

KDDI Corporation

TNFD Report v3

**- The Challenge towards Nature-Positive
Through the Power to Connect -**

March 2025

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1. KDDI's approach to natural capital

In May 2022, KDDI Corporation ("KDDI") announced "KDDI VISION 2030" and the "New Medium-Term Management Strategy (fiscal years 2023-2025)." KDDI VISION 2030 has been created by including our corporate philosophy, to "care about the material and emotional well-being of all its employees and deliver a thrilling customer experience by always going further than expected with the ultimate goal of achieving a truly connected society" to resolve social issues, as well as the essence of "KDDI Sustainable Action," established in May 2020 with our commitment to keep striving to resolve social issues through our businesses. One of the purposes of the vision is to conserve the global environment. One of its specific initiatives is the KDDI GREEN PLAN, an environmental conservation plan, which specifies action for climate change, conservation of biodiversity, and creating a circular society, as three key issues for our activities.

While the environmental issue of losing natural capital, including biodiversity, could increase risks in our value chains, KDDI can continue to grow by playing our part in resolving environmental issues through our businesses standing on various technologies, such as our communication and IoT solutions. This is why KDDI supports the vision of the Taskforce on Nature-related Financial Disclosures ("TNFD") and joined the TNFD Forum in April 2023. KDDI will strive to proactively disclose information based on TNFD's information disclosure framework. This report has been created in accordance with the TNFD Final Recommendations v1 released in September 2023.

Further, we will work on social issues that are becoming ever more serious—such as climate change including global warming, environmental issues such as the destruction of biodiversity, human rights issues and widening economic divide—by collaborating with global institutions and assessment institutions, taskforces creating disclosure frameworks, and stakeholders including investors, customers, suppliers, and employees. The ultimate goals are to improve corporate value and help society to grow sustainably.

[KDDI VISION 2030](#)

[KDDI Sustainable Action](#)

[KDDI GREEN PLAN](#)

2. General requirements

(1) Approach toward materiality

1-1 Environmental policies

The KDDI Group, in adherence to the KDDI Environmental Charter, considers it our crucial responsibility to promote global environmental protection. As a global enterprise, we understand the importance of conserving and passing our irreplaceable planet on to future generations, so are promoting company-wide initiatives to achieve a carbon-free society, conserve biodiversity, and create a circular society.

[KDDI's Approach to Environment](#)

1-2 Materiality selection process

KDDI selects key issues (materiality) related to sustainability through the following process.

1. Identify key issues based on GRI requirements, an international guideline for sustainability information disclosure, and ESG assessment organizations' requirements for the information technology and telecommunications industry.
2. Set priorities by scoring the "interests of long-term investors, including multi-stakeholders" and "impact on business," respectively.
3. Identify the six top-priority issues (materiality) by reflecting opinions from interviews with outside experts.
4. Discuss and determine relevance at Sustainability Committee and Board of Directors meetings.

[Integrated Sustainability Report 2024, p. 70 onwards](#)

(2) Establishment of the scope of disclosure

In this report, we looked at business domains presented in the Medium-Term Management Strategy and decided to target our telecommunications business after considering various domains' business scales, impact on natural capital, and assessment possibilities. First, we categorized the telecommunications businesses to be assessed into mobile devices, stations, communication cables, and data centers. We have considered the upstream (procurement of raw materials), direct operation (production, construction, installation) and downstream (use and disposal) areas of each item's value chain and identified key raw materials, where they come from, where production/construction/installation takes place, and where they are used and disposed of.

(3) Where to find nature-related issues

We evaluated the habitat potential of invasive aliens and rare species of plants at base stations (pylon type), data centers, and others related to the telecommunications business in Japan, as indicated in the establishment of the scope of disclosure. Consequently, we identified the sites that should be considered for priority action.

(4) Integration with other sustainability-related disclosures

We have disclosed information in the Integrated Sustainability Report on KDDI's governance, strategy, risk management, and metrics and targets related to climate and nature using both the Climate-related Financial Disclosure Task Force ("TCFD") and TNFD frameworks, including our initiatives to achieve a decarbonized society, conserve biodiversity, and create a circular society. The TCFD and TNFD are listed in separate chapters in the current Integrated Sustainability Report. We will closely monitor future trends in the development of disclosure standards and promote the disclosure of information.

[Integrated Sustainability Report 2024, p. 64 onwards](#)

(5) The time horizons considered

The KDDI Group's dependence on and impact on biodiversity and natural capital, assessment of risks and opportunities, and various initiatives are generally set for the short term until FY2025, the period covered by the Medium-Term Management Plan; for the medium term until FY2030, the target year of the KDDI Group's carbon neutrality target*; and for the long term from FY2040 to FY2050, the target year of the KDDI Group's net-zero target*.

[*KDDI Group's targets](#)

(6) Engagement with communities and stakeholders in identifying and evaluating nature-related issues

The KDDI Group has set forth the KDDI Group Human Rights Policy. It is positioned to clarify our efforts toward respecting human rights to fulfill our responsibility to all stakeholders based on our corporate credo. The KDDI Group has established Key Human Rights Issues based on this policy. One main issue is ensuring "harmony with local communities and eliminating human rights violations in the supply chain" to achieve our goal of providing services and products that consider human rights. In addition to considering the human rights of local residents when constructing facilities, we have pledged to closely monitor our supply chain to ensure that human rights violations do not occur through the use of conflict materials. We also strive to improve our efforts to respect human rights. To achieve this, we engage in dialogue and discussions with relevant stakeholders, such as local governments, local communities, suppliers, and experts, regarding our response to actual and potential negative human rights impacts.

[KDDI Group Human Rights Policy](#)

