So far we have summarized the climate/ nature-related dependencies and impacts on the Group's business. From here, we will analyze the risks and opportunities for the Group's business

(1) Climate/Nature-related risks and non-life insurance industry

Changes in risks related to future climate change and biodiversity loss will have a significant impact on the non-life insurance industry. For example, as climate change progresses, disasters such as heat waves, droughts, and forest fires caused by global warming will become more frequent and increase in magnitude. Furthermore, the risk of heavy rainfall and flooding will increase as precipitation patterns are affected, and the risk of flooding of coastal areas will increase as sea levels rise due to melting glaciers and thermal expansion of ocean waters.

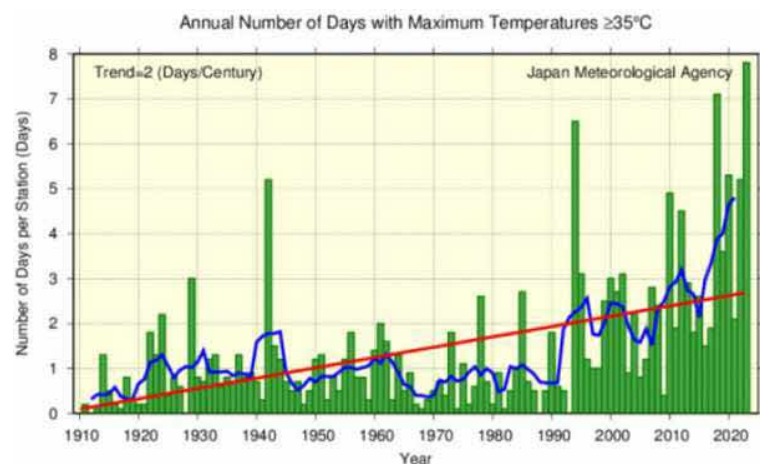
In Japan, the annual average temperature is expected to rise and the number of extremely hot days and torrential rains are expected to increase. The above-mentioned risks are expected to materialize and supply chain disruptions are expected to affect corporate activities.

[Secular changes in annual average temperature in Japan]



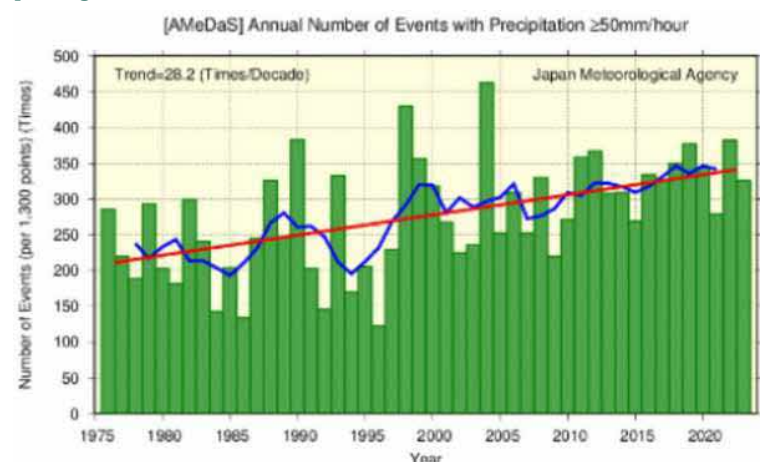
(Source: Japan Meteorological Agency, Climate Change Monitoring Report 2023, p.51)

[Secular changes in the annual number of extremely hot days (daily maximum temperature of 35°C or higher) in Japan]



(Source: Japan Meteorological Agency, Climate Change Monitoring Report 2023, p.52)

[Changes in the Number of Short-Duration Intense Rainfall Events in Japan]



(Source: Japan Meteorological Agency, Climate Change Monitoring Report 2023, p.60)

As climate change becomes more severe, the number of endangered species has increased from about 1,500 to more than 7,000 over the past 10 years, raising concerns about the loss of biodiversity. When biodiversity is lost, the ecosystem services that nature provides, such as soil stability, will decrease, which increases the risk of floods and landslides and decreases water purification

ecosystem services. This is expected to have an impact on many corporate activities, including agriculture and industry, such as water resource depletion and water quality deterioration.

(i) Examples of impacts on non-life insurance industry

The increasing frequency and magnitude of these natural disasters will result in increased claims settlement and may affect the profitability of non-life insurance companies, as the reinsurance market, which the companies use to diversify risk, is also exposed to similar risks, and this could result in higher reinsurance premiums paid by non-life insurance companies.

(ii) Existence of uncertainties in risk assessment

While the above-mentioned risks have been identified through various scientific validations, the prediction models used to estimate these risks also contain uncertainties. This section describes the Group's perception of these uncertainties.

a. Uncertainties in climate prediction models

The Coupled Model Intercomparison Project (CMIP), an international project that aims to advance scientific understanding of climate change by comparing and evaluating multiple climate projection models and integrating their results, also provides data for climate projection and scenario analysis in the IPCC assessment report. Its climate prediction models contain the following uncertainties:

a. Structural Uncertainty of the Model	Because each model uses different parameters, results may vary among models. In particular, greenhouse and parasol effects of the clouds associated with global warming differ from model to model, and this is the biggest factor* in the uncertainty of climate change predictions.
b. Uncertainty of external forcing	Uncertainty also exists regarding future changes in external forcing, such as solar radiation, volcanic activity, and anthropogenic GHG emissions.
c. Uncertainty of internal variability	In the climate system there is natural internal variability (such as El Niño events), which can affect model predictions.
d. Uncertainty of data	Uncertainty exists in the accuracy of the observed data used to validate models and set initial conditions. The JMA report on changes in the frequency of short-duration intense rainfall events in Japan mentioned above also suggests that future data accumulation is needed to reliably capture these long-term changing trends, due to the low frequency of extreme heavy rainfall events and the relatively short observation time of AMeDaS.
e. Uncertainty of scale	The model is grid-based, which limits its spatial resolution, limiting its ability to predict regional climate change in detail.

* Zelinka et al., Causes of Higher Climate Sensitivity in CMIP6 Models, <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019GL085782>

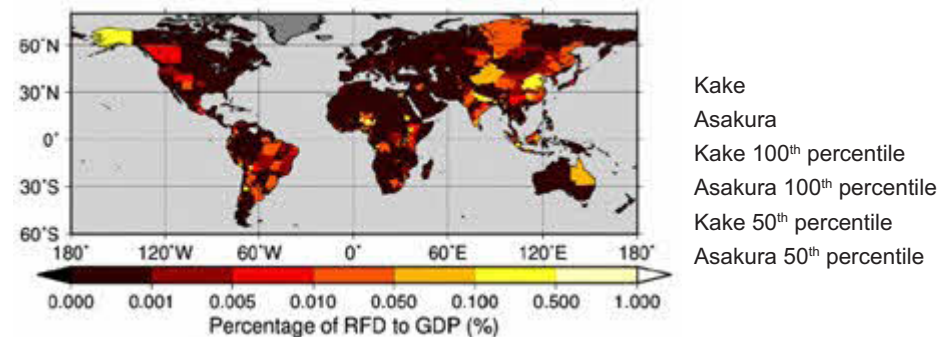
As such, we recognize that there are multiple uncertainties in the climate models provided in the IPCC assessment reports, and that even in the analysis results for the scenario in which global warming progresses the most (RCP8.5/SSP5-8.5) the impact could be higher than expected.

b. Uncertainty regarding the damage amount after taking flood control measures

Floods are a natural disaster that has a particularly significant impact on the Group's portfolios. Even after implementing adaptation measures (measures to prevent floods), depending on climate change and socioeconomic development conditions, "limits of adaptation," may occur in which flood damage will increase beyond the current damage amount. This is due to the significant flood damage that occurs during the construction of structures to protect against floods, and it has become clear that it is important to make a decision to implement adaptation measures as early as possible and to secure funding for this purpose.

Taking these points into consideration, the Group has developed the "Endorsement covering emergency evacuation of vehicles in the event of disasters," and other products, that cover the costs incurred to avoid damage in the event of a natural disaster.

[Increase in the amount of flood damage over current damage amount when adaptation measures are implemented]



(Source: Tanoue et al., Residual flood damage under intensive adaptation.)
(Tanoue, M., Taguchi, R., Alifu, H. et al. Residual flood damage under intensive adaptation. Nat. Clim. Chang. 11, 823–826 (2021). <https://doi.org/10.1038/s41558-021-01158-8>)

c. Uncertainty regarding the damage amount caused by landslides,

Diverse ecosystems provide us with ecosystem services such as flood mitigation and soil and sediment retention. If there is a future loss of biodiversity, however, there is a risk that these services will not be available and damage will occur.

For example, forests have the function of preventing landslide disasters by suppressing the occurrence of surface landslides during rainfall. This function increases or decreases as the forest matures or degrades. In addition, compared to young forests, although mature forests are able to prevent landslides from larger-scale heavy rains, in mature forests the driftwood volume in the event of a landslide may be greater.

In Japan, forests cover 67% of the land area, of which approximately 40% are man-made forests in a mature state, and as mentioned above, heavy rainfall is expected to increase due to climate change. As a result, although the amount of damage caused by landslides is expected to increase in the future, the magnitude of the risk may not have been anticipated.

[Increases in driftwood volumes in forests with different maturity]

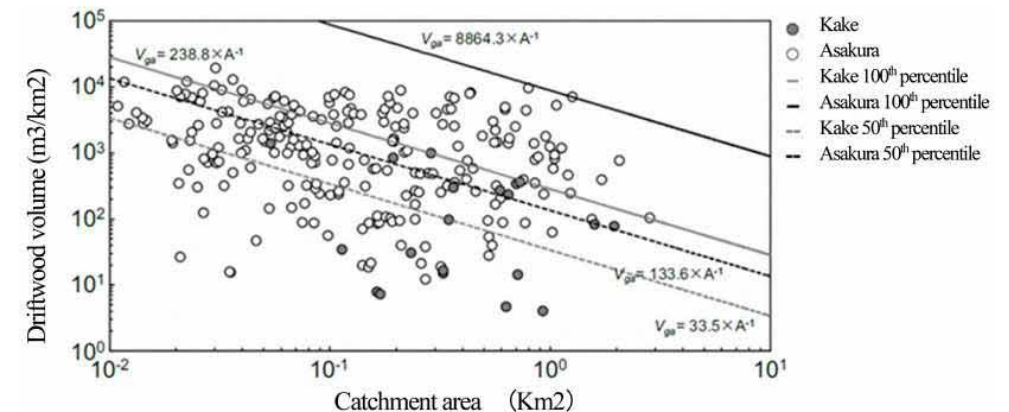


Figure. Comparison of driftwood volume in Kake and Asakura disasters

The Asakura (city in Fukuoka) disaster (solid black line in the figure), the damage is 30-fold larger than that at Kake (City in Hiroshima). Similarly, comparing the 50th percentile lines of the Kake disaster (gray dotted line) and of the Asakura disaster (black dotted line), the damage at Asakura is four-fold larger than that at Kake.
(Source: Sato et al., Evaluation of influences of forest cover change on landslides by comparing rainfall-induced landslides in Japanese artificial forests with different ages)

Believing in the importance of river basin flood control, including forest maintenance that takes these conditions into consideration, the Group has been promoting "Green Resilience" initiatives such as the "Green River Basin Flood Control Initiative" in the Kuma River basin and the "Initiative for realizing water positivity in Kumamoto," which contribute to preventing and mitigating landslide disasters (page 40)

[Image of River Basin Disaster Resilience and Sustainability by All]



(Source: River Basin Disaster Resilience and Sustainability by All, MLIT

<https://www.mlit.go.jp/river/kasen/suisin/index.html>)

(2) Capturing risks in the MS&AD Insurance Holdings: changes in climate, nature and society from both underwriting and investment/loan perspectives

Climate/ nature-related risks include the direct impact of climate change and damage to nature (physical risk) and the impact of rapid social change toward net zero and nature positive (transition risk). As an insurance and financial group centered on non-life insurance business, we need to evaluate risks from both perspectives of underwriting and investment/loan (asset management).

(i) Climate/ nature-related physical risks

The Group is already seeing a financial impact on its underwriting business due to increased natural disaster risks related to climate change, such as forest fires and hailstorms, as well as wind and flood disasters caused by typhoons and torrential rains. In addition to climate change risks, the impact of various nature-related risks, such as depletion of water resources, is expected to increase in society and business activities over the medium- to long-term.

H+: Very High H: High M: Medium L: Low

Classification	Event	Examples of main impacts on policyholders and investment and financing recipients	Examples of main impacts on the Group and degree of impact ◆ Underwriting ◇ Investment and financing	Period of manifestation		
				Short term	Medium term	Long term
Acute risks	Typhoons, hurricanes, storm surges 	Stronger tropical cyclones cause significant damage to homes and businesses. Depending on their course, such cyclones could cause damage over a wide area. Storm surges also cause significant damage to coastal areas	◆ Insurance claims payouts occur, particularly concerning many homes, businesses, vehicles, and other property ◇ Asset management returns deteriorate owing to large-scale damage affecting important business sites at the recipients of investment and financing	H+	●	●
	Torrential rain, flooding 	Increased temperatures increase the amount of water vapor in the atmosphere, causing torrential rainfall. Extensive flooding caused by improper land use or flood control conditions cause significant damage. Lack of soil stability due to deforestation and vegetation removal, or cutting and reclamation of slopes, causes landslides triggered by torrential rainfall	◆ Insurance claims payouts occur, particularly concerning many homes, businesses, vehicles, and other property ◇ Asset management returns deteriorate owing to large-scale damage affecting important business sites at the recipients of investment and financing	H	●	●
	Hail and snow damage 	Hailstorms are caused by active convective activity due to warm, moist air currents in the updrafts generated by strong solar radiation and cold air inflows into the sky. Falling hail damages vehicles and buildings. Many facilities of non-heavy snowfall areas are not strong enough to withstand, and heavy snowfall damages facilities	◆ Insurance claims payouts occur for damage to vehicles and facilities ◇ Not likely to lead to a significant deterioration in asset management returns	H	●	●
	Forest fires 	Heat waves and extreme heat cause forest fires. Insufficient tending to forests, such as the neglect of dead trees and underbrush, increases the risk of fire. Fire spreading to surrounding urban areas, etc., will lead to significant damage	◆ Insurance claims payouts occur for forests, as well as homes and businesses in the event of fires spreading ◇ Asset management returns deteriorate owing to large-scale damage affecting important business sites at the recipients of investment and financing	M	●	●
	Heat wave, cold wave 	Severe heat and cold waves cause human suffering, sudden strains on energy and water resources, and logistical disruptions such as traffic paralysis	◆ Not likely to result in large insurance claims payouts ◇ Not likely to lead to a significant deterioration in asset management returns	M	●	●
Chronic risks	Dry spells and droughts 	Agriculture, food, and water-intensive businesses experience increased costs and losses owing to difficulties in procuring materials and interruptions in manufacturing. In addition, the interruption of water transportation and the shortage of cooling water could affect a wide variety of industries	◆ Not likely to result in large insurance claims payouts ◇ Asset management returns deteriorate as performance worsens at companies dependent on water resources	L	●	●
	High temperatures (heat) 	Disruptions due to rapid increases in energy demand could occur. Data centers, power plants, and other facilities face an increased burden for cooling. Labor efficiency falls as outdoor activities, such as construction sites are restricted, and there is an impact on health, such as increased stress due to heat and the spread of infectious diseases	◆ Not likely to result in large insurance claims payouts ◇ Asset management returns deteriorate as performance worsens at companies for which high temperatures can be a risk	L	●	●
	Depletion of water resources 	The depletion of water resources, such as excessive groundwater pumping and development in groundwater recharge areas, significantly impacts the business activities of companies that use a lot of water for raw materials and manufacturing processes	◆ Not likely to result in large insurance claims payouts ◇ Asset management returns deteriorate as performance worsens at companies dependent on water resources	L	●	●
	Degradation of other ecosystem services 	Serious losses might occur when ecosystem services on which livelihoods and business activities depend, such as pollination for agriculture, are degraded or destroyed owing to damage to natural capital	◆ Not likely to result in large insurance claims payouts ◇ Asset management returns deteriorate as performance worsens at companies overly dependent on ecosystem services where natural capital is severely damaged	L		●

a. Physical Risk Analysis in Underwriting **Underwriting**

The Group believes that it is our social mission to continue to offer coverage even in a society where natural disasters are increasing due to climate change. We carry out scenario analysis to identify changes in natural disaster risk due to the escalation of climate change, and use various methods to confirm the risk analysis and the effects of risk mitigation, such as refining future risk assessment and evaluating the mitigation of damage caused by water-related disasters through the use of nature.

(a) Scenario Analysis: Analysis of the Impact of Changes in Typhoon Severity on Claims Settlements

Further global warming could increase the severity of natural disasters such as typhoons and the increased risk of resultant damage. Therefore, as a scenario analysis of physical risk, we analyzed the potential impact on insurance settlement by typhoon severity associated with global warming.

The project for considering methods of analysis that examines the potential effects of climate change on underwriting was launched by the United Nations Environment Programme Finance Initiative (UNEP FI) in 2018. Over 20 insurance companies that signed on to the Principles for Sustainable Insurance (PSI), including the Group, participated in the project, and worked on developing scenario analysis methods in some working groups based on the likely impacts of climate change subject to analysis.

The Group participated in the working group for analyzing typhoons and hurricanes that have a significant impact on underwriting and examined the impact of future global warming on the risk amounts arising from typhoons and hurricanes. Focusing on changes in the “intensity” and “frequency” of typhoons, and referring to the results of research carried out by Knutson et al. (2020) thereon, we developed an analysis and evaluation tool for 2050 in the 4°C scenario (RCP 8.5).

Regarding storm surge changes caused by typhoons, we also developed an analysis and evaluation tool for 2030 and 2050 under the 2°C (RCP 4.5) and 4°C (RCP 8.5) scenarios, referring to the World Resources Institute (WRI)’s tool, Aqueduct Flood, for evaluating storm surge damage, etc.

Results using the two analytical evaluation tools are as follows. Scopes of analysis are domestic non-life insurance book (e.g., property, marine, personal accident and auto line) that are expected to be paid out due to typhoons.

(i) Changes in typhoons themselves

In 2050 under the 4°C scenario (RCP 8.5), insurance loss arising from typhoons could vary from approximately +5% to approximately +50% due to changes in “intensity,” and from approximately -30% to approximately +28% due to changes in “frequency of occurrence”.