3. Governance

(1) Structure for promoting sustainability

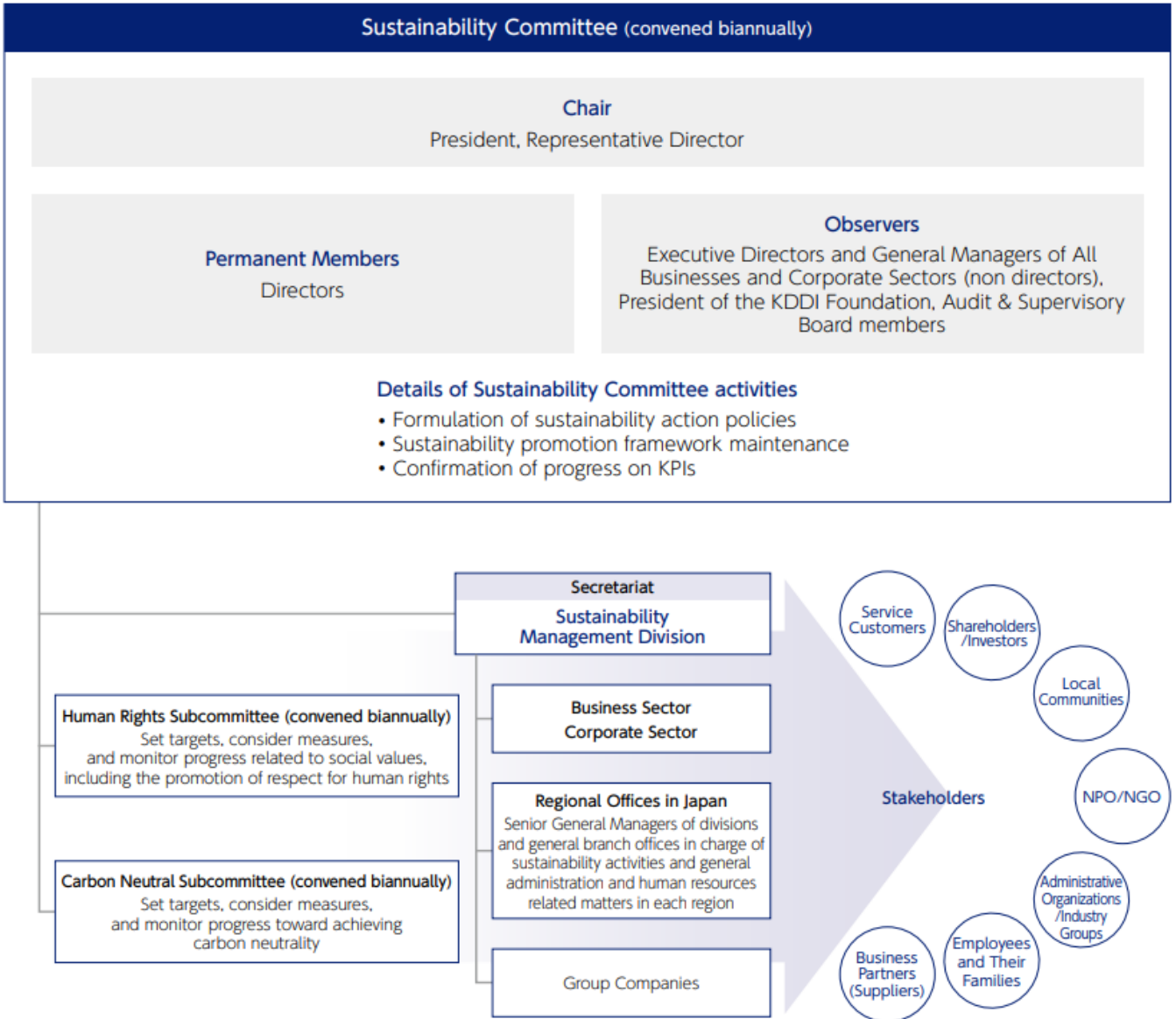
KDDI's sustainability, including for natural-capital related issues, is driven mainly by the Board of Directors and the Sustainability Committee.

The Board of Directors receives reports from the Sustainability Committee every quarter on the progress of initiatives such as climate change, natural capital, monitoring and giving instructions on how measures are taken for key issues and initiatives. The Medium-Term Management Strategy places sustainability management at the center. The aim is to help society grow sustainably and improve corporate value together with our partners, by driving the Satellite Growth Strategy and by enhancing its underpinning management foundation. In establishing the strategies and targets to promote these efforts, the Board of Directors and the Sustainability Committee take dependency, impact, risks and opportunities associated with nature (nature-related risks, etc.) into consideration for deliberations and approvals.

The Sustainability Committee is chaired by the President and is composed of key members from the Board of Directors, among others, operating with sustainability as the pillar of a company-wide management strategy. The Sustainability Committee is responsible for checking and discussing KDDI's key issues and initiatives, such as climate change and natural capital, also monitoring and supervising company risks, opportunities, and its positive and negative impact on society and the environment, and approving reported matters. In the first half of the fiscal year the Committee checks the progress of the year's targets, and if the targets are not being met, analyzes the causes and checks countermeasures. In the second half of the fiscal year, the Committee checks the year's progress and sets targets for the following fiscal year.

We also established the Sustainability Management Division in April 2022 to further strengthen and accelerate the promotion of sustainability management, centrally managing the promotion of sustainability management, executing sustainability policies and executing and supporting the execution of measures throughout the Group, and releasing relevant information as the administrative division of the Sustainability Committee. The Sustainability Management Division has a structure for communicating to the management team the performance and progress of areas in KDDI businesses that are high-priority from the perspective of nature-related risks, etc., so that the management team can instantly recognize and address the issues. A Managing Executive Officer and CFO is responsible for the management team's highest-level responsibility and accountability for policies, commitments and targets of nature-related risks, etc., and for assessments and management of nature-related risks, etc.

Fig. 1 Structure for promoting sustainability



As of August 31, 2024

(2) Engagement with stakeholders impacted by evaluations of and response to nature-related risks, etc.

The KDDI Group has set forth the KDDI Group Human Rights Policy. It is positioned to clarify our efforts toward respecting human rights to fulfill our responsibility to all stakeholders based on our corporate credo. We will also establish a human rights due diligence system following the United Nations Guiding Principles on Business and Human Rights, identify critical human rights issues that may arise during our business activities, and implement appropriate measures to address these issues. The policy upholds "harmony with local communities and eliminating human rights violations in the supply chain" for "providing services and products that consider human rights." In addition to considering the human rights of local residents when constructing facilities, we have pledged to closely monitor our supply chain to ensure that human rights violations do not occur through the use of conflict materials. We also strive to improve our efforts to respect human rights. To achieve this, we engage in dialogue and discussions with relevant stakeholders, such as

local governments, local communities, suppliers, and experts, regarding our response to actual and potential negative human rights impacts.

If building base stations, installing communication cables, and building data centers are likely to inconvenience residents, i.e., by causing noise, we explain to the residents the outline of the planned facilities and the details of the construction in an effort to gain their understanding and support for the construction. We also pay attention to natural capital, including biodiversity, by strictly adhering to relevant laws, regulations, municipal rules and guidelines. For disaster response, we have been organizing structures to respond to various disasters, quickly supporting victimized areas, and taking other such initiatives together with relevant organizations.

We have also established the KDDI Action Guidelines on the Preservation of Biodiversity to ensure understanding of our contribution to the preservation of biodiversity from multiple perspectives. The three principles in the guidelines are "Preserving Diversity in Business Activities," "Collaboration and Cooperation with Related Organizations," and "Promoting Recycling of Resources." We utilize various opportunities to promote activities, such as collaborating with external partners, in line with these guidelines.

[KDDI Group Human Rights Policy](#)

[KDDI Action Guidelines on the Preservation of Biodiversity](#)

A Case Study of Engagement with Local Communities in Yakushima

Yakushima Island, a UNESCO World Heritage Site, attracts many visitors each year. KDDI undertook many consultations to develop an appropriate communication environment to allow visitors to enjoy sightseeing safely and securely without damaging the natural environment of the national park. We not only explained the installation work to the Ministry of the Environment, the Kagoshima Prefecture government, the Yakushima town government, environmentalists, and residents, and complied with laws and regulations, but also engaged in detailed communication with stakeholders. We will expand our service area, improve quality, and create a user-friendly communication environment with a full understanding of the local community.