(ii) Change in storm surge caused by typhoons

In both the 2°C (RCP 4.5) and 4°C (RCP 8.5) scenarios in 2030 and 2050, claims settlement may increase by several percent.

Scenario used	Change in “force” of typhoons (2050)	Change in “frequency” of typhoons (2050)
4°C Scenario (RCP8.5)	Approx. +5 – Approx. +50%	Approx. -30% – Approx. +28%

Apart from the analyses mentioned above, we collaborated in FY2021 with the Bank of Japan and the Financial Services Agency in carrying out scenario analysis exercises referring to materials such as the assumptions of scenarios considered by Network for Greening the Financial System (NGFS), and analyzed the likely claims settlements caused by natural disasters which were becoming increasingly intense under the impact of climate change. In addition to the above, the Group is endeavoring to advance our knowledge by such means as research projects conducted jointly with academic institutions, and is working to improve accuracy in scenario analyses, such as developing an analysis method which reflects changes in typhoon intensity due to climate change.

We will continue to examine methods for assessing the impacts of climate change such as typhoons and floods, while referring to the analysis methods based on UNEP FI projects and information to be published by NGFS.

Note: Release of “Pilot Scenario Analysis Exercise on Climate-Related Risks Based on Common Scenarios” (<https://www.fsa.go.jp/news/r4/ginkou/20220826-2/20220826.html>)

Joint research on typhoon risk assessment in the industry-government-academia collaboration project with the University of Tokyo (ClimCORE)

We have been participating since FY2021 in an industry-government-academia collaborative project (ClimCORE) led by the University of Tokyo. This project aims to develop high-resolution meteorological data for the Japanese region, which is necessary to precisely assess the effects of climate change, and to promote research and development for the use of such data in society. In this project, the Group collaborated with the University of Tokyo to reproduce a real case study using a meteorological model for Typhoon No. 15 (Boso Peninsula Typhoon) in 2019 and to analyze how typhoon intensity changes with climate change. In the analysis, which takes into consideration three changes from average weather conditions due to global warming (increased water vapor in the atmosphere, increased sea surface temperatures, and increased air temperatures in the upper atmosphere), results were consistent with the UNEP FI impact analysis tool in terms of the change rate of maximum wind speed and claims settlements. In addition, the impact of each change on typhoon intensity is suggested in the table below.

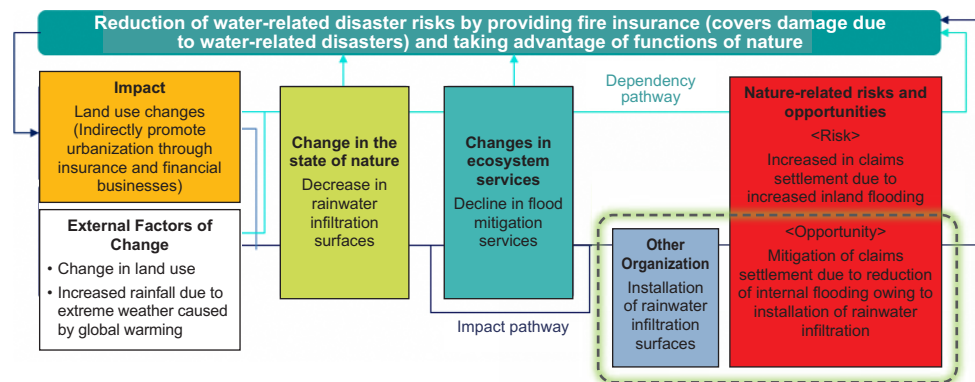
Changes due to global warming	Impacts on typhoon intensity
Increased water vapor in the atmosphere	An increase in water vapor in the atmosphere, which is the energy source of typhoons, contributes to the strengthening of typhoons.
Increased sea surface temperatures	Increased evaporation of water vapor from the sea surface increases the amount of water vapor in the atmosphere, contributing to the strengthening of typhoons.
Increased air temperatures in the upper atmosphere	When the temperature difference between the surface and the sky becomes smaller, the development of cumulonimbus clouds weakens, contributing to the weakening of typhoons.

**(b) Analysis of water-related disaster risk reduction effects by utilizing natural functions
~LEAP Approach: to reduce economic losses from flood-related disasters through the
introduction of green infrastructure*1~**

As analyzed in the Chapter “Climate/Nature-Related Risks and Opportunities,” we recognize that, for non-life insurers, “Prevention of floods/storms” rooted in nature is an important ecosystem service that enables damage mitigation. As short-term heavy rains increase due to global warming, urbanization leads to an increase in paved surfaces as a change in land use, a key impact defined by the TNFD, and the loss of rainwater infiltration function by soil is considered to be a factor that increases the flood disaster risk for non-life insurers.

Therefore, in order to promote measures to reduce the risk of water-related disasters through green infrastructure*1 that exhibits flood prevention functions rooted in nature, we have organized risks and opportunities associated with changes in land use (increasing paved surfaces/installation of rainwater infiltration surfaces), using the chart of “dependencies and impacts on nature, and relationship between risks and opportunities” outlined in the TNFD’ LEAP approach. We conducted a quantitative evaluation in accordance with the procedures of the approach, and confirmed a reduction in the amount of flood-related damage.

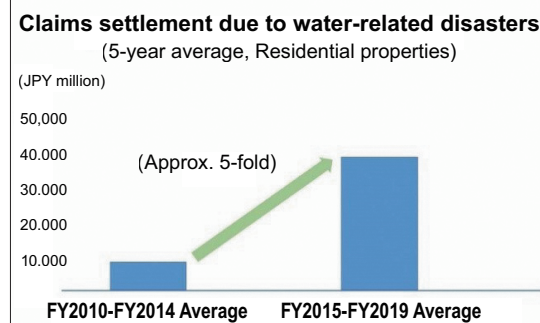
*1: An approach to utilize diverse functions of the natural environment for infrastructure development



Scoping

Domestic fire insurance, which accounts for a large percentage of the Group’s premium income, has seen a rapid increase in the number of claims settlement due to water-related disasters in recent years, as shown in the figure on the right.

Source: General Insurance Rating Organization of Japan



On the other hand, in terms of rainfall conditions in Japan, the frequency of heavy rainfall (50 mm or more of rainfall per hour) increased by approximately 1.5 times between 2014-2023 and 1976-1985*2, and the occurrence of water-related disasters increased proportionally. In recent years, the amount of damage caused by inland flooding in urban areas, etc. accounts for about 40% of all water-related disasters, and in Tokyo, it has reached approx.70%*3. In addition, it is believed that inland flooding has increased as the increase in paved surfaces due to urbanization is preventing rainwater from penetrating into the ground, and rainwater that exceeds the treatment capacity of drainage facilities flows into rivers and sewers all at once. Therefore, identifying “land use change” due to increased impermeable surfaces as a key impact, we decided to analyze the mitigation of flood damage by introducing green infrastructure that temporarily stores and infiltrates rainfall and suppresses runoff.

*2 Japan Meteorological Agency website, “Past Changes in Heavy Rainfall and Extreme Heat Days (Extreme Phenomena).”

*3 Ministry of Land, Infrastructure, Transport and Tourism, “Recent Rainfall and Inland Water Damage, and Current Status of Sewerage System Development”.

Locate

Because the Group provides domestic fire insurance coverage without significant regional bias, the regions analyzed in this case focused on the high risk of damage due to water-related disasters, rather than on sales by region. In recent years, northwestern Kyushu has already experienced severe flooding, and is regarded as one of the regions where rainfall will increase the most (rainfall increases by 1.4 times in a 4°C rise scenario)*4 according to survey results by the Ministry of Land, Infrastructure, Transport and Tourism (hereinafter “MLIT”). Accordingly, we decided to conduct LEAP analysis on specific areas that meet the following conditions in northwestern Kyushu.

- Regions with damage caused by inland flooding in recent years
- Small and medium-sized river basins in cities to verify damage caused by inland flooding.
- Basins with significant land use alteration in recent years

*4 MLIT’s “Ideal Flood Control Plan Based on Climate Change” Recommendation (revised April 2021) “Concept for setting rainfall change multipliers for each regional classification”

Evaluate

Effective measures to control inland flooding include drainage to outside waterways through the construction of pumping stations, drainage through underground discharge channels, as well as storage and infiltration of rainwater at various locations. For rainwater storage and infiltration, there are infiltration systems such as rainwater infiltration basins and rainwater tanks, but recently green infrastructure such as “rain gardens” that utilize natural functions have been attracting attention. These approaches to storage and infiltration is in line with the concept of “River Basin Disaster Resilience and Sustainability by All,” promoted by MLIT, which calls for flood control in entire river basins, not just river areas.

In addition to mitigating flood damage, “rain gardens” are expected to provide a variety of ecosystem services to the region, such as enhancing biodiversity, conserving water basins, and mitigating the heat island effect. However, until now, the accumulated effects of “rain gardens” in basins have not been quantitatively evaluated. In order to clarify the effect of “rain garden” development on reducing the amount of damage caused by flood-related disasters, we carried out a quantitative analysis using the RRI model at actual locations.



Assess

[Target area/basin] Small- to medium-sized river in a core city in northwestern Kyushu, which has been subject to continuous flood damage in recent years. The river basin is (7.8km²)

[Infiltration/storage case setting]

Target	Details
Public/Commercial facilities, Residences	<ul style="list-style-type: none"> Collect rainwater from the roof into a rain garden (20 cm deep) with a base area of 1/5 of the roof area. Permeation capacity from base layer: 100 mm/hr
Parks	<ul style="list-style-type: none"> Storage facility with the same area of the base as the park (20 cm deep) No infiltration from the park is expected.

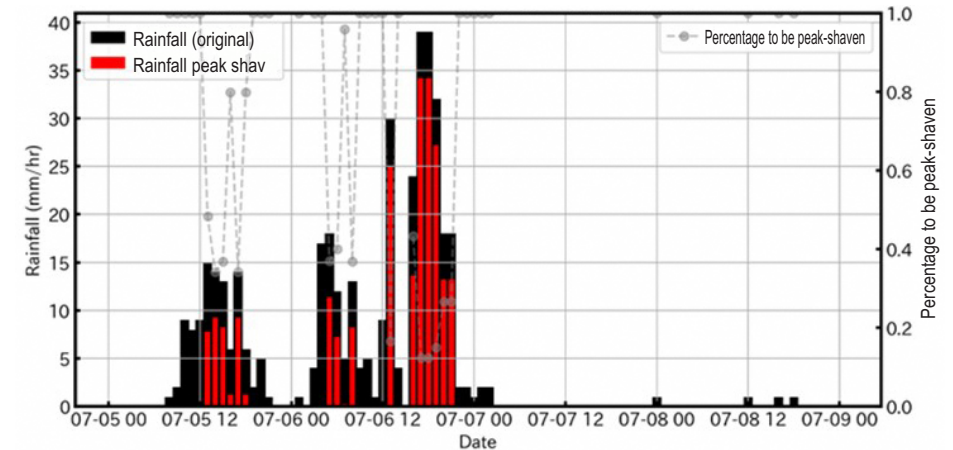
[Target rainfall]

- Actual rainfall amount during heavy rains in July 2018
- Rainfall amount in 2050 based on SSP1-2.6 and SSP5-8.5 scenarios

[Analysis method]

- The effect of installing a rain garden is reflected in the simulation by subtracting “the amount of rainfall stored and infiltrated into the rain garden” from the actual rainfall amount.
- To calculate the inundation depth, time series of rainfall peak shaven (red bar graph) is fed into the RRI model

Rainfall time series before vs. after peak shaving at representative AMeDAS points in the city concerned

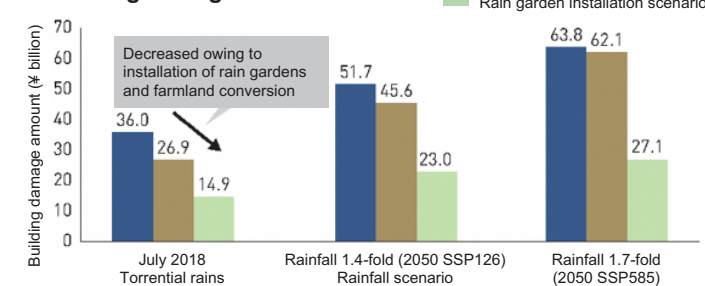


The difference between actual rainfall (black) and rainfall after peak shaving (red) is the storage and infiltration effect of the rain garden.

[Analysis results]

- In the case of the torrential rainfall in July 2008, the amount of damage was reduced by JPY910 million by converting land to farmland, and by JPY2.11 billion by installing rain gardens.
- In both rainfall scenarios, the rain garden installation measure reduces the amount of damage the most.

Experiments by rainfall scenario: building damage amount



Regarding the amount of building damage, we calculated asset values by multiplying the total floor area (3D urban model data) by the house asset table value per unit area for 2018, and then applied the house damage function from the Manual for Economic Evaluation of Flood Control Investment (2020) of MLIT

These calculation results are based on a partial modification of the Rainfall Runoff Inundation (RRI) model program of the Public Works Research Institute.

Preparation (to be continued)

We found that the installation of “rain gardens” has a certain effect on mitigating flood damage. This time, we conducted an analysis based on the assumption of 100% introduction, but in the future we would like to further refine our analysis by examining the effect of reducing the risk of flood-related disasters based on the percentage of systems installed, as well as the locations where the systems can be installed to achieve higher effects.

On the other hand, the installation of rain gardens cannot be expected to have any significant disaster prevention effects without the cooperation of not only public spaces managed by local governments, but also homes, businesses, and various stakeholders within the basins. Incentive mechanisms and collaboration with local governments, research institutes, and NPOs are required to determine the details such as onto whom the burden should be placed for installing equipment that can provide disaster prevention effects. Along with research on green infrastructure such as “rain gardens,” the Group is promoting in various regions to create models of collective action that will encourage safe and secure community development and the transition to nature-positive local communities.

b. Analysis of Physical Risks in Investments and Loans Portfolio **Investment/Loan**

As an institutional investor, the Group makes investments and loans to many companies, and we believe that an increase in water disaster damage at key locations of our investment/loan portfolio companies due to climate change could lead to a deterioration in investment returns. To this end, we analyze the physical risks of the assets of our major investment/loan portfolio companies to identify climate change risks associated with fund management. We also analyze the relationship between the business sites of our investment and loan portfolio companies and sensitive locations. (See page 12)

(a) Scenario Analysis: Evaluation of physical risks for our top 500 investment/loan portfolio companies

The Group has a strong relationship with climate change risks through transactions with customers, and here we quantitatively evaluated the physical risk under climate change scenarios for our investment and loan (stock, corporate bonds, and corporate loans) portfolio.

An increase in physical risks such as floods and wind disasters due to climate change may affect the sales and assets of our investment/loan portfolio companies. Therefore, we selected our top 500 investment/loan portfolio companies and analyzed the impact of flood and wind disaster risk due to climate change on both sales impact and asset impact for stocks, corporate bonds, and corporate loans (for details of the analysis, see “Analysis Models, Methods, etc.” on the right).

Analysis Models, Methods, etc.

Model used	Jupiter intelligence*1 Climate Score Global (CSG) model ver.2.7
Scope	Direct operation sites of Top 500 companies in our investment/loan portfolio (stocks, corporate bonds, corporate loans) (Total 108,600 assets)
Target hazards	Floods (River flooding/storm surge), wind disasters
Evaluation metrics	Weighted average of <annual average loss/annual sales> for each portfolio company in terms of our share of stocks, corporate bonds, and corporate loans*2
Time horizons	2020, 2030, 2040, 2050, 2075, 2100
Scenarios	SSP1-2.6: (less than 2°C scenario)*3 SSP5-8.5: (more than 4°C scenario)*4

*1 U.S. climate-tech startups with which the Group has partnership

*2 Weighted averages follow the Partnership for Carbon Accounting Financials (PCAF) methodology

*3 Scenarios that limit global average temperature increase to less than 2°C above pre-industrial levels under sustainable development

*4 Scenario in which global average temperature increase exceeds 4°C above pre-industrial levels under fossil fuel-dependent development

<Analytical Methods for Evaluation Matrix>

[STEP1] Calculate damage to each site using a model

[STEP2] In order to calculate the impact on profitability, calculate the damage to sales and asset at each time horizon: 2020, 2030, 2040, 2050, 2075 and 2100

- a. Sales damage due to business suspension: Calculate the loss at each site using the following formula:
Expected annual loss ratio due to wind and flood damage at each site[(%)] x [sales amount per location].
Then, aggregate the results of each company to calculate the amount of sales damage
- b. Property damage due to wind and flood damage: Calculate [annual average loss due to wind and flood damage] for each site.

[STEP3]

Divide sales loss and asset loss in each company by gross sales amount to calculate the percentage of total amount of annual sales damaged in each company.

Aggregate by company and calculate the amount of asset damage.