[au provides first telecommunication at Yakushima Shiratani Unsui Ravine \(Japanese only\)](#)

4. Strategy

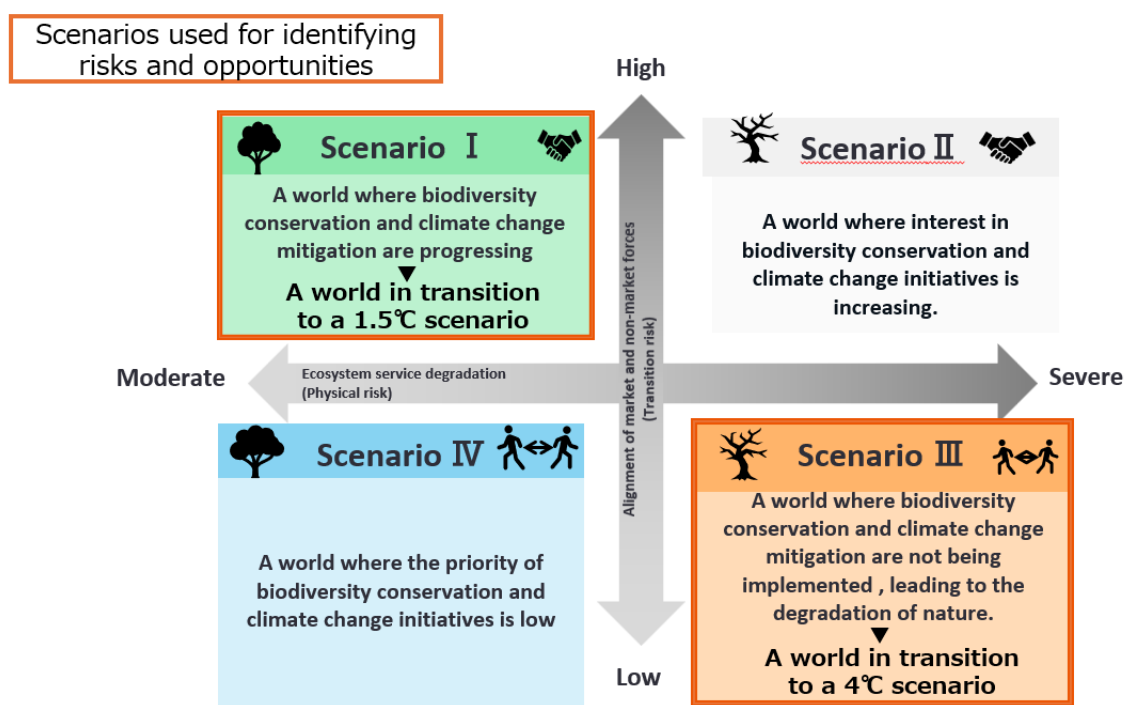
(1) Scenario Analysis

We conducted scenario analysis to identify risks and opportunities, we have conducted scenario analyses. This analysis assumes a scenario as of 2030. Four scenarios were created based on different degrees of alignment of market and non-market forces (transition risk) and ecosystem service degradation (physical risks), with two of the scenarios (Scenario I and Scenario III) taking into account consistency with the TCFD being selected: a 1.5 °C scenario and a 4 °C scenario.

Scenario I: A world where efforts to combat climate change and conserve biodiversity progress, keeping the average temperature rise within 1.5°C and leading to a gradual degradation of natural capital.

Scenario III: A world where efforts to address climate change and conserve biodiversity fail, resulting in an average temperature rise of over 4°C and substantial degradation of natural capital.

Fig. 2 Four scenarios

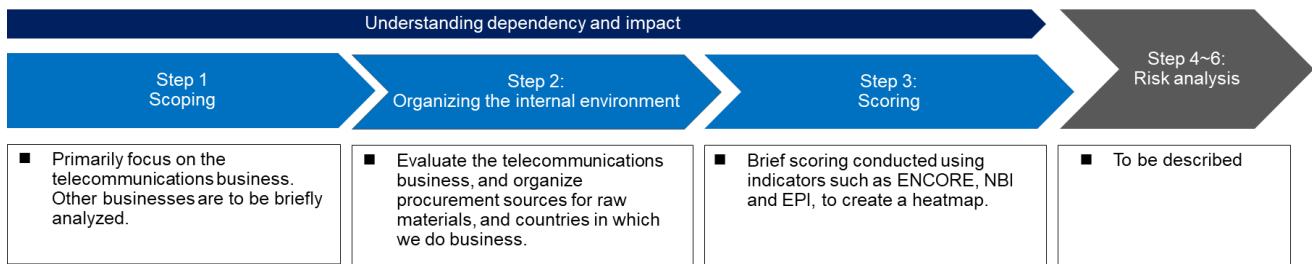


(2) Risk

We identify and assess nature-related risks, etc., in our value chains. From the relationships between business scales and natural capital, we qualitatively assess and interpret the risks' priority, analyze nature-related risks, etc., and evaluate and promote suitable measures.

1-1 Understanding dependency and the impact on natural capital

Fig. 3 How to understand the level of dependency and impact



For "Step 1: Scoping," we looked at business domains presented in the Medium-Term Management Strategy and decided to target our telecommunications business after considering various domains' business scales, impact on natural capital, and assessment possibilities. Dependency and impact on other businesses that could be relevant to key items from natural-capital perspectives was briefly analyzed and will be analyzed in more detail later. For "Step 2: Organizing the internal environments," we organized internal information, and also based on publicly released information, we listed up where raw materials for our telecommunications business are procured from, and in which countries the business operates. As telecommunications facilities are installed and built over vast areas due to the nature of the business, we performed analyses at a national level, including our own operations and the adjacent areas. For "Step 3: Scoring," we scored risks, and created a heatmap to identify the countries operated in, details of activities, and the state of dependency and impact. To do this, indicators were used including ENCORE¹, the tool the TNFD framework recommends, to analyze whether corporate activities impact ecosystems, as well as indexes such as NBI², which aggregates data to assess the ecological importance of countries engaged in the corporate activities, and EPI³, which summarizes the availability and levels of laws concerning the conservation of ecosystems in the countries where we engage in corporate activities.

Also, using TNFD's LEAP approach⁴, and referencing IUCN⁵ guidelines, we performed an evaluation with views to the severity level of pressure to nature. Using the tools and data mentioned earlier, we scored the indicators by the seriousness of dependency and impact, geographical importance, and state of biodiversity-related laws and regulations in the given country.

Shown below are heatmaps that visualize the results of evaluating the dependency and impact on natural capital.

¹ Abbreviation for Exploring Natural Capital Opportunities, Risks and Exposure

² Abbreviation for National Biodiversity Index

³ Abbreviation for Environmental Performance Index

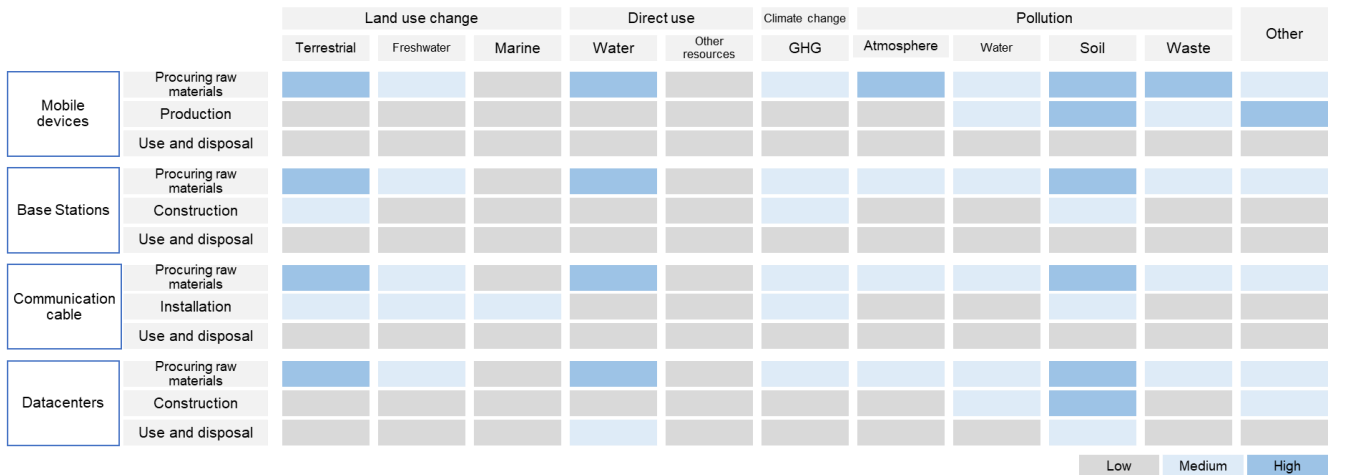
⁴ Process for systematically assessing nature-related risks and opportunities. Consists of four phases: Locate contact with nature (Locate), evaluate dependencies and impacts (Evaluate), assess risks and opportunities (Assess), prepare for and report to investors on nature-related risks and opportunities (Prepare).

⁵ Abbreviation for The International Union for Conservation of Nature

Fig. 4 Heatmap of dependency



Fig. 5 Heatmap of impact

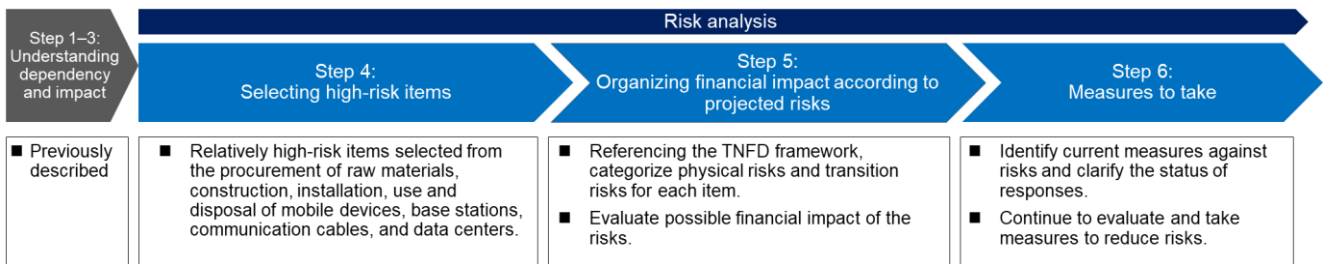


We have identified key dependency and impact items from the results mentioned earlier and our own business perspectives.

- Mining for raw materials (metals) for mobile devices, especially the impact on terrestrial land use change and water resources.
- Soil pollutants from the use of toxic substances arising from mobile device production
- Impact on terrestrial ecosystem especially on land from building base stations and installing communication cables
- Dependency on stabilizing features of water resources, climate and land to procure raw materials for base stations and communication cables

1-2 Risk analysis of natural capital

Fig. 6 Approach for the risk analysis



To perform the risk analysis, we conducted the evaluation based on the Scenario I and III set in the scenario analysis. We evaluated the impact on our business in three levels: 'Large,' 'Medium,' and 'Small.' Next for "Step 4: Selecting high-risk items," we identified high-risk items, or items that scored high, in the dependency and impact assessment, and high-risk items from business perspectives. Next, for "Step 5: Organizing financial impact according to projected risks," we listed up specific risk factors (from the perspective of physical risks and transition risks) and assessed the financial impact projected by such risks. For "Step 6: Measures to take," we identified the state of response to risks arising from land modifications, the procurement of raw materials and parts, building base stations and installing communication cables, or others. For example, we checked again that communication cable routes had been designed so that they were suitable for environmental conservation areas, base stations had been built with considerations to landscape, etc., and we verified that those measures were sufficient to respond to risks. We recognize that if environmental changes lead to a transition to Scenario III, the impact on telecommunications facilities will be larger than if the transition were to Scenario I.

We will continue to consider and take measures for reducing risks further in the future.

Table 1 Table 4 Identification of risk based on Scenario Analysis

Target domains	Key items of dependency and impact	Category	Risk factors	Time frame	Size of Impact		Impact to finance	Risk-reducing measures	
					Scenario I	Scenario III			
Mobile devices	<ul style="list-style-type: none"> Mining for raw materials (metals) for mobile devices, especially the impact on terrestrial land use change and water resources. Soil pollutants from the use of toxic substances arising from mobile device production. 	Physical risks	Acute	<ul style="list-style-type: none"> Disaster-prevention features declining due to deforestation from mining. Increased risks of floods and landslides. 	Short-, Medium-term	small	middle	Rising costs: Supplies of raw materials becoming unstable as suppliers suffer damage, which will also cause prices to soar	<ul style="list-style-type: none"> Procure products according to the Act on Promoting Green Procurement Establish and run sustainable and responsible procurement guidelines Promote recycling of used mobile phones
			Chronic	<ul style="list-style-type: none"> Decline of water resources due to excessive use of water 	Medium-, Long-term	small	middle	Rising costs: Destabilizing raw material supplies, which also causes prices to soar	<ul style="list-style-type: none"> Procure products according to the Act on Promoting Green Procurement Establish and run sustainable and responsible procurement guidelines
		Transition risks	Laws and regulations	<ul style="list-style-type: none"> Enhancement of laws and regulations concerning mining and land pollution 	Medium-, Long-term	small	middle	Rising costs: Laws and regulations tightening causes prices to soar and supplies to decline	<ul style="list-style-type: none"> Adjustment of Sustainable and Responsible Procurement Guidelines in Compliance with Legal Regulations
			Reputation	<ul style="list-style-type: none"> Criticism, and reputational damage from deforestation, water use, water contamination, etc. 	Short-, Medium-term	small	middle	Sales decreasing: Sales decreasing as reputation among stakeholders, including customers, deteriorates	<ul style="list-style-type: none"> Engage key suppliers, such as by conducting surveys on initiatives such as reducing environmental impact and conserving biodiversity
Stations, Communication cables	<ul style="list-style-type: none"> Impact on terrestrial ecosystems, especially on land on which base stations are built and communication cables are installed. Dependency on stabilizing features of water resources, climate, and land to procure raw materials for stations and communication cables. 	Physical risks	Acute	<ul style="list-style-type: none"> Cutting down trees and invading living creatures' habitats for installation, decline of disaster-prevention features from modified ecosystem use. Increased risks of floods and landslides 	Short-, Medium-term	small	middle	Rising costs: Additional costs incurred to maintain ecosystems Fees arising to recover damaged base stations and communication cables	<ul style="list-style-type: none"> Design communication cable routes that are suitable for environment-conservation areas Collaborate with relevant organizations for various initiatives such as implementation of disaster-proof structures and quick support activities for affected areas Build base stations that take the landscape into account Promote reuse and recycling when facilities are discarded Consideration of environmentally friendly communication coverage through Starlink
			Chronic	<ul style="list-style-type: none"> Decrease in water resources due to excessive water use 	Medium-, Long-term	small	middle	Rising costs : Rising water procurement costs are caused by an unstable water supply	<ul style="list-style-type: none"> Implementation of water consumption reduction, recycling, and wastewater management in data center operations
		Transition risks	Reputation	<ul style="list-style-type: none"> Criticism and reputational damage due to loss of landscape, etc. 	Short-, Medium-term	middle	middle	Sales decreasing: Sales decreasing due to reputational deterioration	<ul style="list-style-type: none"> Implementation of stakeholder engagement in the surrounding area of business sites Implementation of construction methods that consider natural landscapes