[STEP4]

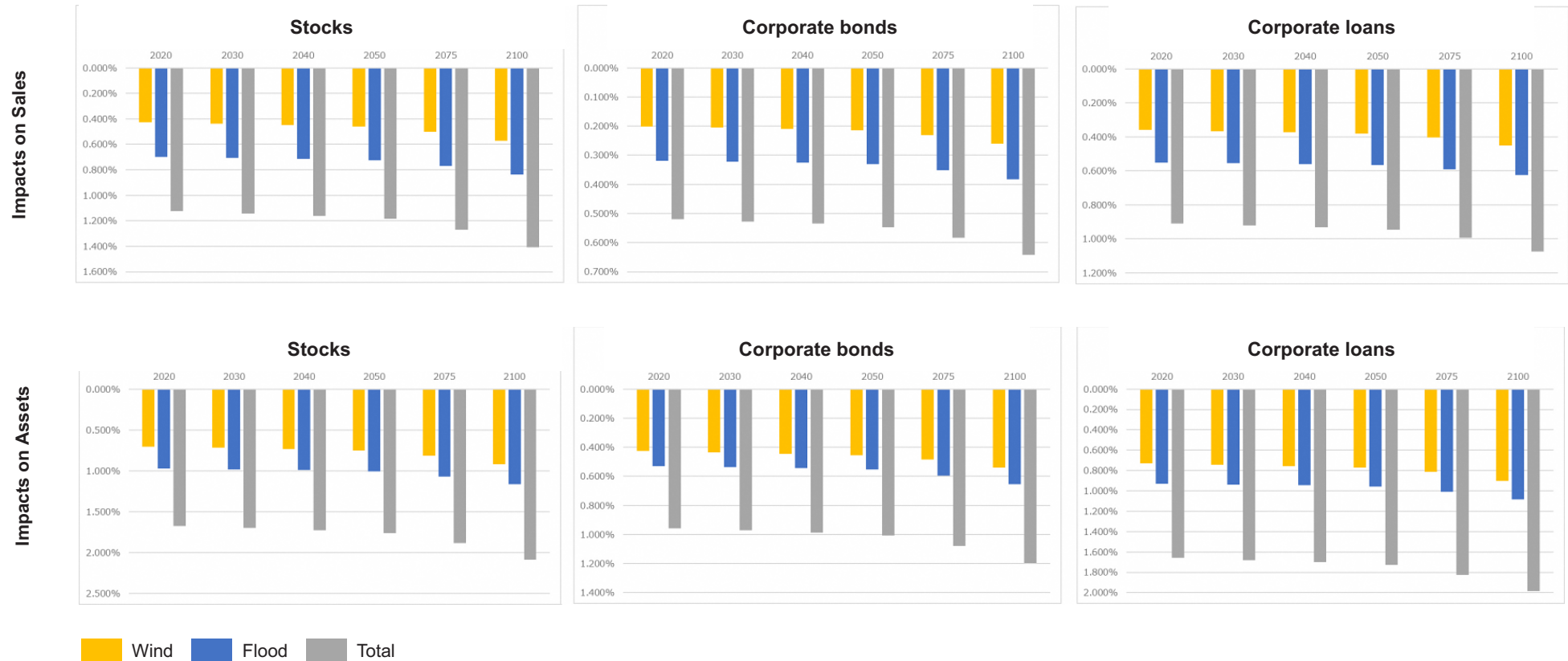
Calculate weighted averages for each attribute (stocks, corporate bonds and corporate loans) based on PCAF methodology. Calculate the percentage of portfolio damage for each attribute, and calculate the sales impact and asset impact for each of a. and b.

[STEP5]

Carry out the procedures STEP 1 through STEP 5 at each time horizon using two scenarios, SSP1-2.6 and SSP5-8.5, and compare the results to identify the increase in percentages of portfolio damage caused by the impacts of climate change.

[Analysis results]

The results of the analysis reveal that in the higher than 4°C scenario for stocks, where the risk increases the most, the impact of sales damage and asset damage may increase by approx. 5.2% (total of flood and wind damage) in 2050. However, the overall impact on the investment and loan portfolio as a whole is considered to be limited in terms of the sales of the investment and loan portfolio companies. However, the impact through the value chain of the investment and loan portfolio companies is not taken into account, which is an issue for the future.

Impact of physical risk on investment and loan portfolios (more than 4°C scenario)

c. Analysis of Physical Risks at Our Operational Sites **Our operation**

(a) Scenario Analysis: Analysis of our operational sites using the Flood Risk Finder

We quantitatively evaluated the physical risks at the operational sites of the Group under climate change scenarios. We identified the flood damage under climate change scenarios and analyzed the increase in flood damage due to climate change, targeting the real estate assets at the major domestic 70 bases owned by the Group.

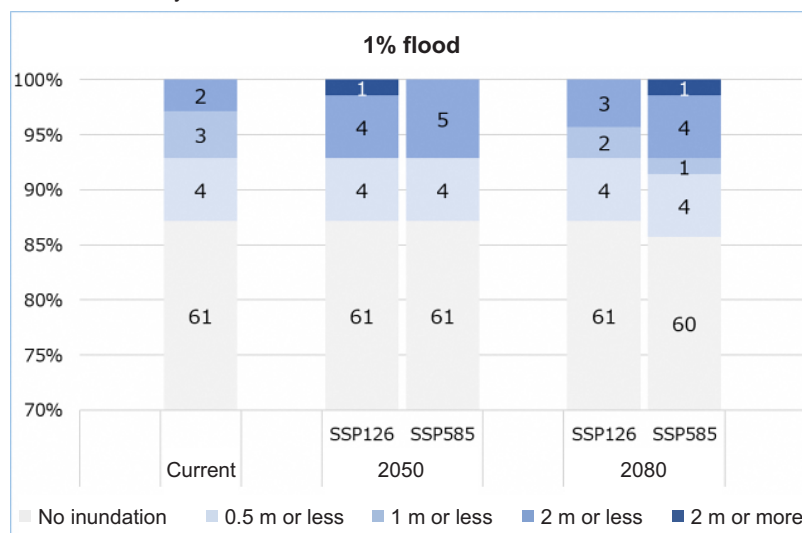
Based on the results of analysis at the Group's own business bases, we will consider disaster prevention measures and business continuity plan (BCP) measures for real estate assets in areas with high flood risk, while also checking current hazard maps and other information.

Changes in flood inundation depth due to climate change

[Analysis result: 1% flood (equivalent to the planned scale flood in the MLIT hazard map)]

The following figure shows the changes in flood inundation depth (as a percentage of the number of bases) for certain years and scenarios for floods with a 1% annual probability of occurrence. Under the SSP1-2.6 scenario, the inundation depth tends to increase in 2050, but this is likely due to uncertainties in the analysis of climate change scenarios. There were no new bases that were likely to be inundated.

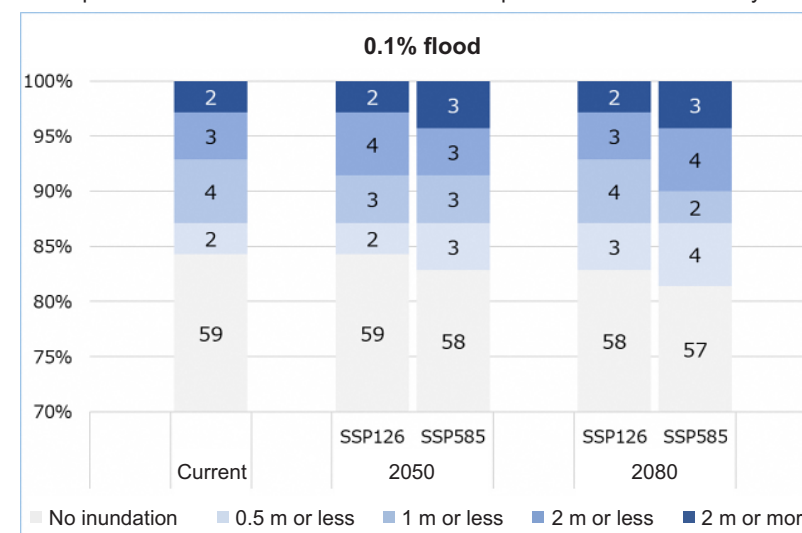
Under the SSP5-8.5 scenario, there is a tendency for the inundation depth to increase in 2050 in many bases that were likely to be inundated in 2020. Additionally, as of 2080, it has been confirmed that one new site is likely to be inundated.



[Analysis result: 0.1% flood (equivalent to the assumed maximum scale flood in the MLIT hazard map)]

The following figure shows the changes in flood inundation depth (as a percentage of the number of bases) for some years and each scenario for floods with a 1% annual probability of occurrence. Under the SSP1-2.6 scenario, it is predicted that in 2080 there will be one new base that is likely to be inundated.

Under the SSP5-8.5 scenario, the number of existing sites showing an inundation of 2 meters or more is anticipated to increase and one new base is expected to be inundated by 2050.



Tool used	Flood Risk Finder*1
Time horizon	2020 (Present), 2050, 2080
Scale of flood	Reproduction period 100 years (1% flood: Flooding with a 1% annual probability of occurrence, equivalent to the planned scale in the MLIT hazard map) Reproduction period 1000years (0.1% flood: Flooding with a 0.1% annual probability of occurrence, equivalent to the assumed maximum scale in the MLIT hazard map)
Scenarios	SSP1-2.6: (less than 2°C scenario)*2 SSP5-8.5: (more than 4°C scenario)*3

*1: A web tool provided by MS&AD InterRisk Research & Consulting, Inc. based on the results of the LaRC-Flood Project launched jointly by the University of Tokyo, Shibaura Institute of Technology, MS&AD InterRisk Research & Consulting, Inc. and MS&AD Insurance Group Holdings Co., Ltd.

*2, 3: As on page 23

(ii) Climate/Nature-Related Transition Risk

In the transition to a net zero or nature-positive society, rapid changes in various areas of society, such as laws and regulations, technology, and markets, pose risks (transition risks) for corporate activities. The Group believes that such risks may lead to lower profits from underwriting and asset management. However, in terms of in underwriting, we expect that the impact will be limited because, with the exception of a few products, there are few insurance products that directly cover transition risk. We believe that technological innovation and the introduction of new laws and regulations create new opportunities for insurance provision, but it also poses risks if we are unable to respond to these needs.

H+: Very High H: High M: Medium

Classification	Event		Examples of main impacts on policyholders and investment and financing entities	Examples of main impacts on the Group and degree of impact ◆ Insurance underwriting ◇ Investment and financing	Period of manifestation		
					Short term	Medium term	Long term
Technology	Advances in net zero and nature-positive technologies and changes in industrial structure		As technologies that contribute to net zero and nature positive, such as decarbonization, recycling, and pollution removal technologies, spread rapidly, could render existing technologies and infrastructure obsolete and result in loss of our share of the traditional market		M	●	●
Market	Changes in demand for products and services that contribute to net zero and nature positivity		Increased demand to net zero and nature positivity among consumers and clients could reduce demand for products and services that lead to global warming and excessive impacts on nature		M	●	●
Policies, laws, and regulations	Rising carbon prices, emission regulations, and changes in the energy mix		Additional carbon price-related costs incurred by businesses that emit large amounts of GHGs, like the imposition of carbon prices by governments, and responses to requests from customers to introduce renewable energy could lead to a loss of earnings and a decline in competitiveness		M	●	●
	Strengthening of environment-related regulations and standards		The strengthening of laws and regulations, etc., as part of efforts to achieve net zero and nature positivity might not only increase regulatory compliance costs but also lead to business downsizing and suspensions, and difficulties in procuring raw materials, resulting in a loss in profitability. In addition, the burden of disclosure could increase costs, and inadequate disclosure might have a negative impact on management		M	●	●
	Increase in climate/nature-related litigation		Errors in climate/nature-related measures have resulted in significant business losses, and there is a risk that such errors in management strategy could lead to high costs, including officer lawsuits and compensation, as well as a decline in corporate value due to brand damage	◆ Possibility of high insurance claims payments in D&O insurance ^{*1} ◇ Decline in investment returns	M	●	●
Reputation	Criticism due to errors or delays in climate/nature-related measures		Risk that the discovery of involvement in businesses that have significant adverse effects on global warming and nature could lead to consumer boycotts and suspension of business with clients, resulting in reduced sales, brand damage, a decline in corporate value, and worsening financing costs	◆ Possibility of insurance claims payments for brand image insurance ^{*2} ◇ Decline in investment returns	H+	●	●

*1 D&O: Directors & Officers' liability insurance. Compensation for damages, litigation expenses, etc., incurred by corporate officers because of claims for damages arising from acts (including omissions) committed by corporate officers in their capacity as officers

*2 Compensation for expenses incurred for measures necessary to restore brand image in the event of an accident requiring compensation, etc.

a. Transition Risk Analysis in Our investment/loan portfolio **Investment/Loan**

(a) Scenario Analysis: Impact of carbon costs on investment portfolios

“Carbon pricing,” which assesses the costs associated with GHG emission volumes, is being considered worldwide as a policy to encourage reductions in GHG emissions, and this policy could indicate a risk of an increased carbon cost burden for companies. Therefore, we analyzed the potential future impact of increased carbon costs on the Group’s investment portfolio as a transition risk scenario analysis.

For the analysis, we used analysis tools developed by S&P Global Trucost, which company researches environmental data such as carbon emissions and climate change risks, we analyzed degrees that investee companies presently have the ability to pay the future carbon costs they would need to bear (carbon earnings at risk (EBIT at Risk)*). Investment portfolio companies with extremely large EBIT at Risk are excluded from the calculations as outliers.

Note: Shows the financial impact on the investment portfolio for each scenario, calculated by dividing the unpriced cost of carbon (UCC) by the earnings before interest and taxes (EBIT).

Taking into consideration that TCFD recommends scenario analysis based on the rise in temperature being maintained at 2°C or less, the Group used the following three scenarios for analysis:

- High scenario: Scenario in which administrative measures are implemented that are sufficient to be in line with international targets (Paris Agreement) of keeping temperature increase to less than 2°C by 2100;
- Medium scenario: Scenario in which long-term administrative policies are enacted to keep global temperature increase to 2°C but short-term administrative policy implementation is delayed; and
- Low scenario: Scenario in which each nation voluntarily implements its own targets but global temperature increase reaches around 3°C.

Our analysis covers domestic and foreign stocks of listed companies (covers approx. 99% on a market value basis) and domestic and foreign bonds (also covers approx. 95% on a book value basis) in our investment portfolio as of the end of March 2023. As for the assumption of investee companies’ profits, the average value for corporate profits for the last 3 years is used to mitigate fluctuations in financial performance. Regarding GHG emission volumes, Scope 1 (directly emitted by the investee companies) and Scope 2 (indirectly emitted through the use of electric power, etc.) are examined.

The results of the analysis are shown in the table right. The carbon cost and transition risk increase in the high and middle scenarios. In the Group’s investment portfolio as of the end of March 2023, it is estimated that in 2050, carbon earnings at risk may increase by approximately 8% in the low scenario and 31% in the high and medium scenario for stocks, and 14% in the low scenario and 48% in the high and medium risk scenario for corporate bonds

[MS&AD Group Carbon Earning at Risk (EBIT at Risk)]

<Stocks (as of March 31, 2023)>

	Low Scenario	Medium Scenario	High Scenario
2030	4.5%	13.2%	18.2%
2040	7.2%	22.1%	27.5%
2050	8.4%	31.1%	31.1%

<Corporate bonds (as at March 31, 2023)>

	Low Scenario	Medium Scenario	High Scenario
2030	7.8%	21.5%	29.1%
2040	12.0%	34.9%	42.9%
2050	13.9%	48.4%	48.4%

This analysis is based on the current levels of greenhouse gas emissions by investee companies. If they promote decarbonization, the carbon cost allocated to them is reduced and then the future carbon earnings at risk will also be reduced. We will continue to mitigate the impact on the investment portfolio through engagement with investee companies.

(b) Analysis of Consistency with 2°C Scenario

We also analyzed the transition paths of our investment/loan portfolio companies for alignment with the 2°C target of the Paris Agreement, using S&P Global Trucost’s analysis tools.

This analysis evaluates both historical and future (medium-term) expected emissions, and determine whether emissions reductions of our investment portfolio companies over time are at an appropriate level in line with the global warming prevention targets of the Paris Agreement.

In analyzing transition pathways, S&P Global Trucost uses two calculation methods, the “Sectoral Decarbonization Approach (SDA)” recommended by the “Science Based Targets initiative (SBTi),” and the Greenhouse Gas Emissions per unit of Value Added (GEVA) approach.

By using historical data on corporate business activities and GHG emissions with 2012 as the base year and forward-looking data up to 2030, we evaluate the expected future transition paths. This aims to eliminate the uncertainty in the assessment caused by relying solely on estimated emissions data, and to ensure a sufficient time period covered to reduce the impact of year-on-year changes on the verification results.

Our analysis covers domestic and foreign stocks of listed companies (covers approx. 98% on a market value basis) and domestic and foreign bonds (also covers approx. 91% on a book value basis) in our investment portfolio as of the end of March 2023.

The results of the analysis are shown in the table below. The transition paths for both stocks and corporate bonds were estimated as 2°C to 3°C, and both are expected to exceed the carbon budgets that meet the 2°C target of the Paris Agreement by 2030.

[Analysis of Consistency with MS&AD Group 2°C target]

As of the end of FY2023	Stocks	Corporate bonds
Transition path through 2030	2°C – 3°C	2°C – 3°C

Achieving net zero by 2050 requires fundamental changes in policy, technology, social systems, and lifestyles. Countermeasures are required at the policy level in each country, including the spread of green investment, thorough energy conservation, and decarbonization of power sources using renewable energy. An increasing number of our investment/loan portfolio companies are also formulating transition plans to achieve net zero emissions. The Group will continue to analyze the consistency of investment/loan portfolios with the goals of the Paris Agreement, including the percentage of companies that are consistent with the goals and the details of their transition plans, and will support the transition of our investment/loan portfolio companies to net zero emissions.

(3) Climate/Nature-related opportunities

Based on the identified climate/ nature-related physical risks and transition risks, the Group is committed to resolving the social issues that cause risks, as well as to reducing the occurrence of the risks themselves. Through our activities we will realize the creation of shared value with society, by identifying and communicating risks, preventing the emergence of risks and reducing their impact, and reducing economic burdens.