1-3 Evaluation of the impact of the telecommunication business on ecosystems

The TNFD Final Recommendations v1.0 present five impact drivers affecting the state of nature: climate change, land use change, resource use, pollutants, and invasive alien species [1]. As clarified in the previous section on the Heatmap of Impacts, we acknowledge that in the telecommunications business, building base stations and installing communication cables will impact land use, including land areas. In response, KDDI will continue to evaluate and take measures for reducing such risks by taking action such as designing communication cable routes that are suited to environmental conservation areas and building base stations that take landscape protection into account.

Notes on invasive alien species among the above factors are included in the "Other" category on the Heatmap of Impacts in the previous section. Since the spread of their distribution could affect the ecosystems, including rare native species, more detailed studies are needed. However, the lack of biological data has also been a hindrance.

While alien animal species tend to spread on land due to the escape or abandonment of captive animals [2], invasive alien plant species mainly invade by their seeds attaching to the clothing and shoes of passers-by [3]. Therefore, the spread of invasive alien species due to human migration is more pronounced in plants than animals, and the impact should be considered.

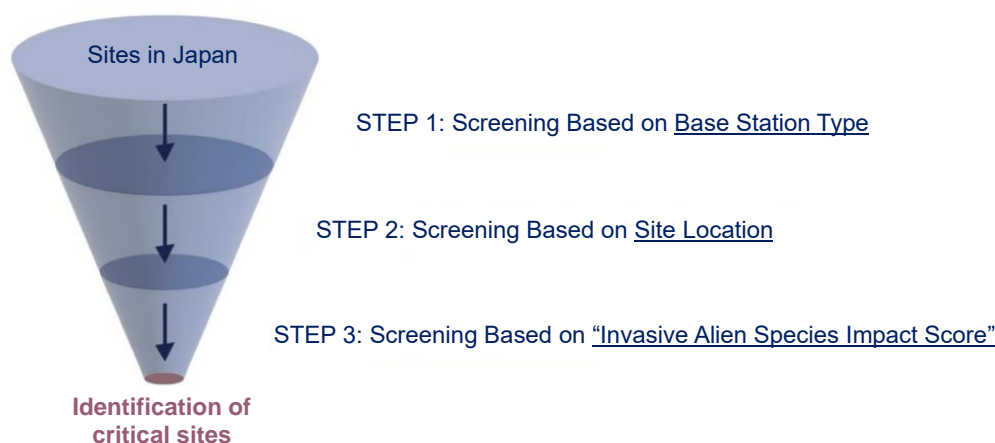
The impact of non-native plants on local ecosystems is more pronounced than that of animals [4]. Invasive alien species pose a greater risk to rare species with limited populations and habitat ranges, and this risk is closely associated with the possibility of species extinction. This is one of the factors that the TNFD identifies as a state of nature [5].

To verify the potential for reducing the environmental impact and contributing to biodiversity conservation, KDDI evaluated the habitat potential of invasive alien and rare plant species for a comprehensive list of sites involved in the telecommunications business. Consequently, we identified sites believed to have a more significant impact on ecosystems. This analysis was conducted using BiomeViewer, a biodiversity visualization service provided by Biome Inc.

Analysis Process

Domestic base stations, data centers, and other sites were screened using the following three steps to identify critical sites that invasive alien species may more heavily impact.

Fig. 7 Site screening steps



i. STEP 1: Screening Based on Base Station Type

Only pylon types accompanying land use change were included for base stations; those installed on building rooftops, indoors, and on utility poles, were excluded.

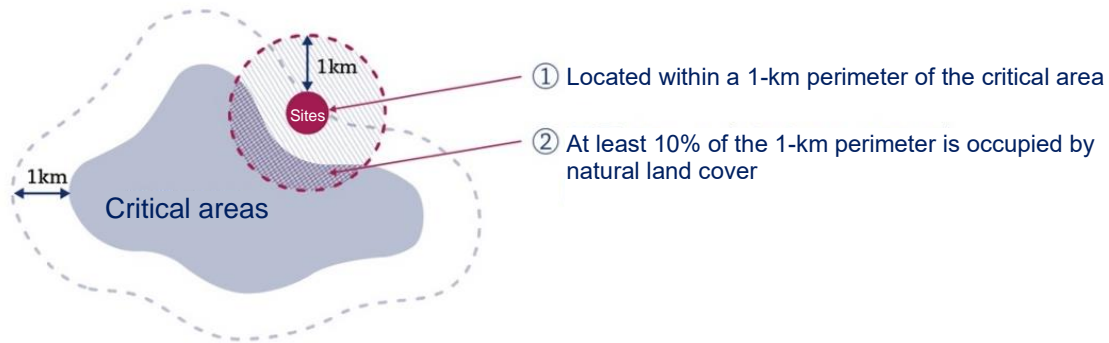
ii. STEP 2: Screening Based on Site Location

We narrowed our focus to sites where at least 10% of the 1-km circumference is covered by natural land⁶ and are located within 1 km of the critical area⁷.

⁶ Calculated based on the vegetation survey report of the Ministry of the Environment's Basic Survey for Nature Conservation. Natural land cover is defined as a vegetation cover with a naturalness of 9 or greater. Source: The Fifth Basic Survey for Nature Conservation Vegetation Survey Report (Ministry of the Environment Biodiversity Center of Japan) (https://www.biodic.go.jp/kiso/vg/vg_kiso.html) (Japanese only)

⁷ Critical areas are defined as special areas and special protection areas in natural parklands based on the National Land Use Planning Act, wilderness environments and special districts in nature conservation areas, and national and prefectural designated wildlife sanctuaries based on the Wildlife Protection, Control, and Hunting Management Act.

Fig. 8 Screening based on site location



iii. STEP 3: Screening Based on "Invasive Alien Species Impact Score"

Species distribution modelling was used to estimate the habitat potential⁸ of various invasive alien and rare species and to calculate their impact scores. The rare species impact score was calculated considering the degree of vegetation naturalness surrounding the base stations.

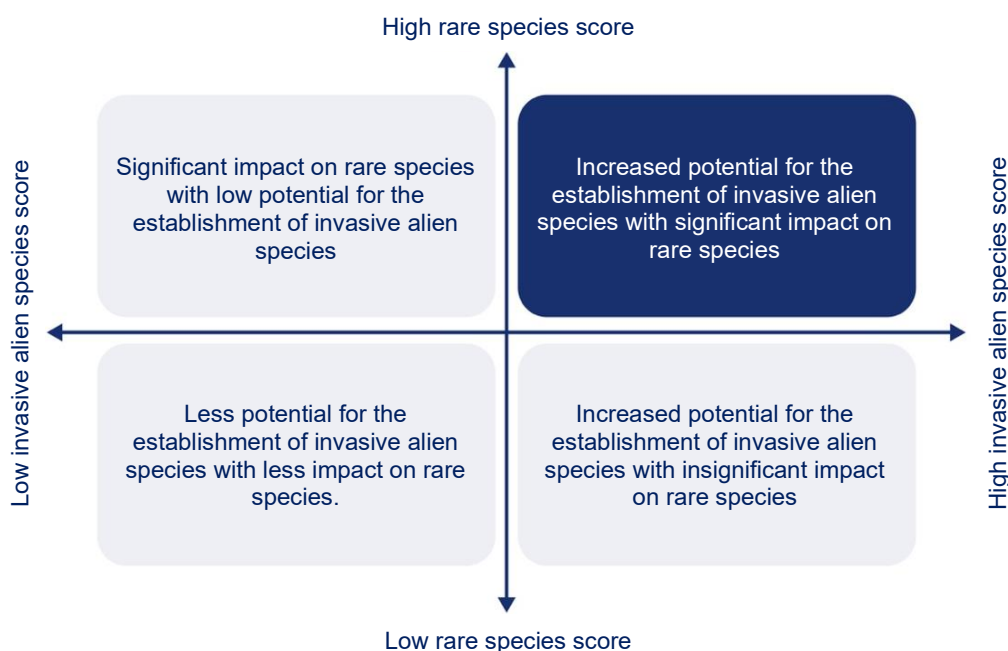
⁸ We evaluated the sites' environmental suitability for the species, and estimated the potential distribution using species distribution modeling, utilizing big data of biological observations and environmental data from Biome Inc. [6]. Note that this evaluation's calculations were based on the resolution of JIS X0410's standard regional mesh (1-km mesh).

Table 2 Metrics considered and their targets

Score Classification	Breakdown	Metrics used	Targets
Invasive alien species score	Invasive alien species habitat potential	Total value of various habitat potentials	Invasive Alien Species Act for plants, list of invasive alien species for the prevention of ecological damage, 100 worst invasive alien species in Japan.
Rare species score	Rare species habitat potential	Total value of various habitat potentials	Species covered by the Ministry of the Environment's Red List of Plants CR, EN, VU and NT categories
	Vegetation naturalness	Ratio of natural land cover ⁶	1 km around the site

The higher the invasive alien species score, the greater the risk of invasion due to the presence of invasive alien plant species in the area. Moreover, the higher the habitat potential, the greater the likelihood of these invasive species becoming established if they do invade. Meanwhile, the greater the rare species score, the more impact an invasive alien species would have if it became established.

Fig. 9 Handling of the invasive alien species and rare species scores



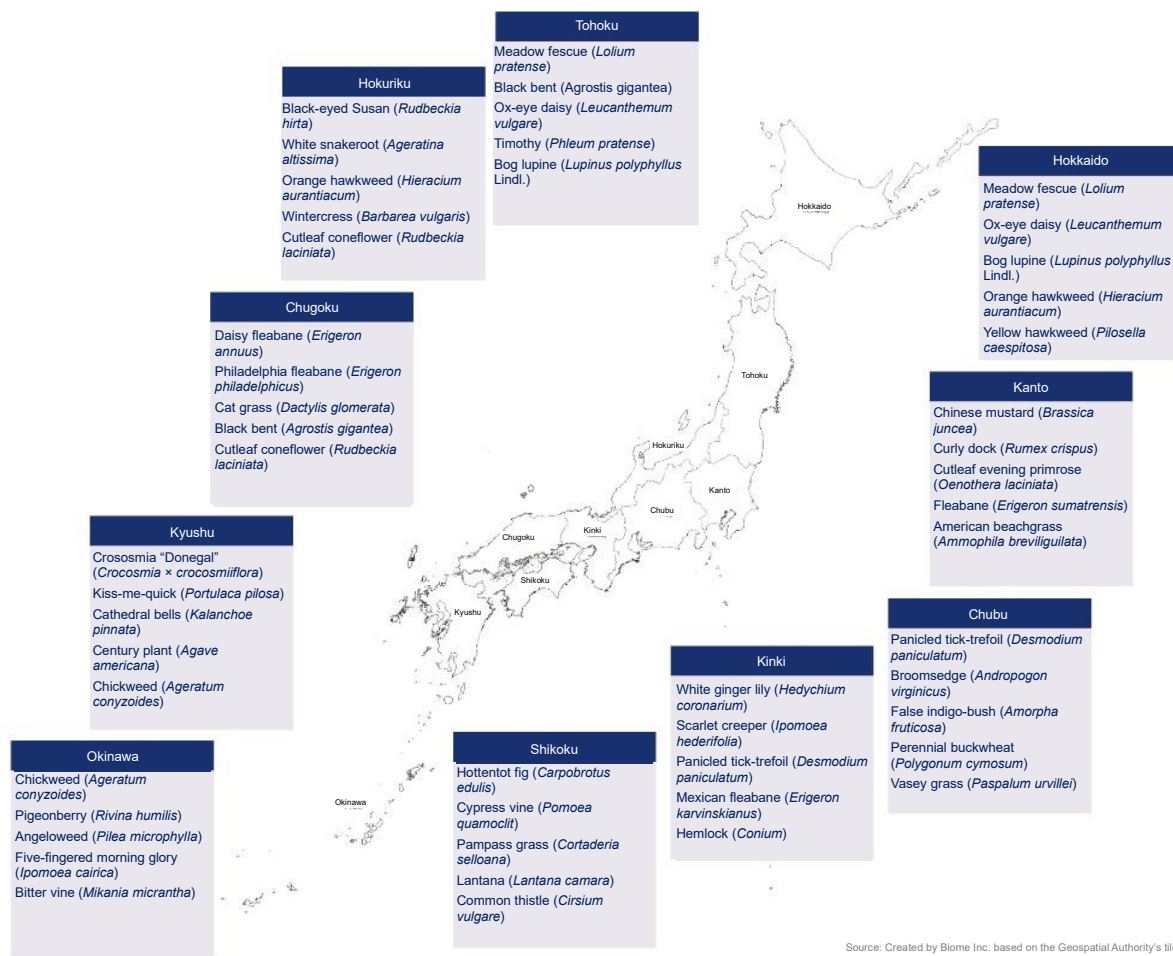
Based on this, the sum of the alien and rare species scores was calculated as the final Invasive Alien Species Impact scores. Due to ecosystem endemism, significant locations in each region must be considered. For this reason, we evaluated the scores based on regional classifications⁹.