	External Environment, Background	Impact on Our Business (Assessment)	Time Horizon		
			Short	Medium	Long
(i) Insurance products for climate change risks	As the physical risks associated with climate change increase, the importance of insurance to protect against economic losses is increasing. Correcting the protection gap is an issue in each country.	In addition to traditional coverage for wind and water-related disasters, there is a need to provide a variety of compensation methods such as weather derivatives and weather index insurance to adapt to climate change. Opportunities are also emerging to offer coverage in collaboration with international organizations.	●	●	●
(ii) Climate change adaptation, disaster prevention and mitigation services	With the frequent occurrence of serious losses, there is a strong need to prevent damage or limit losses, and the global adaptation business is estimated to be up to JPY50 trillion annually by 2050. Furthermore, NbS, which includes disaster prevention and mitigation that utilizes nature, is positioned as an important issue in the "European Green Deal" etc.	In addition to providing disaster prevention and mitigation services to policyholders, service targets are expected to expand to include local governments that promote disaster prevention and mitigation. There is a need for insurance companies with strengths in risk analysis to create innovative adaptation businesses.	●	●	●
(iii) Insurance products to protect against the deterioration of ecosystem services	There are increasing calls for coverage for natural capital and ecosystem services to prevent the degradation of ecosystem services essential for people's livelihoods and businesses due to severe natural disasters, pollution, and development (e.g.; economic value of pollinators is approx. JPY470 billion).	In a Mexican marine resort area, an insurance policy was structured to protect coral reefs, an important tourist resource, from hurricanes. Similar insurance products and policies that cover the cost burdens in business activities associated with loss of ecosystem services may be considered.		●	●
(iv) Services related to nature and biodiversity	Half of GDP is dependent on natural capital, and in order to ensure the sustainability of business activities, analysis of nature-related risks and solutions such as nature conservation and restoration to mitigate risks are required before significant losses occur.	As an insurance company that has provided disaster risk analysis and mitigation measures based on regional characteristics, there are high business synergies in analyzing and providing solutions for nature-related risks that are unique to the regions business activities.		●	●
(v) Insurance products and services that support and promote net zero	At COP28, a goal of tripling renewable energy power generation capacity by 2030 was adopted, and investment in renewable energy continues to be strong, reaching approximately JPY2 trillion in 2040 in the Japanese market alone. In addition, growth is expected in technologies and products that contribute to low fuel consumption/electric vehicles and energy conservation. Furthermore, as the emissions trading system for high-emission industries will go into full operation from FY2026, emissions trading, including voluntary credits, will become more active.	The construction of new equipment associated with investment in renewable energy and decarbonization technology will lead to an increase in insurance demand. On the other hand, companies in high-emission industries, where reductions are extremely difficult, are expected to utilize carbon credits, which will also increase the need for coverage related to the composition and distribution of credits.	●	●	●
(vi) New coverage and services in line with business model transformation towards nature positive and a circular economy	The World Economic Forum estimates that as of 2030 the transition to a nature-positive economy will require approximately JPY368 trillion in annual global investment, resulting in an increase in business opportunities of JPY1,372 trillion. More than three-quarters of this estimate is also strongly related to net zero emissions and the circular economy. New technologies and business models will be created in diverse industries for major social and economic transformations.	In order to implement unprecedented technologies and mechanisms into society, insurance systems that cover risks will be important. Demand is expected for risk solutions for new businesses that contribute to nature positive, net zero, and a circular economy in the upstream and downstream of the supply chain, such as the procurement of certified materials with low environmental impact and the promotion of recycling.		●	●
(vii) Consulting needs to support analysis of risks and opportunities related to climate and nature and the development of business strategies	TCFD has 4,872 companies worldwide and 1,470 companies in Japan (as of October 12, 2023), and TNFD has 416 companies worldwide and 109 companies in Japan that have agreed to disclose information in accordance with the framework. In the EU and Japan, similar information disclosure of information is becoming mandatory.	There is a high need for consulting services as advanced knowledge and analysis are required to comprehensively identify climate/ nature-related risks and opportunities in business, formulate business strategies, and disclose information, including long-term risk analysis.	●	●	●

(4) Risks and opportunities in six industries


Underwriting Investment/Loan

We analyzed the physical risks, transition risks, and opportunities for each of the six industries identified in the chapter on climate/nature-related dependencies/impacts. We also analyzed the risks and opportunities for the Group in these industries. Going forward, we will continue to work with our customers to create opportunities and countermeasures against climate/ nature-related risks.


a. Automobile/parts industry

	Companies in the automotive/parts industry Risk: ◆Upstream ■Own operation ◇Down stream Opportunity: ◆Upstream ■Own operation ◇Down stream	Our Group Risk: ●Underwriting ○Investment/Loan ◎Consulting service Opportunity: ●Underwriting ○Investment/Loan ◎Consulting service
Physical Risk	<ul style="list-style-type: none"> ◆ Supply chain disruptions such as damage to suppliers and manufacturing contractors and suspension of logistics functions due to natural disasters ◆ Increase in costs of materials caused by reduced yields and quality deterioration of natural rubber and other raw materials due to temperature rise, drought, and ecosystem deterioration ■ Losses and decreased sales incurred by damage to facilities and equipment production suspension due to natural disasters ■ Increase in energy costs and employee health risks, and decrease in productivity associated with deterioration of quality, factory operation rate and cooling efficiency of air conditioning equipment due to extreme temperature rise ◇ Loss of customers due to damage, shutdown of operations and disruption of store operations caused by natural disasters and delays in taking countermeasures for business partners and delivery destinations ■ Gaining customer trust and increasing orders by strengthening BCP response to large-scale disasters caused by extreme weather ■ Increase profits through added value by enhancing the durability of products that can withstand rising temperatures, precipitation, and changes in weather patterns 	<ul style="list-style-type: none"> ● Increase in claims settlement due to natural disasters ● Decline in premium income due to poor business performance ○ Decrease in asset value or deterioration of business performance in our investment/loan portfolio companies due to damage from natural disasters ◎ Support for developing BCP in preparation for natural disasters, extreme temperature rises, water shortages, etc. ◎ Increase in revenue by providing services related to adaptation measures, disaster prevention and mitigation, and environmental preservation.
Transition Risk	<ul style="list-style-type: none"> ■ Decrease in demand for conventional internal combustion engine vehicles due to increased environmental awareness among consumers ■ Increase in the cost of responding to stricter environmental regulations such as exhaust gas regulations, fuel efficiency standards, GHG emissions, and water resources and waste management, and an increase in the burden of capital investment for energy conservation and renewable energy ◆ Increased in nature-related due diligence in procurement of mineral resources, etc. and procurement costs of sustainable raw materials ◆ ■ Increase in costs due to introduction of carbon tax ■ Loss of revenue due to reputational damage caused by air pollution, water pollution, plastic pollution, and emissions associated with business operations ■ Decline in reputation and sales from stakeholders and investors due to delays in responding to climate change measures and ESG information disclosure ■ Increase in sales due to increased demand for EVs and FCVs ■ Gain in market share through successful introduction of technologies with lower environmental impact, such as use of renewable energy and reduction of water and plastic use ■ Increase in sales through cost reduction and value appeal by using recycled materials and reusing resources ◇ Reduction of transportation costs and GHG emissions by improving logistics efficiency (shared transportation, modal shift) 	<ul style="list-style-type: none"> ● Decline in premium income due to business downturn in the relevant companies and markets ● Decrease in insurance premiums due to stricter underwriting standards and conditions as a result of tightening of environmental regulations ○ Decline in investment returns due to business downturn in companies and markets that are not adequately addressing climate and natural issues ● ○ Reputational damage due to involvement in businesses that lead to global warming and destruction of nature ● Increase in sales by providing insurance products that support new technologies such as EVs and FCVs, value chain probability, and introduction of new business models such as recycling ○ Business leap forward in the relevant companies and markets that have made progress in addressing climate/ nature-related issues ◎ Increased revenue from intermediaries such as credits to offset GHG emissions ◎ Development and provision of new services that mitigate negative impacts on the natural environment related to raw material procurement, etc. ◎ Increase in revenue by providing services related to information disclosure and business strategy based on climate/ nature-related risks


b. Transportation industry

	Companies in the transportation industry Risk: ◆ Upstream ■ Own operation ◇ Down stream Opportunity: ◆ Upstream ■ Own operation ◇ Down stream	Our Group Risk: ● Underwriting ○ Investment/Loan ◎ Consulting service Opportunity: ● Underwriting ○ Investment/Loan ◎ Consulting service
Physical Risk	<ul style="list-style-type: none"> ◆ Serious impact on transportation infrastructure and flight schedules and increased risk of accidents due to natural disasters ◆ Impact on operations due to changes in turbulence frequency due to climate changes and changes in wind and ocean current patterns ◆ Decrease in labor productivity under harsh working conditions due to temperature rises, and increase in labor costs due to shortage of workers ■ Increase in energy costs associated with deterioration of the durability of vehicles and infrastructure, increase in maintenance costs and decrease in cooling efficiency of air-conditioning equipment due to extreme temperature rises ■ Increase in transportation costs due to depletion of fossil fuels and other natural resources ■ Increased risk of accidents due to collisions with large animals such as whales, deer and bears ◇ Damage to business partners or suspension of operations due to natural disasters, increase in costs of alternative logistics, and loss of business opportunities ◇ Decrease in the number of passengers due to damage to natural tourism resources ■ Increase in revenue through services that respond to increase in transportation demand through rapid response in the event of disasters 	<ul style="list-style-type: none"> ● Increase in claims settlement due to natural disasters ● Decline in premium income due to poor business performance ○ Decrease in asset value or deterioration of business performance in our investment/loan portfolio companies due to damage from natural disasters ◎ Increase in revenue by providing services related to adaptation measures, disaster prevention and mitigation, and environmental preservation.
Transition Risk	<ul style="list-style-type: none"> ■ Increased operational and technology development costs due to stricter regulations on emissions, fuel efficiency standards, and ecosystem protection ■ Decreased demand for traditional transportation methods due to rising environmental awareness among consumers and businesses ■ Increased costs associated with the introduction of carbon taxes, credit purchases, and the shift to sustainable biomass and SAF (Sustainable Aviation Fuel) fuels ■ Loss of market share due to the failure to implement environmentally friendly technologies such as renewable energy usage and GHG emissions reduction ■ Reputation damage due to air pollution, water contamination, and waste generation associated with business operations ■ Fines, compensation costs, and expenses for pollution removal and habitat restoration, as well as reputation damage, resulting from transportation accidents ■ Decline in stakeholder and investor evaluations and sales due to delays in addressing climate change measures and ESG information disclosures ■ Increased sales through the development and introduction of decarbonized transportation methods utilizing energy sources such as EVs and FCVs ■ Cost reduction and creation of new market opportunities through the provision of environmentally and nature-conscious transportation services and joint transport ■ Cost reduction and increased sales through the use of recycled materials and the promotion of resource re-use, emphasizing value ◇ Reduction in transportation costs and GHG emissions through logistics efficiency improvements (joint transport, modal shift) 	<ul style="list-style-type: none"> ● Decrease in insurance premium income due to the business downturn of the company or market ● Reduction in insurance premium income due to stricter underwriting standards and conditions following the enhancement of environmental regulations ○ Decline in investment returns due to the business downturn of companies or markets that inadequately address climate and natural challenges ● Reputation damage due to involvement in businesses contributing to global warming and environmental destruction ● Increased demand for new types of coverage due to support for business transformations, such as new energy sources and transportation methods ○ Significant business advancements for companies or markets that have adequately addressed climate and natural challenges ◎ Increase in income through the intermediaries of credits that offset GHG emissions ◎ Development and provision of new services that mitigate negative impacts on the natural environment ◎ Increase in income through the provision of services related to information disclosure and business strategies that consider climate/ nature-related risks


c. Food/beverage industry

	Companies in the food/beverage industry Risk: ◆ Upstream ■ Own operation ◇ Down stream Opportunity: ◆ Upstream ■ Own operation ◇ Down stream	Our Group Risk: ● Underwriting ○ Investment/Loan ◎ Consulting service Opportunity: ● Underwriting ○ Investment/Loan ◎ Consulting service
Physical Risk	<ul style="list-style-type: none"> ◆ Damage to raw material production areas (farmland/aquaculture farms), instability in raw material procurement, and suspension of logistics functions due to natural disasters ◆ Reduced yield and quality of raw materials, depletion of natural resources; increased costs for maintaining quality, changing procurement regions, and developing alternative raw materials due to heatwaves, droughts, water shortages, and the degradation of ecosystems such as water quality and soil. ◆ ■ Decrease in labor productivity under harsh working conditions due to temperature rises and increase in labor costs due to shortage of workers ■ Incurrence of recovery costs due to damage to factories, production stoppages, and disruption of logistics by the extreme weather and natural disasters ■ Increase in energy costs due to deterioration of cooling efficiency of air conditioning equipment by the extreme temperature changes ■ Increase in costs to respond to landslides and flood disasters due to sea level rise and extremely severe weather disasters ◇ Damage to business partners or suspension of operations due to natural disasters, increase in costs of alternative logistics, and loss of business opportunities 	<ul style="list-style-type: none"> ● Increase in claims settlement due to natural disasters ● Decline in premium income due to poor business performance ○ Decrease in asset value or deterioration of business performance in our investment/loan portfolio companies due to damage from natural disasters ◎ Increase in revenue by providing services related to adaptation measures, disaster prevention and mitigation, and environmental preservation.
Transition Risk	<ul style="list-style-type: none"> ◆ Relocation of production /procurement area and burden of relocation costs associated with the expansion of natural conservation areas, stricter regulations on land use, the use of pesticides and fertilizers, etc., and instability in raw material procurement ◆ Increase in procurement costs due to enhanced traceability, desire for sustainable raw materials by regenerative agriculture, etc., and competition with raw materials for biofuels, etc. ■ Increase in cost of responding to stricter environmental regulations, including GHG emissions, water management, waste management, air/soil pollution and increase in burden of capital investment for energy conservation and renewable energy ■ Decrease in sales associated with brand image deterioration and suspension of handling at retail stores due to inability to respond to growing consumer awareness on climate-related and environmental issues. ■ Loss of market share due to failure to introduce technologies with lower environmental impact, such as renewable energy use, reduced GHG emissions, reduced water use, and environmentally friendly packaging ■ Increase in energy costs due to introduction of carbon tax ■ Decline in evaluation from stakeholders and investors, decline in corporate value and stock prices, and increase in response costs due to delays in responding to climate change measures, biodiversity considerations, and ESG information disclosure ■ Loss of revenue brought about by reputational damage due to air/ water/plastic pollution, and emissions associated with business operations ◆ Increase in profits by establishing sustainable production methods for raw materials, improving added value through environmental conservation in production areas, and stabilizing procurement costs ■ Ensuring stable yields by developing raw materials and varieties in response to climate change (raw materials resistant to extreme heat, pest-resistant varieties), improvement of water use efficiency, and switching to land use with reduced environmental impacts ■ Increase in development and sales of new products in response to increased demand and changes in consumer preferences due to climate change (products to prevent heat stroke and infectious diseases) ■ Reduction of transportation costs and GHG emissions by improving logistics efficiency (shared transportation, modal shift) ■ Gain of market share due to success in introduction of renewable energy use, reduced GHG emissions, reduced water use, and technologies for raw materials and packages with lower environmental impacts 	<ul style="list-style-type: none"> ● Decline in premium income due to business downturn in the relevant companies and markets ● Decrease in insurance premiums due to stricter underwriting standards and conditions as a result of tightening of environmental regulations ○ Decline in investment returns due to business downturn in companies and markets that are not adequately addressing climate and natural issues ● ○ Loss of reputation due to involvement in businesses that lead to global warming and destruction of nature ● Development of new insurance products that address climate change risks and environmental risks ○ Business leap forward in the relevant companies and markets that have made progress in addressing climate/ nature-related issues ◎ Increased revenue from intermediaries such as credits to offset GHG emissions ◎ Development and provision of new services that mitigate negative impacts on the natural environment related to raw material procurement, etc. ◎ Increase in revenue by providing services related to information disclosure and business strategy that take climate/ nature-related risks into consideration


d. Materials Industry (petrochemical)

	Companies in the materials industry (petrochemical) Risk: ◆ Upstream ■ Own operation ◇ Down stream Opportunity: ◆ Upstream ■ Own operation ◇ Down stream	Our Group Risk: ● Underwriting ○ Investment/Loan ◎ Consulting service Opportunity: ● Underwriting ○ Investment/Loan ◎ Consulting service
Physical Risk	<ul style="list-style-type: none"> ◆◆■ Increase in costs due to supply chain disruptions, instability in raw material procurement, and suspension of logistics functions, caused by natural disasters ◆ Decrease in yield and quality of raw materials and increase in quality maintenance costs, due to deterioration of ecosystem such as heat, drought, water shortages, and deterioration of water quality ◆■ Decrease in labor productivity under harsh working conditions due to temperature rises and increase in labor costs due to shortage of workers ■ Increase in energy costs due to deterioration of cooling efficiency of air conditioning equipment caused by extreme temperature changes ■ Incurrence of costs associated with damage to factories, production stoppages, and disruption of logistics due to extreme weather s and natural disasters such as drought ◇ Decrease in sales due to damage, shutdown of operations due to extreme weather or natural disasters in business partners and delivery destinations 	<ul style="list-style-type: none"> ● Increase in claims settlement due to natural disasters ● Decline in premium income due to poor business performance ○ Decrease in asset value or deterioration of business performance in our investment/loan portfolio companies due to damage from natural disasters ◎ Increase in revenue by providing services related to adaptation measures, disaster prevention and mitigation, and environmental preservation.
Transition Risk	<ul style="list-style-type: none"> ◆ Increased in nature-related due diligence in procurement of mineral resources, etc. and procurement costs of sustainable raw materials ◆■ Loss of revenue brought about by damage to reputation due to environmental destruction in raw materials procurement and air/ water/ waste pollution and plastic pollution associated with business operations ◆■ Incurrence of fines, damages, pollution removal and habitat restoration costs, etc. due to environmental accidents, and loss of reputation ■ Increase in cost of responding to stricter environmental regulations, including GHG emissions, water/ waste management, air/ soil pollution and increase in burden of capital investment for energy conservation and renewable energy ■ Loss of revenue as a result of demand restraint for virgin materials due to the acceleration of the circular economy ■ Customer loss due to brand image deterioration caused by inability to respond to growing consumer awareness on climate/ nature-related issues ■ Loss of market share due to failure to introduce technologies with lower environmental impact, such as renewable energy use, reduced GHG emissions, reduced water use, and environmentally friendly packaging ■ Increase in energy costs due to introduction of carbon tax ■ Decline in evaluation from stakeholders and investors, decline in corporate value and stock prices, and increase in response costs due to delays in responding to climate change measures, biodiversity considerations, and ESG information disclosure ◆ Enhancement of added value and stabilization of procurement costs by switching to raw materials with less environmental impact, such as utilization of sustainable biomass / recycled materials ■ Market expansion for products resistant to environmental changes such as rising temperatures and droughts ■ Capturing of new markets by focusing on waste reduction and products with low environmental impact ■ Gain of market share due to success in introduction of renewable energy use, reduced GHG emissions, reduced water use, and technologies for raw materials and packages with lower environmental impacts ■◇ Creation of new markets through product design that responds to the circular economy and the establishment of recycling systems and systems for material recycling ◇ Reduction of transportation costs and GHG emissions by improving logistics efficiency (shared transportation, modal shift) 	<ul style="list-style-type: none"> ● Decline in premium income due to business downturn in the relevant companies and markets ● Decrease in insurance premiums due to stricter underwriting standards and conditions as a result of tightening of environmental regulations ○ Decline in investment returns due to business downturn in companies and markets that are not adequately addressing climate and natural issues ●○ Loss of reputation due to involvement in businesses that lead to global warming and destruction of nature ● Development of new insurance products that address climate change risks and environmental risks ○ Business leap forward in the relevant companies and markets that have made progress in addressing climate/ nature-related issues ● Developing new insurance products that address risks associated with new schemes to reduce environmental impacts, such as promoting sustainable raw material procurement and recycling, and coverage for losses related to shared delivery, etc. ◎ Increased revenue from intermediaries such as credits to offset GHG emissions ◎ Development and provision of new services that mitigate negative impacts on the natural environment related to raw material procurement, etc. ◎ Increase in revenue by providing services related to information disclosure and business strategy that take nature-related risks into consideration

e. Technology/Hardware Industry (Electronic Equipment, Devices & Components/Semiconductors)