Findings

As a result, we screened the top-scoring sites based on regional classifications and identified those sites that should be considered for priority action. An example is shown below.

⁹ 10 regional classifications, covering Hokkaido, Tohoku, Kanto, and Chubu.

Fig. 10 Example of invasive alien species with estimated site distribution identified based on regional classifications



Source: Created by Biome Inc. based on the Geospatial Authority's tiles (white maps) on the Geospatial Information Authority of Japan's website (<https://maps.gsi.go.jp/development/ichiran.html#std>)

Based on the findings of invasive alien and rare species habitat potential identified during the evaluation process, we conducted field surveys within critical sites to target the following additional aspects: verifying vegetation habitat status and analyzing the impact on animal species. With the aforementioned verified, we investigated the actual environment and vegetation status in the critical sites identified through the Invasive Alien Species Impact scores. Furthermore, we evaluated the impact on ecosystems, considering not only plants but also animals.

Additional Verifications

i. Conducting Field Surveys

In January 2024, we conducted random exploratory surveys (i.e., using survey methods to explore and clarify the biota at each site) in the identified critical sites and their surrounding areas to investigate the habitat status of invasive alien plant species. We conducted these surveys in two sites in the Kinki region, which is relatively unlikely to be affected by snowfall. Moreover, it is recommended that multiple surveys be conducted in a year focusing on spring and summer, which is the flowering period (i.e., anthesis) for many plants.

The following table shows the invasive alien species that were actually found inhabiting around base stations.

Table 3 Invasive alien plant species found through field surveys

Base station	Specific name	List of invasive alien species for the prevention of ecological damage (highly hazardous alien species)	List of invasive alien species for the prevention of ecological damage (other hazardous alien species)	100 worst invasive alien species in Japan
A	Tall Golden rod (Solidago altissima)	Yes		Yes
	Annual fleabane (Erigeron annuus)		Yes	Yes
	Weeping lovegrass (Eragrostis curvula)	Yes		Yes
	Cutleaf evening primrose (Oenothera laciniata)	Yes		
	Oriental cocklebur (Xanthium canadense)		Yes	Yes
	Sumatran Fleabane (Erigeron sumatrensis)			Yes
	Broomsedge bluestem (Andropogon virginicus)		Yes	
	Pink-headed persicaria (Persicaria capitata)		Yes	
	Bigleaf periwinkle (Vinca major)	Yes		
	Tall flatsedge (Cyperus eragrostis)	Yes		
	Mexican fleabane (Erigeron karvinskianus)		Yes	
	Common dandelion (Taraxacum officinale, T. spp.)	Yes		Yes
	Confederate rose (Hibiscus mutabilis)		Yes	
B	Annual fleabane (Erigeron annuus)		Yes	Yes
	Philadelphia fleabane (Erigeron philadelphicus)			Yes
	Sumatran Fleabane (Erigeron sumatrensis)			Yes
	Tick Trefoil (Desmodium paniculatum)		Yes	
	Tall Golden rod (Solidago altissima)	Yes		Yes

Fig. 11 Examples of invasive alien plant species found through field surveys

From the left, Oriental cocklebur, Tick Trefoil, Sumatran Fleabane, and Tall Golden rod



Fig. 12 Conducting field survey (left) Upon survey, soles were cleaned and sanitized to prevent invasive alien plant species from spreading (right)



ii. Conducting Evaluations on Animals

As mentioned earlier, the direct impact of our telecommunications business that is resulting from invasive alien species could be larger on plants than animals. Nonetheless, attention should be paid to the indirect impacts that may cause plant community structure changes on animals. Most butterfly species belonging to the order Lepidoptera in the class Insecta tend to feed on plants during the larva period in their life cycle, and many butterfly species have a lifestyle that depends on a specific plant as the host plant. Those butterfly species could be affected by plant community structure changes.¹⁰

Therefore, we additionally evaluated the critical sites identified through the evaluation concerning plants by scoring the habitat potential of the order Lepidoptera. Our goal was to verify the telecommunications business's impact on ecosystems in a more comprehensive and inclusive manner. The evaluation of the habitat potential was made using BiomeViewer in the same way as for the evaluations of invasive alien plant species and rare plant species.

Response Going Forward

Based on the habitat potentials of invasive alien and rare plant species, as well as the findings of the latest field surveys and analysis on the indirect impact to animals, we will strategically consider measures to reduce the impact on ecosystems in a multilateral way. KDDI will continue to conduct biodiversity impact assessments at our telecommunication business locations and consider and implement measures to reduce risks further.

¹⁰ "Consequences of exotic host use: impacts on Lepidoptera and a test of the ecological trap hypothesis" (<https://link.springer.com/article/10.1007/s00442-016-3560-2>)



Thank you very much for the opportunity for us to be involved in this excellent initiative.

In this project, we conducted a comprehensive assessment of the risks posed by the establishment of invasive alien species in extensive and multiple telecommunications business locations.

While many companies in Japan have already begun to disclose TNFD data, this is the first report ever to cover such a large number of business locations. I believe this project was made possible thanks to KDDI's extensive telecommunications network and Biome's unparalleled biological big data.

This project is a pioneering example that promptly addressed the issue of measures against invasive alien species. This issue was listed as a core global metric in the TNFD Final Recommendations v1.0, released in September this year. I hope these findings will aid KDDI's sustainability management and establish a positive precedent for future TNFD disclosures.

As for the invasive alien species survey using Starlink Business conducted this year, further development is being considered. Biome will continue working with KDDI to promote various actions aimed at nature positivity.

Shogoro Fujiki, President and CEO, Biome, Inc.

1-4 Examples of initiatives addressing risk reduction

I. Measures to establish an au communication zone in Shiratani Unsui Ravine, Yakushima, while considering the natural environment.

Outline

Yakushima Island, a UNESCO World Heritage Site, attracts many visitors each year. Due to the site's location within a national park, there are limitations on installing new structures. The aim was to establish a communication environment enabling visitors to safely and securely enjoy the scenic view without damaging the surrounding natural environment.

We communicated with the Ministry of the Environment, the Kagoshima Prefecture government, the Yakushima town government, environmentalists, and residents. We complied with laws and regulations and also implemented measures to conserve the landscape and prevent deforestation, as shown below.