	Companies in the technology/Hardware industry (Electronic Equipment, Devices & Components/Semiconductors) Risk: ◆ Upstream ■ Own operation ◇ Down stream Opportunity: ◆ Upstream ■ Own operation ◇ Down stream	Our Group Risk: ● Underwriting ○ Investment/Loan ◎ Consulting service Opportunity: ● Underwriting ○ Investment/Loan ◎ Consulting service
Physical Risk	<ul style="list-style-type: none"> ◆◇ Increase in costs due to supply chain disruptions, instability in raw material procurement, and suspension of logistics functions, caused by natural disasters ◆ Decrease in yield and quality of raw materials and increase in quality maintenance costs due to ecosystem deterioration such as water shortages and deterioration of water quality ◆■ Decrease in labor productivity under harsh working conditions due to temperature rises and increase in labor costs due to shortage of workers ◇ Loss of customers due to damage, shutdown of operations at business partners and delivery destinations caused by extreme weather or natural disasters ■ Recovery costs incurred as a result of business suspension due to damage to factories and decrease in sales due to extreme weather and natural disasters ■ Disruption of production and services and increase in costs due to depletion of water resources ■ Increase in energy costs due to deterioration of cooling efficiency of air conditioning equipment due to extreme temperature changes ◇ Loss of customers due to disruption or delayed response associated with damage or shutdown of operations at business partners and delivery destinations caused by extreme weather or natural disasters 	<ul style="list-style-type: none"> ● Increase in claims settlement due to natural disasters ● Decline in premium income due to poor business performance ○ Decrease in asset value or deterioration of business performance in our investment/loan portfolio companies due to damage from natural disasters ◎ Increase in revenue by providing services related to adaptation measures, disaster prevention and mitigation, and environmental preservation.
Transition Risk	<ul style="list-style-type: none"> ◆ Cost Burden of moving and relocating procurement areas for minerals, etc. due to expansion of nature conservation areas, and instability of raw material procurement ◆■ Loss of revenue caused by reputational damage due to environmental destruction during raw materials procurement and air/ water/ waste pollution associated with business operations ■ Increase in cost of responding to stricter environmental regulations, including GHG emissions, water management, waste management, air pollution, soil contamination throughout the product value chain, and an increase in the burden of capital investment for energy conservation and renewable energy ■ Decrease in sales associated with brand image deterioration and suspension of handling at retail stores due to inability to respond to growing consumer awareness on climate-related and environmental issues. ■ Loss of market share due to failure to introduce technologies with lower environmental impact, such as renewable energy use, reduced GHG emissions, reduced water use, and packaging with less environmental impact, including the establishment of recycling technologies ■ Increase in energy costs due to introduction of carbon tax ■ Decline in evaluation from stakeholders and investors, decline in corporate value and stock prices, and increase in response costs due to delays in responding to climate change measures, and ESG information disclosure ■ Loss of revenue brought about by damage to reputation due to air/ water/ waste pollution and emissions associated with business operations ■ Increase in opportunities to create and offer climate change-related products and services in response to changes in technology and markets ■ Reduction of transportation costs and GHG emissions by improving logistics efficiency (shared transportation, modal shift) ■ Gain of market share through successful introduction of technologies with lower environmental impact such as use of renewable energy, reduction of GHG emissions, reduction of water use, and environmentally friendly packaging 	<ul style="list-style-type: none"> ● Decline in premium income due to business downturn in the relevant companies and markets ○ Decline in investment returns due to business downturn in companies and markets that are not adequately addressing climate and natural issues ●○ Loss of reputation due to involvement in businesses that lead to global warming and destruction of nature ● Development of new insurance products that address risks associated with new schemes aimed at reducing environmental impact, such as compensation for losses related to sustainable raw material procurement, recycling initiatives, and joint transportation. ○ Business leap forward in the relevant companies and markets that have made progress in addressing climate/ nature-related issues ◎ Increased revenue from intermediaries such as credits to offset GHG emissions ◎ Development and provision of services to mitigate negative impacts on the natural environment related to raw material procurement, water use, etc. ◎ Increase in revenue by providing services related to information disclosure and business strategy that take nature-related risks into consideration

f. Electricity/gas industry

	Companies in the electricity/gas industry Risk: ◆ Upstream ■ Own operation ◇ Down stream Opportunity: ◆ Upstream ■ Own operation ◇ Down stream	Our Group Risk: ● Underwriting ○ Investment/Loan ◎ Consulting service Opportunity: ● Underwriting ○ Investment/Loan ◎ Consulting service
Physical Risk	<ul style="list-style-type: none"> ◆ Supply chain disruptions, instability in raw material procurement, and suspension of logistics functions caused by natural disasters ◆ Decreased hydroelectric power sales and increased cooling costs due to water shortage ◆ Unstable procurement of raw materials due to poor harvest of biomass fuels, etc. due to extreme weather conditions ◆ Decrease in labor productivity under harsh working conditions due to temperature rises and increase in labor costs due to shortage of workers ■ Increase in costs in the event of extensive damage to power plants, substation and transmission equipment, etc. due to extreme weather or natural disasters, resulting in long-term shutdowns or large-scale power outages, etc. ■ Increase in costs to deal with the destruction of the natural environment due to the construction of power plants and gas extraction facilities, fragmentation of ecosystems due to the construction of power lines and pipelines, and changes in river ecosystems due to the construction of hydroelectric dams 	<ul style="list-style-type: none"> ● Increase in claims settlement due to natural disasters ● Decline in premium income due to poor business performance ○ Decrease in asset value or deterioration of business performance in our investment/loan portfolio companies due to damage from natural disasters ◎ Increase in revenue by providing services related to adaptation measures, disaster prevention and mitigation, and environmental preservation.
Transition Risk	<ul style="list-style-type: none"> ■ Increase in costs in response to stricter environmental regulations, such as GHG emissions, water/ waste management, and air/ soil pollution ■ Incurrence of costs due to the cancellation or reduction of business plans due to opposition movements by indigenous peoples, local communities, NGOs, etc., or orders by authorities from the perspective of nature conservation, or litigation results ■ Loss of customers due to a decline in brand image caused by the impacts on biodiversity and ecosystem services in the construction and operation of power plants and emergence of risks to the region (e.g., bird strikes, slope disasters caused by deforestation, etc.) ■ Increase in costs of procuring sustainable biomass fuels due to land competition and increased demand ■ Loss of market share due to failure to introduce technologies with low environmental impact, such as reducing GHG emissions and water usage ■ Increase in energy costs due to introduction of carbon tax ■ Decline in evaluation from stakeholders and investors, decline in corporate value and stock prices, and increase in response costs due to delays in responding to climate change measures, biodiversity considerations, and ESG information disclosure ■ Loss of revenue brought about by loss of reputation caused by air/ water/ waste pollution associated with business operations ■ Increased opportunities to create and provide climate change-related products and services in response to changes in decarbonization and energy technologies and markets that coexist with the natural environment ■ Gain of market share through successful introduction of technologies with lower environmental impact such as use of renewable energy, reduction of GHG emissions, reduction of water use 	<ul style="list-style-type: none"> ● Decline in premium income due to business downturn in the relevant companies and markets ● Decrease in insurance premiums due to stricter underwriting standards and conditions as a result of tightening of environmental regulations ○ Decline in investment returns due to business downturn in companies and markets that are not adequately addressing climate and natural issues ○ Loss of reputation due to involvement in businesses that lead to global warming and destruction of nature ● Development of new insurance products that address climate change risks and environmental risks ○ Business leap forward in the relevant companies and markets that have made progress in addressing climate/ nature-related issues ◎ Increased revenue from intermediaries such as credits to offset GHG emissions ◎ Development and provision of services to mitigate impacts on the natural environment at business locations such as power plants ◎ Increase in revenue by providing services related to information disclosure and business strategy that take nature-related risks into consideration

3. Approaches Based on Climate/Nature-related Risks and Opportunities

● Initiatives for Identifying and providing information on risks - Business Activities with Consideration for Sustainability

Based on our “Sustainability Approach,” the Group practices business activities with sustainability in mind, aiming to solve social issues together with our stakeholders. When underwriting insurance and making investments and loans, we evaluate and analyze risks that could have a negative impact on the environment and society, and work with our business partners to reduce these risks. In addition to climate/ nature-related physical risks and transition risks, we evaluate and analyze various risks, referring to the Japan Bank for International Cooperation (JBIC)’s “Japan Bank for International Cooperation Guidelines for Confirming Environmental and Social Considerations” and the IFC (International Finance Corporation)’s “Performance Standards.” These risks include the impacts on nature and communities of renewable energy projects, which have been spreading rapidly due to decarbonization, and new agriculture, forestry, and fisheries projects, which involve large-scale development in unexplored areas, as well as risks related to indigenous peoples’ rights. We support net zero and nature positive through the provision of products and risk consulting services that help prevent and reduce discovered risks and resolve issues.

[Businesses subject to environmental/social risk assessment]

- Thermal power generation/extraction (oil/gas)
- Renewable energy power generation (hydropower)
- Agriculture, forestry, and fisheries (involving large-scale new development on unexplored land)
- Project that may destroy natural and cultural heritage sites protected under the UNESCO Convention for the Protection of World Heritage Sites and wetlands protected under the Ramsar Convention

[Main survey items] *Varies slightly depending on the type of business

Topics	Main survey items
Labor	Risks of child labor and forced labor, other labor-related problems (working conditions, labor practices, etc.), countermeasures taken by companies
Local Residents	Neighbor issues, measures related to resident relocation, etc.
Indigenous Peoples	Problems, proximity to indigenous areas, response policies, etc.
Impact on Local Community	Land development, impacts on ecosystem, complaints, etc.
Project Type	Whether it is new development of unexplored land, etc.
Protected Areas/Priority locations, etc.	Whether it falls under a protected location or a priority location, etc.
Endangered species/species	Impact on endangered species/species, etc.
Climate Change	Impact on physical risks, status of transition planning, etc.
Ecosystem	Utilization/modification, etc.

“Sustainability Approach”

(<https://www.ms-ad-hd.com/en/csr/summary/materiality.html>)

● Approach through underwriting and investments/loans

○GHG emissions reduction targets related to our underwriting and investment

In November 2023, the MS&AD Insurance Group set interim targets for GHG emissions reductions by 2030. (see “Transition to 2050 Net Zero” for details.). Through engagement in dialogue with clients, we share challenges they have in reducing GHG emissions and work together to solve them.

Interim Target		
GHG emissions of major domestic business partners*1 reduction rate	Reduction targets	Reduce by 37%*2 compared to FY2019 by FY2030
	Action targets	Through dialogue with customers, we will share issues in reducing GHG emissions. We will work together with customers to reduce GHG emissions by proposing solutions that contribute to resolving issues.

*1 GHG emissions of major domestic clients (approx. 3,300 companies) selected based on premium income (related to the Group’s underwriting and investments/loans)

*2 Calculated from FY2030 GHG emissions target in Japan’s NDC (Nationally Determined Contribution) and the FY 2019 total emissions contained in the same report.

To achieve our goals, in FY2023 we began activities to hold dialogue with our policyholders on sustainability issues, including GHG emissions reduction. In the past we have been proposing products and services to our underwriting portfolio companies aimed at resolving key sustainability issues as part of our CSV (Creating Shared Value) initiatives, but in FY2023 we launched dialogue activities focused completely on sustainability issues. Through dialogue, we are working to understand the sustainability issues of our policyholders and propose solutions to resolve them. In promoting this initiative, we have also begun dialogue with agencies and brokers regarding proposing solutions to resolve sustainability issues.

● Support for a decarbonized society through investments and loans

Aiming to help our investment and loan portfolio companies reduce GHG emissions, we promote initiatives through engagement to address climate change, and we provide investment and loans in project financing and funding related to construction of renewable energy power generation plants, such as those for solar, wind and biomass. Mitsui Sumitomo Insurance, Aioi Nissay Dowa Insurance, Mitsui Sumitomo Aioi Life Insurance, and Mitsui Sumitomo Primary Life Insurance jointly invested in the impact funds which focus on climate change, while also building expertise in this area.

With regard to initiatives through engagement with our clients on climate change, we are working to understand the organizational structures of our investee companies in relation to addressing climate change, their efforts toward reaching GHG emission reduction targets, their plans for technological innovation, and the challenges they face. For examples of the details of engagement, please refer to "III. Risk and Impact Management, 4. As Responsible Institutional Investor" on page 46.

● Initiatives to reduce GHG emissions from our business operation

The Group set interim targets for GHG emission reduction in FY2010, and has been working to reduce GHG emissions associated with our business activities. In FY2020, we achieved our initial GHG emission reduction target (30% reduction compared with FY2009 as a baseline), and in May 2021, we have set new targets in line with the Paris Agreement. We set the new target as "Net Zero Emissions by 2050," and also set an interim target and renewable energy introduction rate target for FY2030.

We are working to reduce energy use and introduce renewable energy by means such as installing state-of-the-art energy-saving equipment in our own office buildings, installing solar power generation equipment, and replacing company-owned vehicles with fuel-efficient ones. In addition, business style reforms such as remote work, telecommuting and the active use of online conferencing leads to the improvement of employees' well-being as well as a reduction in gasoline and electricity consumption through a reduction in employees' travel and office space. This will lead to a reduction in energy related to commuting and business trips, and a reduction in the so-called Scope 3 GHG emissions. As part of Scope 3 reductions, we are working on business process reforms such as Web-based insurance policy applications, claims settlement procedures, various notifications, as well as reducing the burden on nature by reducing paper usage.

● Products/services that contribute to climate change adaptation

Water damage coverage, which is attached to fire insurance policies for residences and businesses, covers damage to buildings, household goods, equipment, etc. caused by floods, etc.

Prompt claims settlement for damage is extremely important in helping disaster victims rebuild their lives. "Weather derivatives" stabilize company earnings by avoiding and mitigating losses incurred by abnormal or unseasonable weather. This effect is especially noticeable in industries that are highly dependent on weather, such as agriculture and tourism. In Australia, we use the Insurtech technology to provide a "weather index insurance platform for farmers" that enables customers to get online insurance quotes in real time. In countries where the insurance market is not fully developed, when a natural disaster of a certain scale occurs, recovery and reconstruction may be extremely difficult, leading to further poverty and political instability. In cooperation with the World

Bank and other international organizations, we are committed to quickly providing reconstruction funds to such countries through our participation in public natural disaster compensation schemes.

● Expansion of coverage for natural disasters and initiative on pre/post claims settlement

In response to the frequent occurrence of natural disasters, the Group supports local disaster prevention and mitigation activities through services such as the real-time damage forecasting website application, "cmap.dev," and the loss prevention/mitigation system, "Loss Prevention Dashboard." Through Japan's first alert service that notifies users of information on hailstorm forecasts, we support the avoidance and mitigation of damage from hailstorms by delivering push alerts to service users in areas where the probability of hailstorms is increasing.



In addition, our "Inland Flooding Forecast System," which is currently undergoing verification trials, will predict the occurrence of inland flooding, which is frequent in urban areas, with the aim of reducing damage by helping resident's evacuation and flood countermeasures.

We also support prompt issuing of disaster certificates and streamlining the issuance process, as a post-claims settlement service to quickly help those affected by the disaster to rebuild their lives.

To implement these various services and local disaster prevention and mitigation activities, we have launched a "Disaster Prevention Partner" system in cooperation with agencies. Playing a central role, the Group has established a collaborative system with local governments and disaster relief organizations and with agencies and other organizations that conduct disaster prevention activities tailored to local characteristics, which will lead to improvement of local disaster preparedness while strengthening points of contact with customers. This will lead to the creation of business opportunities.

● Support for net zero emissions and transition to nature positive through offering our insurance products

Like coverage for risks associated with renewable energy businesses, MS&AD Group has been providing insurance products that support companies in their transition towards net zero and nature positive.

We offer insurance to cover a decrease in sales revenue in cases where a natural disaster has caused damage to equipment that was intended to generate J-Credits. To support decarbonization, we have been also developing endorsements to cover additional costs. Although conventional insurance products could only pay up to the cost of restoring the property to its original condition, we support the transition to a net zero society based on the “Build Back Better*” concept. Our “Carbon Neutral Support Endorsement” covers the cost of installing equipment to reduce CO₂ emissions when a damaged building is restored. Our “Endorsement for Cost of Replacement with Electric Vehicles, etc.” covers the cost incurred when a gasoline-powered vehicle had a significant accident and it will be replaced with an electric vehicle, etc.

Reducing resource use is a key element in the transition to nature positive, and promotion of circular economy is essential. In response to the social issue of mass waste in the apparel industry, our “Coverage for Clothing Circulation Expense (Insurance for non-burning)” covers recycling expenses incurred by clothing manufacturers and retailers in the event of damage, thereby supporting the circular use of clothing. In addition, we are working with customers to utilize recycled parts in automobile repairs, contributing to the realization of circular economy.

As products/services that contribute to the preservation and restoration of natural capital and biodiversity, our “Endorsement for Additional Expenses for Dealing with Marine Contamination,” covers the cost of conservation and restoration activities for damage to the natural environment, and aims to supplement the social responsibility of vessel operators, which was previously not covered by the policy. Our “Endorsement for Coverage of Reforestation Expenses, etc., (Forest Keeper)” covers the cost of reforestation for the preservation and restoration of disaster-affected forests.

We also provide an insurance system to cover the risk of fire spread to other property due to “Noyaki (open burning),” a traditional practice in Aso, Kumamoto Prefecture, which is essential for maintaining grasslands. In some cases, they were forced to suspend this practice due to a lack of allowance for the risk of fire spread, but the provision of our “Noyaki (open burning) Insurance” enables a tradition that is closely tied to the nature and history of Aso to be preserved, helps agricultural and livestock products to be maintained, and contributes to the preservation of its abundant water resources.

Note: A concept advocated in the field of disaster prevention that not only restores communities to their original state, but also takes measures to make them more resilient during the recovery phase after a disaster.

[Debt-for-nature swap for marine conservation supported by MS AUL's credit insurance]

A Debt for Nature Swap (DfNS) is a financial arrangement in which a portion of a country's outstanding debt is forgiven, cancelled, or restructured by its creditors in exchange for commitments to invest in environmental conservation or sustainable development initiatives. The primary objective of such arrangements is to address financial and environmental challenges simultaneously, providing a win-win solution for debtor nations and the global environment.

MS Amlin Underwriting Limited (MS AUL) contributed to a DfNS involving Ecuador by providing political risk insurance connected to the loan, which enhanced investor confidence and enabled a reduction in debt pricing. A use case highlighting MS AUL's involvement and exploring the broader potential of the insurance industry in driving sustainable and socially responsible initiatives was published in partnership with the University of Cambridge Institute for Sustainable Leadership, the secretariat of ClimateWise.

Ecuador, home to the rich biodiversity of the Galapagos Islands, initiated a DfNS aimed at preserving its marine ecosystems and addressing critical challenges such as overfishing. This was achieved by restructuring its debt in exchange for commitments to marine conservation. MS AUL's political risk reinsurance provides coverage against the risk of default by the Ecuadorian government.

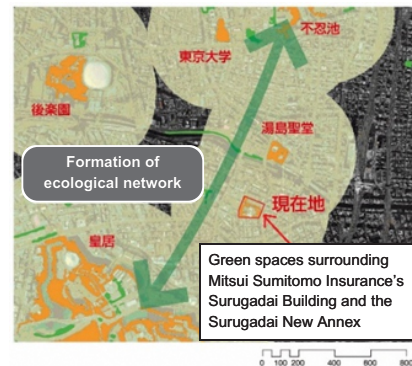
This initiative underscores the important role that insurance companies can play in facilitating the transition to a nature-positive economy by mitigating risks inherent in financial transactions and fostering investor confidence. Furthermore, it highlights the importance of continuous monitoring, reporting and adaptation strategies, supported by regulatory frameworks and technological innovations, to ensure the long-term success and integrity of such initiatives.

Scaling up investments in natural environment conservation projects that contribute to climate change adaptation will require extensive cross-sectoral collaboration and mobilization of diverse expertise. The ability of insurance companies to manage complex risks positions them as essential contributors to advancing both environmental and financial sustainability.



[Corporate Green Space Support Package]

Since its completion in 1984, Mitsui Sumitomo Insurance's Surugadai Building has had a high greening rate and a rooftop garden, which was unusual at the time. Since the completion of Surugadai New Annex in 2012, which has a green space centered on native species, the building has been home to a variety of living species and is highly regarded as a corporate green space that reflects consideration for biodiversity. A consortium led by MS&AD InterRisk Research & Consulting provides full support, from the planning of green spaces to the selection of tree species and subsequent utilization of the green space. It received certification as a "Nationally Certified Sustainably Managed Nature Sites," in the first year which the Ministry of the Environment started in 2023. Even in highly developed urban areas, by improving the quality of green space it is possible to develop an ecological network that connects neighboring green spaces, thereby improving the habitat of wild birds. Analysis using the LEAP approach of TNFD for urban real estate at our business sites revealed that some locations are in close proximity to priority locations in terms of biodiversity conservation. Business sites companies with such potential can contribute to the local ecosystem by maintaining their green spaces.



Based on our experience in creating green spaces surrounding Mitsui Sumitomo Insurance's Surugadai Building and the Surugadai New Annex (Surugadai Green Spaces), we offer a "Corporate Green Space Support Package" for companies with business sites equipped with green spaces. We offer support through our "Corporate Green Space Potential Evaluation," a desk-based quantitative evaluation of how corporate green space can contribute to the local ecosystem, as well as the planning of green space, roadmap creation, rough estimates, and specific utilization plans after green space creation. We also provide "Corporate Green Space Insurance" to cover damage and expenses incurred at corporate green spaces due to unexpected and sudden accidents.

● Providing new services towards a net zero and nature positive society

Without limiting ourselves to providing insurance products, we are working to establish a new business model for decarbonization by leveraging our customers' and various networks. "Roof Plus" is a scheme that collaborates with solar O&M companies to support small- and medium-sized enterprises (SMEs) in introducing self-consumption solar power generation equipment on a lease basis. This scheme makes it easier for SMEs to install rooftop power generation equipment, which used to be mainly installed by large enterprises.

Going forward, it is expected that there will be a movement toward utilizing carbon credits and emissions rights to cover GHG emissions that remain even after companies make their own reduction efforts toward net zero. We have launched an "emission rights trading intermediary business" to support companies, mainly our business partners. In collaboration with startups, we also provide support for the acquisition of J-Credits created by the thinning of forests in Japan.

In order to protect the local natural environment, which is a valuable tourism resource, we have launched a project to prevent littering and promote recycling at Mt. Fuji. We will install "SmaGO,"

IoT smart trashcans, with signage to raise awareness of manners and provide information on separation of trash at tourist attractions. In addition to eliminating overtourism in areas with a high concentration of tourists, we will promote more efficient waste management and environmental conservation, and the project will contribute to regional development by improving the sustainability of natural capital and further enhancing the attractiveness of tourist destinations.

● Analysis and evaluation of climate/ nature-related risks/opportunities and support for disclosure

MS&AD InterRisk Research & Consulting provides services to evaluate and analyze climate/ nature-related physical and transition risks and to support corporate's disclosure. In particular, we have focused on the quantitative evaluation of the physical risks of climate change in collaboration with external organizations with advanced knowledge. In 2020, we partnered with U.S. startup Jupiter Intelligence to launch a service that quantitatively assesses the risk of various future natural disasters worldwide with an accuracy of 90 m × 90 m, based on climate change impact assessment using AI. In addition, the "Large-Scale Assessment of Flood Risks Due to Climate Change (LaRC-Flood®)" project launched in 2028, in collaboration with the University of Tokyo and Shibaura Institute of Technology, has achieved highly accurate estimation of inundation depth distribution around the world, and the results are used in consulting. In 2023, as a new business, we began providing "Flood Risk Finder," a SaaS platform that can evaluate flood risks around the world.

Regarding nature-related risks, it is necessary to cover not only direct business activities but also the entire value chain, including raw material procurement. It is important to conduct scientific evaluation and analysis on a regional basis, as this varies depending on the state of the nature and ecological systems in each region that the business has contact with, as well as the essence of the business. With the evolution of AI and DX technologies, startups called nature techs, which decipher and analyze the complexity of nature, are emerging in Japan and abroad. In 2022 the MS&AD Group partnered with Think Nature Inc., which owns natural capital big data, and continues to conduct demonstrations with companies having groundbreaking technology. In addition to providing general support, we provide support focused on industries with particularly strong connections to nature, such as "TNFD Disclosure Support for Urban Real Estate and Freshwater Resources."

[Climate-related]

Quantitative assessment service for natural disaster risks

Based on the location information of business sites, we simulate various disaster indicators/ financial impacts with high precision for each scenario of temperature rise, time horizon, and recurrence period, to help identify the physical risks when climate change becomes a reality.

Flood Risk Finder

A SaaS platform that can perform flood risk assessments around the world. Calculating changes in future flood inundation depths and the amount of damage caused by flooding under the current climate at business sites, under scenarios of less than 2°C rise, and 4°C rise, we support companies in identifying flood risks and effectively managing risks.

[Nature-related]**TNFD consulting for all businesses**

Based on the TNFD recommendations and LEAP guidance, we utilize geographic information systems (GIS), etc. to conduct location-based analysis of sensitive locations/priority areas such as direct operation sites and raw material procurement areas, to identify dependencies/impacts and risks/opportunities. We have experience in supporting companies in a variety of industries, including trading companies, real estate, materials, transportation, daily necessities, steel, construction, energy, food, beverages, electrical and electronics, IT, tourism, operational institutions, and insurance.

TNFD consulting for urban real estate

In the evaluation of “priority locations” required by TNFD, by limiting the evaluation target to urban areas in Japan, it become possible to evaluate “priority locations” incorporating precise data and evaluation methods that capture the natural characteristics of Japanese cities.

TNFD support services focused on freshwater resources

By incorporating GETFLOWS, a hydrological model owned by Geosphere Environmental Technology that visualizes the global water cycle, into our nature-related consulting expertise, we provide services that can be used not only for disclosure but also for setting goals and considering specific countermeasures.

TNFD consulting for regional financial institutions

By focusing on the unique characteristics of regional financial institutions and their foundations, and conducting evaluations that capture the characteristics and relationships of their nature and industry, we can advance the examination of nature-related risks and opportunities that are unique to regional financial institutions. This consulting provides support for nature-related evaluations, disclosures, and actions unique to regional financial institutions and their foundations.

[Development of business risk quantification tools related to the environment and biodiversity]

Aioi Nissay Dowa Europe Limited in partnership with an AI venture, Mind Foundry established Aioi R&D Lab-Oxford (hereinafter “Lab”), a joint laboratory that conducts research and development activities in cutting-edge technology and science. Together with a nature tech company, Natural Capital Research Ltd., the Lab has begun developing a tool powered by an AI model to quantify the economic value of nature-related business risks. We aim to evaluate the financial impact of business risks on the environment and biodiversity due to corporate activities such as urban development and farmland development.

The developed tools will be used by business companies and financial institutions to select projects and evaluate investment targets based on their impact on biodiversity, thereby contributing to the maintenance and improvement of biodiversity. In addition, we will link our consulting services with the use of the tools to provide easy-to-understand and efficient services for nature positive.

● Collective Action to encourage the transition to Nature positive

Unlike net zero, the approach to transitioning to nature positive differs depending on the state of local nature and ecosystems. Climate change increases the risk of natural disasters in regions, and damage to natural capital leads to the loss of natural benefits such as disaster prevention and mitigation functions, abundant harvests, and beautiful landscapes. These impacts have wide-ranging effects throughout local communities, and are difficult issues for individuals or companies to solve alone, though there haven’t been sufficient cooperation among the efforts of local stakeholders to resolve the issues. In some regions, initiatives have been begun toward Nature-based Solutions (NbS), which help disaster prevention and mitigation, decarbonization, water resource conservation, and improvement of well-being while preserving biodiversity. However, the structure for collaboration and evaluation indicators are not yet fully developed.

To resolve regional issues, it is important to share clear goals for nature positive, taking into account the content and degree of dependencies on nature and the impact on nature by land use changes in the region. Based on this, it is necessary to formulate effective measures and promote collaboration among various stakeholders (collective action). In the MS&AD Green Earth Project, we promote collective actions toward nature positive through conservation and restoration activities of the natural environment at three locations across Japan, collaborating with research institutions and involving local businesses, NPOs, etc. We aim to create a safe, secure, and vibrant regional model by promoting the realization of nature positive and the resolution of issues such as disaster prevention/mitigation using nature, and the recharge of water resources.

MS&AD Green Earth Project**“Green Basin Flood Control Project” in the Kuma River Basin, Kumamoto Prefecture**

Purpose: In the Kuma River basin, in response to the severe flood disaster caused by torrential rains in July 2020, “Green Basin Flood Control” has been adopted, to simultaneously pursue sustainable regional development and environmental conservation by incorporating environmental views to a new approach of “Basin Flood Control,” which combines both hard and soft measures for the entire basin, not just the river. As part of this project, we work to preserve wetlands located on the tributaries of the Kuma River, and to utilize nature for disaster prevention/ mitigation and for regional development.

Partners: Prefectural University of Kumamoto, Kumamoto University, Kuma Wetland Research Group, General Incorporated Association Kumagawa NP, Sagara Village, etc.

“Town with the Cycle of Life Project” in Minamisanriku, Miyagi Prefecture

Purpose: Minamisanriku Town, which was severely damaged by the Great East Japan Earthquake, has set a future vision as “Forests, Villages, Sea and People - Town with the Cycle of Life” and is promoting the development of a town that cycles both resources and people. We are working to realize a nature-positive community by creating blue carbon and preserving the marine ecosystem through the restoration of seaweed beds, and by promoting the appropriate use of socio-ecological production landscapes through forest care and biochar production and other measures.

Partners: Center for Sustainability, Minamisanriku Town (Nature Center), etc.

“Satoyama and Water Cycle Project” in Inbanuma Basin , Chiba Prefecture

Purpose: Through the preservation of valleys and grasslands that remain in the Inbanuma Basin, where urbanization and concentration of business sites are progressing, this project promotes the improvement of water quality and mitigation of water-related disasters by improving the water cycle. Through collaboration with diverse stakeholders, the project aims to build a model case for the implementation of nature-based solutions (NbS) that conserve biodiversity and use ecosystems for disaster prevention/ mitigation, decarbonization, water resource conservation, and well-being

Partners: Yataamuzai Field and Forest Association (NPO), General incorporated association SODO, National Institute for Environmental Studies, etc.



Activity in Kuma River Basin



Coastal cleanup in Minamisanriku



Activity in Inbanuma Basin

Kumamoto Water-Positive Project

Kumamoto City, with a population of 500,000, is the only city in Japan with 100% of its tap water supplied by groundwater, making it a world-class groundwater city, thanks to the blessings of nature of Mount Aso. On the other hand, in Kumamoto City's water source recharge area, in the middle reaches of Shirakawa River in Kumamoto Prefecture, there are concerns about the sustainability of water resources due to development and groundwater extraction associated with the expansion of factories. In March 2024, to address these issues, we launched the “Market-driven Public-Private Partnership Study Group on Visualization of Science-based Scenarios and Development of Nature Finance Mechanisms to Realize Water Positive Kumamoto,” and are considering initiatives to conserve water resources and nature positive in the basin.

Members: Prefectural University of Kumamoto, The Higo Bank, Ltd., Kumamoto Groundwater Foundation, Suntory Holdings Ltd, Development Bank of Japan Inc., MS&SD Group, etc.

● Participation in climate/nature-related initiatives and alliances

In initiatives toward net zero and nature positive, it is essential to advance the transition of society as a whole based on scientific knowledge. The key is to promote research, establish standards and rules in business, and build a system to promote them. The Group actively participates in joint research with academic institutions, participates in climate/ nature-related initiatives and alliances, and takes the initiative in building collaborative mechanisms. Through such initiatives, we are actively working with a variety of stakeholders to support social transitions and achieve a “resilient and sustainable society”. By strengthening contacts with stakeholders and discovering pain points

during this transition process, we will work to create synergies between the creation of an ideal society and the sustainable growth of the Group, leading to the development of new markets, insurance, and services.

Each of the group companies collaborates with various research institutions, and we are particularly participating in the following research projects related to climate and nature

Major joint research with research institutions**LaRC-Flood® Project (the University of Tokyo, Shibaura Institute of Technology)**

In 2018, we launched a project with Professor Hirabayashi of the Shibaura Institute of Technology and Associate Professor Yamazaki of the Institute of Industrial Science, the University of Tokyo, whose results have been introduced to the IPCC, with the aim of conducting research on assessing the impact of climate change on flood risks and returning research results to society. Project has published a “Map of Predicted Flood Frequency Changes Due to Climate Change.” Since FY2021, the Group has been selected for a matching grant program with NEDO, leading to the development and provision of “Future Flood Hazard Map” and the development of a SaaS-type “Flood Risk Finder” (page 39).

[ClimCORE Project] Strategic Social Co-creation Hub through Regional Meteorological Data and Advanced Academic Research (the University of Tokyo)

This project aims to develop “weather reanalysis data for Japanese region” that reproduces the atmospheric conditions in the Japanese region from the past to the present at high resolution, and to reproduce the overall picture of atmospheric conditions homogeneously in four dimensions over a long period of time, as well as to research the utilization of such big data on weather and climate and the establishment of the system for its utilization. The Group is carrying out the joint research regarding risk evaluation for typhoon through the participation in this project (See page 20)

* The program is funded by the Japan Science and Technology Agency (hereinafter “JST”) through the open innovation platform for industry-academia co-creation program (COI-NEXT).

Green Basin Flood Control Project; The Regional Co-Creation Center for “A Sustainable Society Originating from Reconstruction Centered on River Basin Flood Control”, (Prefectural University of Kumamoto)

Based on the torrential rains that hit the Kuma River Basin in July 2020, Kumamoto Prefecture advocates “Green Basin Flood Control” to achieve safety and security not only through river maintenance, but also with the comprehensive strength of the entire basin, while coexisting with the natural environment. With this concept at the core, it will advance research on flood control technology, environmental restoration, and regional DX that will strengthen evacuation systems, with the aim of realizing sustainable regions where people can continue to live safely and securely, with a rich environment, and where young people can remain and gather. Funded by JST's COI-NEXT in 2021. The Group is participating in the wetlands preservation activity (see page 40) as the “MS&AD Green Earth Project,” while advancing research for insurance/ financial products and DX, etc. contributing to disaster prevention.

* Funded by JST's COI-NEXT in 2021.

“Nature Positive Sustainable Development Hub” (Tohoku University)

Based on the “nature positive” philosophy of turning the degradation of nature into a recovery trend, academia, the financial/business sectors, local governments, citizens, etc. will collaborate to advance research to: (i) Visualize and sustainably enhance the value of nature, (ii) Create a mechanism for financial flow toward nature positive, (iii) Nurture people who support a nature-positive and developing society. The Group works to develop biodiversity assessment methods and biodiversity certifications, and create and implement mechanisms for the financial flow toward nature positive.

* Funded by JST’s COI-NEXT in 2024.

As a global initiative, we support and participate in the Principles for Sustainable Insurance (PSI), the United Nations Environment Programme Finance Initiative (UNEP FI). We are actively involved in analyzing climate change scenarios in insurance and participating in the Nature Positive Insurance working group, strive to improve the knowledge of the Group and the industry through taking measures such as learning from leading international cases and inputting our own examples. We also joined the “PCAF,” which develops methods for measuring and disclosing GHG emissions from investment/loan and insurance portfolios, and are working to measure/disclose GHG emissions from financial institutions and to promote/disseminate the measurement/disclosure. Group employees are also contributing to the development of international sustainability-related disclosure standards.

As climate-related initiatives in Japan, we are participating in the GX League, a climate-related organization in which industry, government, and academia collaborate aimed at achieving carbon neutrality by 2050 and social reform, as promoted by the Japanese government. We have also been participating, since its inception, in the “Japan Climate Initiative,” a network that strengthens the dissemination of information and exchange of opinions among companies, local governments, NGOs, and others actively working on climate change countermeasures.

In terms of more concrete support for companies to achieve net zero emissions, we established the Association of Carbon Accounting Advisors to promote the spread of CO₂ emissions measurement methods in Japan and the accurate reflection of emissions in financial information. Through this, we also contributed to the creation of the first private qualification in Japan.

In the nature-related field, we have been accelerating initiatives through collaboration between companies from early stage, including the launch of the Japan Business Initiative for Biodiversity (JBIB) in 2008. We are also involved in the establishment and operation of the Association for Business Innovation in harmony with Nature and Community (ABINC), which is a spin-off from JBIB and develops and operates a green space certification system.

These achievements have led to the participation of Group employee as a member of the TNFD, and we are currently working primarily to spread awareness of the TNFD recommendations in Japan.

In addition, we are participating in the 30by30 Alliance, which contributes to the international goal of converting more than 30% of the world’s land and oceans into protected and conserved areas by 2030. In 2023, the green area surrounding Mitsui Sumitomo Insurance’s Surugadai Building and the Surugadai New Annex was registered as the first certified sites.

Climate/Nature-related Initiative and Alliance**[Sustainability Standards Board of Japan (SSBJ)]**

Following the establishment of the International Sustainability Standards Board (ISSB), which aims to develop international sustainability disclosure standards, SSBJ was established in Japan in 2022 and is in the process of developing sustainability standards in Japan. The Group has provided committee member since its establishment and contributed to the development of the draft standards published in March 2024. We will contribute to the development of sustainability standards, play a role in supporting sustainability disclosure by Japanese companies, and work toward disclosures that meets investors’ expectations.

[Taskforce on Nature-related Financial Disclosures (TNFD)]

In order to develop a framework for assessing and disclosing nature-related risks and opportunities to shift global financial flows from negative impacts to positive ones for nature, TNFD was launched by four organizations: Global Canopy and United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), WWF. Since its inception, our employee have participated as task force member. In June 2022, we established the TNFD Consultation Group Japan together with the Keidanren Nature Conservation Council and the Norinchukin Bank, and are working to promote understanding and raise awareness of the TNFD framework. Partly due to this, early adopters of the first version of the disclosure recommendations published in September 2023 included 80 Japanese companies, or one-quarter of the world’s total, as of the Davos meeting in December of the same year, and it is becoming more popular in Japan.

[Partnership for Carbon Accounting Financials (PCAF)]

This is an international initiative to develop methods for measuring and disclosing GHG emissions from investment/ loan and insurance portfolios, which the Group joined in 2021. We also participate in a working group that develops methods for measuring GHG emissions related to underwriting, as well as the PCAF Japan coalition, which works to promote and disseminate measurement and disclosure of GHG emissions by financial institutions, thereby contributing to the reduction of GHG emissions in society as a whole.

[Japan Business Initiative for Biodiversity (JBIB)]

JBIB was launched in 2008, centered around 14 companies that participated in the “The Story of Biodiversity Told by Companies” held in 2007, with the aim of learning from each other and taking action to promote biodiversity conservation in business. Since then, the Group has been working actively as a chairman company. As of the end of June 2024, the membership has expanded to 64 companies (41 regular members, 23 network members). Holding a number of voluntary study groups to research nature-related information disclosure and the relationship between dependency and impact in business, it is working to create tools and guidelines for companies to utilize. It is also making advanced efforts as Japan’s leading biodiversity initiative, participating in the Conference of the Parties (COP) and exchanging views with relevant ministries and agencies.

[Association for Business Innovation in harmony with Nature and Community (ABINC)]

ABINC was established as its business organization in 2013 after members of JBIB Sustainable Biodiversity Land Use Working Group, together with researchers from Tohoku University and Yamagata University, developed the “Guidelines for Sustainable Business Sites.”. It carries out activities aimed at promoting businesses toward a biosymbiotic society, such as the certification of corporate green spaces that take biodiversity into consideration (ABINC certification).

MS&AD InterRisk Research & Consulting serves as the secretariat and MS&AD Holdings contributes to the activities as a member. ABINC certification is also an accredited rating for adding points by the GRESB, an international tool that measures ESG considerations in companies and funds in the real estate sector, and has provided nearly 200 certifications in total.

[Finance Alliance for Nature Positive Solutions (FANPS)]

Four financial institutions, including MS&AD Insurance Group Holdings, SMBC Group, Development Bank of Japan and The Norinchukin Bank, established a financial alliance in February 2023 for the purpose of supporting corporate efforts toward nature positive and engaging in joint surveys and research to build momentum in Japan. The alliance is working to provide specific support for companies through measures such as providing a “FANPS Simple Diagnostic Tool” that can visualize the status of corporate compliance with TNFD disclosure, and publishing the “Solution Catalogue Toward Nature Positive,” a collection of solutions to reduce and mitigate excessive dependencies on nature and negative impacts, to regenerate nature. Going forward, we will strengthen our alliance with a view to collaborating in finance to foster start-ups and other companies with technologies beneficial to nature positive.

III. Risk and Impact Management

Based on the MS&AD Insurance Group Risk Appetite Statement, we have determined to clarify the amount of risk that can be held under normal conditions and to take risks based on its capital policy in order to realize its management vision. We develop a Group medium-term management plan that is in line with our Risk Appetite Statement. Also, we aim to ensure soundness and improve capital efficiency and RoR based on the ERM cycle.

As for underwriting risk, we are working to advance growth strategies and assertively take on risks, while also striving to set appropriate insurance conditions, control natural catastrophe risks, and expand our returns.

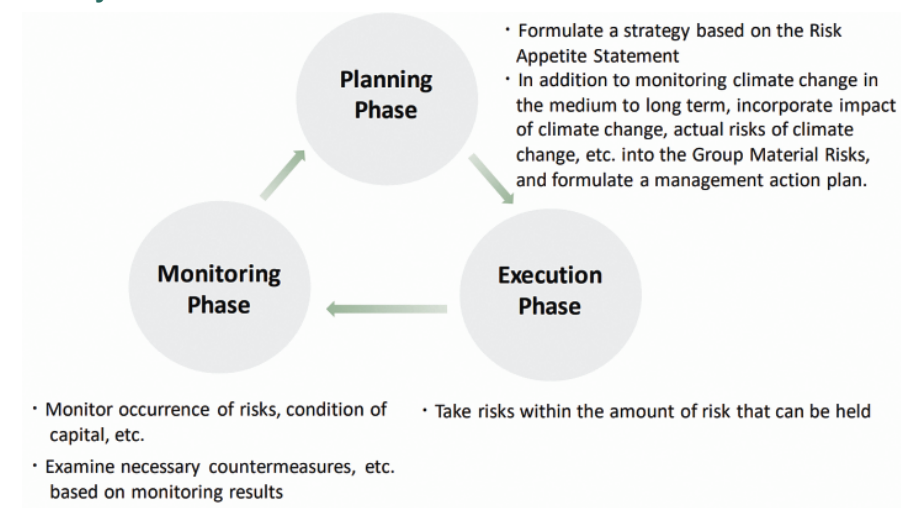
With regard to asset management risk, we strive to implement comprehensive asset and liability management that takes into account the characteristics of liabilities, and the reduction of strategic equity holdings, and to expand our returns while securing the soundness and liquidity of assets.

In terms of risk management at the Group, based on the MS&AD Insurance Group Basic Policy on Risk Management, we recognize risks including climate-related risks, quantitatively determine the magnitude and possibility of their occurrence, and optimize their scope and extent. We also process risks by possession, transfer, and avoidance, verify their effects, and improve the processing method based on the results. The status of risks is reported to the Management Committee. Matters concerning climate-related risks are also reported to the Group Management Committee and the Board of Directors after discussing by the ERM Committee.

The Group selects risks to be controlled by management as Group Material Risks, and formulates Management Action Plans after assuming their occurrence scenarios, taking into account factors such as “climate change”, and regularly monitors the status of risks. Thus, the Group has been working to control risks. In the following table are shown the key scenarios for individual Group Material Risks established while paying attention to climate change. We also conduct regular medium- to long-term monitoring.

In addition, because “depletion of natural capital (exhaustion of resources, deterioration of and crises of ecosystems, and human-induced pollution and accidents that cause major damage to the environment)” could have impacts on Group management over the medium and long terms, we conduct regular status monitoring as one of the Group Emerging Risks.

● ERM cycle



● Group Material Risks and Key Scenarios for Climate Change

Group Material Risks Related to Climate Change	
	“Key scenarios” related to climate change
Occurrence of large-scale natural catastrophe	Increase in insurance payments due to occurrence of large-scale natural catastrophe in Japan and overseas such as wind/flood disasters, wildfires, snow/hail disasters, and drought
Significant increase in credit risk	Deterioration in the performance and default positions of our investment/loan portfolio companies due to factors such as strengthening of regulations in relation to transition to decarbonization and delays in response thereto.
Occurrence of behavior that is detrimental to the corporate value of the Group, loss of social credibility	Deterioration in reputation and financial burden due to deficient responses to disclosures and issues concerning sustainability, such as those relating to climate change and associated lawsuits, etc. within the Group
Pandemic of new influenza and other diseases	Occurrence of a situation where the Group is unable to properly execute its business/services due to a pandemic of new infections influenced by global warming and other factors. and their prolonged impacts, etc.
Changes in insurance market	New insurance product in relation to responses to climate changes, such as decarbonization technologies and increase in claims payment due to development of a recycling-oriented society, etc.

1. Identification process of dependencies/impacts on Nature and risks

The Group is using TNFD recommendations and the tool introduced by TNFD to identify dependencies and impacts on nature through its underwriting, investments and loans, and business operations, as well as the risks associated with these activities. Since dependencies and impacts on nature vary according to the nature of the business, we classify our underwriting and investment/loan portfolio companies by industry based on the GICS code, and strive to understand the overall dependencies and impacts in each industry. Since natural conditions differ from region to region, we identify specific regions where our underwriting and investment/loan portfolio companies are involved in their business, and proceed with evaluating overlaps with sensitive locations and dependencies/impacts. This fiscal year, we analyzed the overlap of sensitive locations with respect to the operating sites of our top 500 investment/loan portfolio companies. There is a lack of data and tools to evaluate nature in specific areas such as our underwriting/other investment/loan portfolio companies, and the entire supply chain of our portfolio companies. We intend to increase the scope and granularity of the evaluation while closely monitoring technological progress and data expansion.

As the process related to nature-related risks in underwriting and investment is a new field, the Corporate Sustainability Department plays a central role in coordinating with the corporate risk management division, investment and loan division, and underwriting division.

2. Management of Natural Catastrophe Risks

The Group manages natural disaster risks through measuring and understanding the risk levels for covered events by geography and type of disaster, using a model which incorporates engineering knowledge, mainly that relating to meteorology and architecture. Of these risks, those subject to the impacts of climate change include typhoons, floods and forest fires.

In addition to carrying out stress testing of large-scale natural disasters, for wind/flood disasters in Japan with large risks and wind/flood disaster risks in the U.S.A, we aim to maintain financial soundness by setting the maximum risk levels (risk limits) for the Group and for each company, using the levels of risk that occur once every 200 years as a basis.

The Group has also established a basic policy regarding net retention of natural disaster risks, and based on this policy, each Group company strives to appropriately underwrite and procure reinsurance (outward and inward). We are thus working to control natural disaster risks throughout the Group. Through these efforts, we aim to improve the financial soundness of the Group as a whole and reduce the risk of fluctuations in profit and loss during a given period.

We have also been working to further refine the model based on the latest academic knowledge and the status of occurrence of natural disasters, in collaboration with external organizations that are conversant with natural disaster risks. Additionally, we are working on such topics as incorporating the effects of climate change into stress tests and having the uncertainties of climate change reflected in the risk levels for the entire Group.

Stress Testing

We conduct stress tests to confirm the impact of various stress events on capital and risk levels.

In order to complement the limitations of statistical methods for risk measurement, stress testing identifies portfolio vulnerabilities and assesses the need for and urgency of counter-measures, using scenarios that take account of significant changes in the external environment and other factors selected based on the Group's portfolio and risk profile.

We have been conducting tests based on assumptions of more severe stress, such as "consecutive typhoons," and "consecutive hurricanes in North America," and making estimates based on assumptions of the impact of long-term climate change on "domestic typhoons."

3. Litigation Risks in Underwriting

As lawsuits related to climate change are becoming more frequent, claims for liability insurance covering litigation risks may increase. Liability insurance is a product which covers such payouts as damages for which our customers (hereinafter, "Insured") are liable and legal costs incurred in lawsuits. Major liability insurance products covering litigation risks with respect to climate change include the following:

Product	Coverage	Litigation Risks Related to Climate Change
Property Owner's (Manager's) Liability Insurance	Damages, legal costs, etc. for which the insured becomes liable as a result of injuries or damage to a third party or its property shall be paid as insurance benefits. Covered by this insurance are such bodily injuries and property damage as have a causal relationship with the insured's business activities, etc.	The insured may face litigation for such reasons as omitting to take measures for prevention or mitigation of damage due to climate change in the course of the insured's business activities.
Directors' and Officers' Liability Insurance (D&O Liability Insurance)	Paid as insurance benefits will be damages, legal costs, etc. for which an insured company director becomes liable in a claim for damages filed for its act (or omission of act) while performing its duties as a director.	It is possible that a lawsuit is brought against an insured company director for such reasons as delay or deficiency in taking measures against climate change, or insufficient disclosure of information by the company, etc. We sometimes observe such lawsuits being filed for the purpose of encouraging behavior modification in relation to climate change issues.

With regard to litigation risk relating to climate change in underwriting, the Group ascertains the risk situation through confirming factors such as the state of underwriting of relevant insurance products and the litigation occurrence status under the management control of Group Material Risks. We also define "depletion of natural capital (exhaustion of resources, deterioration of and crisis over ecosystems, and human-induced pollution and accidents that cause major damage to

the environment)" as one of the Group Emerging Risks and monitor the situation thereof in order to fully understand the medium- to long-term trend of relevant risk events.

4. As Responsible Institutional Investor

The "Japan's Stewardship Code," a set of principles for "responsible institutional investors," published by Financial Services Agency, is a code of conduct for institutional investors who invest in listed shares, etc. in Japan. As an asset owner, the Group supports its intent.

The Group has a policy of conducting "constructive dialogue (engagement) with investee companies, focusing on management issues, shareholder returns policy, and other non-financial information such as ESG from the perspective of enhancing the corporate value of the investee and promoting sustainable growth over the medium to long term, in accordance with Japan's Stewardship Code. In addition, toward realization of a decarbonized society, we are encouraging them to reduce GHG emissions and disclose information based on TCFD recommendations. Specific matters to be confirmed include organizational structures in relation to addressing climate change, their efforts toward reaching GHG emissions reduction targets, their plans for technological innovation, and any challenges they face.

[Examples of initiatives for engagement in relation to climate change]

Example 1	Example 2
For a wholesale company with large GHG emissions, we confirmed the progress and challenges, including plans to withdraw from the coal business, new businesses that contribute to reducing GHG emissions, and value chain initiatives. We confirmed that the company is progressing according to plan toward achieving targets, and that new businesses are also being actively pursued as new revenue opportunities.	For a company that handles construction-related products, we confirmed the status of their climate change response efforts and issues. We confirmed that the company is making steady progress as planned toward its sales targets for climate change-related products that help customers reduce their GHG emissions. We requested the company to consider disclosing the percentage of sales that climate change-related products account for, and the quantitative disclosure of the impact of GHG reduction in the future.

5. Business Activities with Consideration for Sustainability

The Group aims to enhance corporate value by contributing to solutions for sustainability issues with profound understanding through stakeholder engagement.

In underwriting, we provide products and services that respond to the demands of society, while also considering issues and risks that could have negative impacts on society and the global environment.

Our investment considers ESG factors in pursuit of medium-to long-term returns and contribution to solutions of sustainability issues.

Our business activities take into account dependencies and impacts on the environment and society, including climate change and natural capital, and an overview of our policies and initiatives is published on our official website as the Group's approach to ESG issues; these activities are incorporated into our underwriting and investment and loan practices.

● ESG Guidelines

Sector	Classification	Guideline
Coal	To be excluded	Coal fired power plant, Coal mine (Mainly producing thermal coal)* ¹
	To be excluded	Underwriting new policy of oil and gas extraction and coalmining projects* ³ by companies whose primary business is coal* ²
Oil/Gas	To be excluded	Oil sand mining, Oil & Gas extraction in the Arctic region* ³
	To be reviewed	Oil fired power plants and oil fields, Oil and mining, and gas fields
Controversial weapons	To be excluded	Controversial weapon manufacturer (cluster munitions, anti-personnel mines and chemical weapons)
Agriculture, Forestry and Fisheries	To be reviewed	New agriculture, forestry and fisheries project involving large-scale development in unexplored areas
Hydroelectric power	To be reviewed	Construction of new hydroelectric power plants
Nature conservation area	To be reviewed	Project with negative impact on UNESCO World Heritage Sites or Ramsar-listed wetlands that may have negative impact on the environment and local communities
Human rights	To be reviewed	Businesses which may violate human rights of indigenous people or local communities

*1 Existing coal fired power plants and thermal coal mines with technologies and techniques aiming to achieve the goals of the Paris Agreement might be handled after careful consideration.

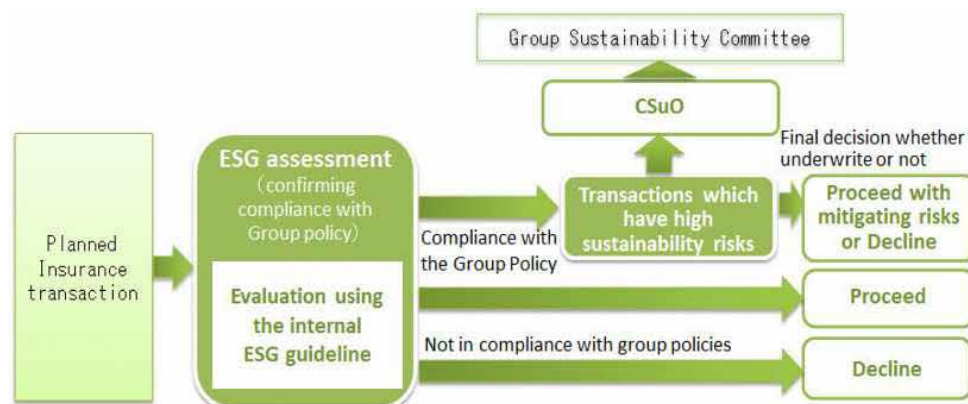
*2 Companies that derive at least 25% of their revenues from coal-fired power generation, thermal coal mines or companies that generate at least 25% of their energy from coal.

*3 Projects and companies planning to decarbonize to achieve the goals of the Paris Agreement are exempted.

● Underwriting

[Examination process]

After confirming that projects are in compliance with the Group's policies, we accept only those cases that fall under our policy. For projects that are considered to be in compliance with the Group's policies but are deemed to have high sustainability risks (ESG risks), we have established an escalation process and report such transactions to the Group Sustainability Committee.



● Investment and Loan

[ESG investment and loan initiatives]

Making initiatives for incorporation of ESG factors into the investing and financing decision-making (integration), constructive dialogue (engagement), and investment and loan projects that contribute to sustainability (positive impact) as the pillars, we implement investments and loans.

ESG investment and loan initiatives	Content	Target assets	Investment and loan balance
Integration			
Reflection of the response to the Group's "business activities considering sustainability"	Screening specific uses of funds and industries without investments and loans, and making prudent decisions on whether to engage in transactions from the perspectives of responding to climate change, improving the sustainability of natural capital, and respecting human rights	All assets under management	—
Incorporation of the Group's priority issues into the research	Focusing on "CO ₂ emissions," "deforestation," "water risk," and "human rights violations," evaluations by ESG evaluation companies and international initiatives (such as CDP) are used for investment decisions and monitoring.	Corporate bonds, stocks, and loans	¥7.5 trillion
Constructive Engagement			
Engagement	Conduct dialogue centered on stewardship activities	Shares	¥1.8 trillion
Positive Impact			
Sustainable/thematic investing	ESG issues, investments, and loans in themes such as renewable energy (e.g., solar, wind, hydrogen), green transition finance (greenhouse gas reduction), and regional revitalization	Bonds, stocks, loans, and private equity	¥374 billion
Impact investing	Investment in themes such as healthcare and education, focusing on climate change	Private equity	

*Applies to active investment and passive investment management, as well as to entrusted investment management companies.

[Systematic Incorporation of ESG factors into the Investment/Loan Processes]

In addition to conventional financial and non-financial analysis, in asset classes such as stocks, corporate bonds, loans, and private assets that are managed by the Group, we systematically incorporate into our investment and lending decisions business activities that take into account sustainability of the Group, and risk assessment and analysis of Group ESG issues using external assessment organizations.

We also send questionnaires on an annual basis, in principle, to the investment management companies that we commission to manage our corporate bond and stock investments, to confirm their ESG initiatives.

IV. Metrics and Targets

1. Metrics for Dependencies and Impacts

The Group has defined six sectors - consumer discretionary, materials, consumer staples, industrials, information technology, and utilities - as having significant nature-related dependencies and impacts. The percentages of our underwriting portfolio companies and investment/loan portfolio companies in these sectors in FY2023 were 72.0% and 63.9%, respectively.

In addition, the exposure (investment and loan ratio) to businesses in sensitive locations of high importance from a biodiversity perspective was 1.49% for stocks, 1.71% for corporate bonds, and 0.9% for corporate loans (our top 500 investment/loan portfolio companies).

2. Metrics for Risks and Opportunities

● Metrics for products/services that contribute to climate change responses / improvement of sustainability of natural capital

Annual average premium growth rate of 18% in years to 2025 in insurance products which contribute to “Symbiosis with global environment ~ Planetary Health” as KPI of our medium-term management plan in order to accelerate the provision of products and services covering risks related to climate change.

Item	Scope	Target	FY2023
Products and services which contribute to “Symbiosis with global environment ~Planetary Health~”	Group companies (Japan) + and other affiliates	18% of annual average revenue increase	24.5%

● Metrics for products which help improve the resilience of society

We aim to increase the number of underwritten policies for products which help improve the resilience of society by an average of 20% per year until 2025.

Item	Scope	Target	FY2022	FY2023
Rate of increase in the number of underwritten policies for products which help improve the resilience of society	MS/AD	20% of annual average	29.4%	17.6%

● Insurance premium income from products which contribute to decarbonization, circular economy and improvement of the resilience of society

Item	Scope	Unit	FY2023
Insurance premium income from products which contribute to decarbonization, circular economy and improvement of the resilience of society	MS/AD	JPY million	205,883 (4.8%)

● Metrics for natural catastrophe risk levels in underwriting

Risk levels that occur once every 200 years.

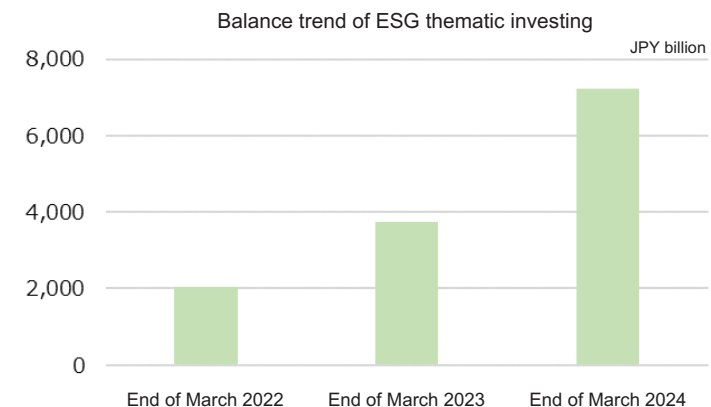
● Metrics for ESG thematic investing including climate change responses / improvement of sustainability of nature capital

Zero carbon transition requires technological innovation and capital investment toward a drastic reduction of greenhouse gas emissions. Factors such as growth of demand for funding and needs for new financial products and services will likely bring about opportunities for financial institutions. The Group is working on ESG thematic investing aimed at leading to solutions for various social issues on the premise of ensuring profitability.

(JPY billion)

Example of Topics	End of March 2024
	Outstanding balance of investment and loan
Investment in funds with ESG themes	232.3
Support for initiatives designed to reduce GHG emissions	
Renewable/Next Generation energies (solar power, wind, hydrogen, etc.)	73.3
Transition-/Sustainability-linked finance	28.0
Green finance	146.6
Support for global sustainable development	
Social sustainability (including supranational bonds)	221.3
Impact investment* for regional revitalization and healthcare, and other investments	21.5
Total	722.9

Note: Of the investment amount commitment to the fund, only the amount already invested is included.



● Metrics for investment in venture business including climate change responses/ improvement of sustainability of nature capital

We are promoting cooperation and collaboration with innovation partners that contribute to resolving social issues, such as such as Jupiter Intelligence, a company which offers AI-based climate change risk assessment that responds to TCFD.

Item	End of March 2024
Number of the Group climate/nature-related investments through MS&AD ventures (all cases)	8 (109)

3. Environmental Burden of Our Business Activities

- Greenhouse gas emissions and energy consumption from our Group's business activities
- Water consumption, waste emissions, etc. from our Group's business activities
 - ESG data/materials ISO26000 Core Subjects (Environment)
(<https://www.ms-ad-hd.com/en/csr/data.html#012>)

4. Metrics and Targets for Reduction of Environmental Burdens of the Group's Business Activities

● Targets

[GHG emissions Reduction Target]

Target		FY2030 Target	FY2050 Target	FY2023 Actual
Scope 1・2*1		-50% compared to basic fiscal year (FY2019)		-35.3%
Scope 3*2	Categories 1, 3, 5, 6, 7 and 13	-50% compared to basic fiscal year (FY2019)		-24.8%
	Underwriting portfolio/ Investments/Loans portfolio companies	-37% compared to basic fiscal year (FY2019) (Key Japanese domestic corporate clients) In order to work with clients to reduce GHG emissions, we will deepen dialogue, identify issues for reduction, and propose solutions to resolve these issues.	Net zero	—

*1: Scope 1 refers to direct emissions from our Group, such as gasoline from company-owned vehicles. Scope 2 refers to indirect emissions from consumption of purchased electricity, etc.

*2: Indirect emissions through the Group's business activities other than Scope 2. Category 1 refers to purchased products and services (covered by paper and mail). Category 3 refers to fuel and energy activities other than Scope 1 and Scope 2. Category 5 refers to waste from operations. Category 6 refers to business trips by employees. Category 7 refers to employee commuting. Category 13 refers to leased assets

*3: GHG emissions of our major Japanese corporate clients (approx. 3,300) selected based on premium income (related to our underwriting and investment/loan portfolios)

[Renewable Energy Usage Rate]

Target Year	Usage Rate	FY2023 Actual
FY 2030	60%	23.0%
FY 2050	100%	

5. Greenhouse Gas Emissions in Our Investment and Loan Portfolio Companies

The following table shows the carbon footprints (CO₂ equivalent of greenhouse gas emissions from business activities) of our investment and loan portfolio companies. Scope 1 and Scope 2 greenhouse gas emissions of our investment and loan portfolio companies are measured using Trucost's tool for calculating greenhouse gas emissions using a proprietary modeling approach, and PCAF estimates when there is not enough information disclosed by our investment and loan portfolio companies or publicly available. Assets subject to the analysis are domestic and foreign stocks of listed companies (covering approx. 99% on a market value basis), domestic and foreign bonds (covering approx. 97% on a book value basis), and domestic and foreign corporate loans (covering approx. 95% on a book value basis) out of the Group's investment and loan portfolio as at the end of March 2023).

We are adopting PCAF standards for measuring greenhouse gas emissions in our investment and loan portfolio companies.

- ESG data/materials [Underwriting and investment/loan portfolios]
(https://www.ms-ad-hd.com/en/csr/data.html#underwriting_investment)

[GHGs Emissions of Our Investment and loan Portfolio Companies (Scope 1 and Scope 2)]

(i) By Asset

(Unit: kt-CO₂e)

Asset	FY2021*1	FY2022*2	FY2023*3
Stocks	2,501	2,302	2,111
Corporate Bonds	2,538	2,400	1,944
Corporate Loans	273	286	225

*1: Calculated in FY2021 using portfolio as of end of March 2021. Stocks 99%, Corporate Bonds 69%, totaling 98.6%.

*2: Calculated in FY2022 using portfolio as of end of March 2022. Stocks 99%, Corporate Bonds 67%, Corporate loans 48%, totaling 98.4%

*3: Calculated in FY2023 using portfolio as of end of March 2023. Stocks 99%, Corporate Bonds 97%, Business loans 95%, totaling 97.6% In addition, GHG emissions from commercial real estate totaled 61,000 t-CO₂e out of our investment and loan portfolio companies as at the end of March 2023.

(ii) By Industry

(Unit: kt-CO₂e)

Industry*	Our Investment and loan Portfolio Companies (Scope 1 and Scope 2)
Energy	357
Materials	1,493
Industrials	795
Consumer Discretionary	280
Consumer Staples	238
Healthcare	14
Finance	53
Information Technology	77
Communication Services,	16
Utilities	946
Real Estate	11
Total	4,280

Note: GIGS sector classification is adopted

6. Weighted Average Carbon Intensity (WACI) in Our Investment and Loan Portfolio Companies

Weighted average carbon intensity (WACI)* is used as metrics of the carbon intensity of our investment/loan portfolio. Scope 1 and Scope 2 for our investment/loan portfolio companies are calculated through information disclosed by the companies, S&P Global Trucost analysis tool, and estimated value provided by PCAF. Subject assets are same as those of "5. Greenhouse Gas Emissions in Our Investment and Loan Portfolio Companies" (stocks, corporate bonds and corporate loans).

Note: It is an indicator which is a weighted average of "the ratio of GHG emissions vs. sales amount" in each of our investment/loan portfolio companies and "percentage of holding in the Group's investment/loan portfolio companies."

[Weighted Average Carbon Intensity (WACI) in Our Investment and Loan Portfolio Companies (As at the end of March, 2023)]

(Unit: t-CO₂e / US\$ 1 million)

Asset Class	FY2021*1	FY2022*2	FY2023*3
Stocks	131.5	114.5	100.1
Corporate Bonds	205.6	221.5	152.2
Corporate Loans	256.5	273.2	184.3

*1: Calculated in FY2021 using portfolio as of end of March 2021. Stocks 99%, Corporate Bonds 69%, totaling 98.6%

*2: Calculated in FY2022 using portfolio as of end of March 2022. Stocks 99%, Corporate Bonds 67%, Corporate loans 48%, totaling 98.4%

*3: Calculated in FY2023 using portfolio as of end of March 2023. Stocks 99%, Corporate Bonds 97%, Business loans 95%, totaling 97.6%

Further related information

Strategy

- Medium-to Long term Targets
(<https://www.ms-ad-hd.com/en/csr/summary/kpi.html#link-list-3>)
- ESG integration and sustainability approach
(<https://www.ms-ad-hd.com/en/csr/summary/esg.html>)

Risk Management

- ERM and Risk Management
(https://www.ms-ad-hd.com/en/group/value/risk_management/erm.html)

Metrics and Targets

- Targets and Results (<https://www.ms-ad-hd.com/en/csr/summary/kpi.html>)
- ESG data/materials ISO26000 Core Subjects [Environment]
(<https://www.ms-ad-hd.com/en/csr/data.html#012>)

Appendix: Terms Related to Heat Map

<Dependency Heat Map: ecosystem services>

Term	Explanation
Animal energy	Labor provided by domesticated animals such as cattle, horses, donkeys, goats, and elephants, used in agriculture, etc.
Bioremediation	Natural processes whereby organisms such as microorganisms, plants, algae, and some animals decompose, reduce, and detoxify pollutants.
Mass flow rate mitigation	Sediment transport and storage functions in rivers, lakes, oceans, etc. through buffering and attenuating mass flows
Climate adjustment	Function of nature to moderate the climate. Global climate adjustment is achieved through long-term storage of carbon dioxide in soil, plant biomass, and oceans. At the regional level, ocean currents and winds adjust climate. At the regional and micro levels, vegetation adjusts temperature, humidity, and wind speed.
Dilution by the atmosphere and ecosystem	The function of nature, such as fresh and ocean water and the atmosphere, to dilute gaseous, liquid, and solid wastes produced by human activities.
Suppression of infectious diseases	Disease control functions in plants, animals, and humans
Textiles and other materials	Fibers, etc. collected from plants, algae, and animals that are used directly or processed for various purposes. In addition to wood and further unprocessed fibers, this includes production materials such as cellulose, cotton, and dyes, as well as plant, animal, and algae materials for use in production of feed and fertilizers.
Filtration	Filtration, sequestration, storage, and accumulation of pollutants by various organisms, including algae, animals, microorganisms, vascular plants, and non-vascular plants.
Prevention of floods/storms	Flood and storm suppression functions provided by the sheltering, buffering, and damping effects of natural and planted vegetation.
Genetic materials	DNA derived from all living organisms, including plants, animals, and algae.
Underground water	Water stored underground in aquifers composed of permeable rock, soil, and sand. Water contributing to groundwater sources is derived from rainfall, snowmelt, and water flow from natural freshwater sources.
Habitat maintenance	Function to maintain habitats that contribute significantly to reproduction of individual members of a particular species. These include places where larvae occur in high numbers, where they are protected from predators, and where they grow faster than in other places.

Term	Explanation
Stabilization/Erosion prevention	Large-scale stabilization and erosion control functions performed by vegetation that protect and stabilize terrestrial, coastal, and marine ecosystems, coastal wetlands, and sand dunes. Slope vegetation helps prevent avalanches and landslides, while mangroves, seagrasses, and macroalgae help prevent beach and sediment erosion.
Mitigation of sensory impacts	Functions that reduce impacts on human health and the environment, such as noise and light pollution reduction provided by plants.
Pest control	Pest control and invasive alien species management functions provided by the introduction and maintenance of predators against insect pests and invasive alien species, landscaping to reduce pest invasion, and natural toxins against pests.
Pollinators	Pollinator functions provided primarily by three elements: animals, water, and wind. The majority of plants self-propagate, depending on pollinators such as insects, and the pollen-carrying functions of water flow and wind.
Soil quality	Soil quality, such as fertility and soil structure, maintained by processes such as weathering, nitrogen fixation, nitrification, and mineralization
Surface water	Water flowing over the surface of the ground, such as river water
Ventilation	Ventilation function of nature and planting, which is essential for improving indoor air quality. Without this, accumulation of volatile organic compounds (VOCs), airborne bacteria, and mold could pose the risk of long-term health damage to building occupants.
Water cycle	Circulation of water that flows through the Earth's atmosphere, land, and oceans. The hydrologic cycle is involved in [replenishment][recharging] of groundwater sources (aquifers) and maintenance of surface water flow.
Water quality	Quality of water provided by maintaining the chemical states of fresh and salt water, such as rivers, streams, lakes, and groundwater sources, and ensuring a favorable living environment for biota.

<Impact Heat Map: Impact drivers>

Term	Explanation
Utilization of terrestrial ecosystems	Modification of terrestrial ecosystems associated with development of agricultural land, commercial forests, and mines
Utilization of freshwater ecosystem	Impacts on freshwater ecosystems such as wetlands, ponds, lakes, streams, rivers, and peatlands through modifications associated with the construction of bridges, dams, seawalls, etc.
Utilization of marine ecosystem	Modification of marine ecosystems associated with aquaculture and mining development
Use of water	Impacts from groundwater and surface water use
Utilization of other resources	Mining minerals and capturing wild fish, wild mammals, etc.
GHG emissions	Emissions of greenhouse gases such as carbon dioxide (CO ₂) and methane (CH ₄)
Air pollution	Air pollution due to substances other than GHG
Water pollution	Impacts of discharging of pollutants into bodies of water
Soil contamination	Contamination of soil by wastes, etc.
Wastes	Impacts of various types of waste emissions
Disturbance	Effects of high-intensity or prolonged noise or light pollution
Introduction of alien species	Biological changes and interference due to introduction of alien species.