<Initiatives>

- Due to restrictions on new structures, a base station was installed in the Kagoshima Prefecture government building, where a network had already been installed.
- Using satellite links for data transmission from the base station eliminates the need to cut down trees to install communication cables.
- Used a small hydraulic power generator at Shiratani Unsui Ravine. This approach eliminates the need to cut down trees to install poles and wires, typically required when electricity is sourced from remote locations.
- Considering the landscape, a smaller 30cm antenna was introduced instead of the usual 2m antenna.
- The radio's cover is designed to blend in with the natural landscape.

Fig. 13 Communication zone countermeasure work (left) Base station and small, circular antenna (right)



Results and Future Outlook

We have created an environment where customers can comfortably use mobile phones without compromising the magical primeval forest of Yakushima. KDDI has been active in improving the coverage of cell phones in tourist spots throughout Japan since 2014. We will continue to work with stakeholders to expand service areas, improve service quality, and create a user-friendly telecommunications environment.

[au provides first telecommunication at Yakushima Shiratani Unsui Ravine \(Japanese only\)](#)

II. Nature-friendly submarine cable installation for the natural habitat of corals and sea turtles

Outline

The vast majority of international calls and overseas coverage of sports and news rely on the Internet and submarine fiber-optic cables, but the latter serve as the main artery for more than 99% of all international telecommunications. Meanwhile, discussions are being held, and measures are being taken to avoid or mitigate environmental impacts on coral and sea turtle breeding, as well as the fishing industry, arising from cable installation work.

KDDI Cableships & Subsea Engineering Inc. installs cables following the KDDI Group's Sustainability Management, Procurement Policy, and Human Rights Policy.

Cable installation is done in consultation with the relevant departments of local governments to ensure compliance with laws and regulations, and business plans are formulated in line with ordinances. Prior to installation, we consult with the relevant fishery operators and obtain their consent before commencing work. We place great importance on building good relationships with residents and strive daily to build relationships that facilitate dialogue by participating in local events.

In designing the cable route, we investigate the water depth, topography, soil firmness, and soil and mud properties in advance to determine the best route. In doing so, we make sure to plan a route that avoids any living corals.

We take measures to avoid or mitigate impacts when building on sandy beaches, such as avoiding sea turtle spawning season and restoring the beach to its original state.

Fig. 14 Full picture of a submarine cable

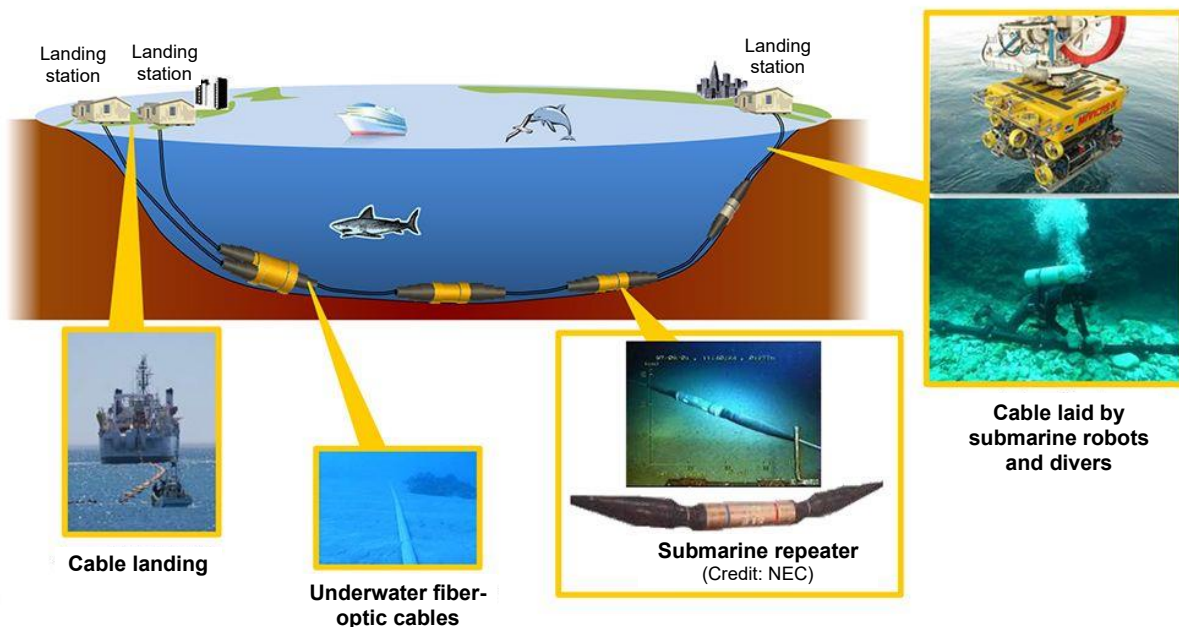
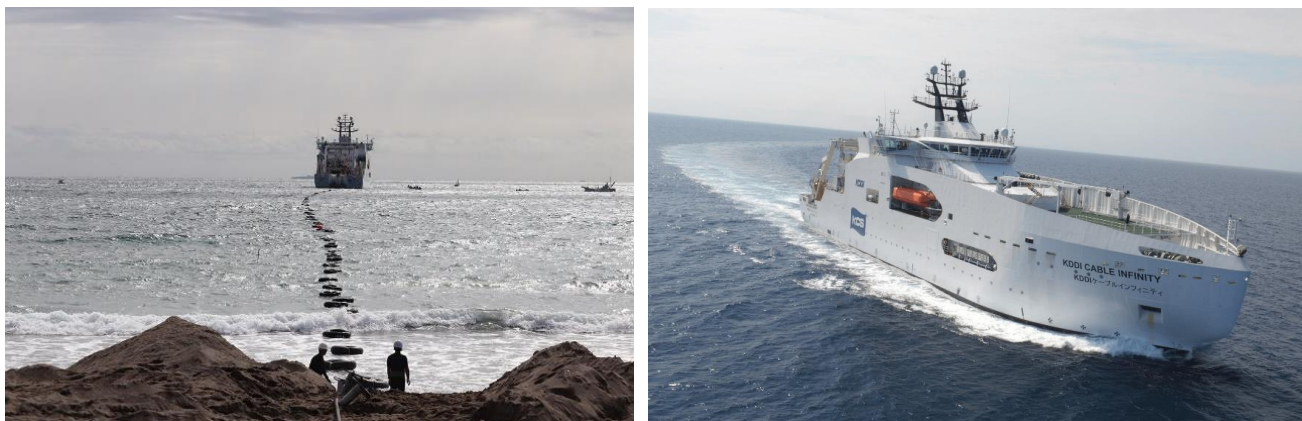


Fig. 15 Unloading (left) KDDI Cable Infinity (right)



Results and Future Outlook

KDDI Cable Infinity, a vessel used for laying and repairing submarine communication cables, is Japan's first self-navigating communication- and power-cable laying vessel. It is also capable of handling the installation of cables for offshore wind power generators, which are raising hopes as a renewable energy source.

We will expand our efforts to minimize the impact on nature by taking measures that consider the environmental impact of exhaust gasses, such as installing NOx removal equipment (SCR system).

[Entering the era of high-capacity submarine fiber optic cables responsible for 99% of international communications, including the Internet \(Japanese only\)](#)

[KDDI Cable Infinity](#)

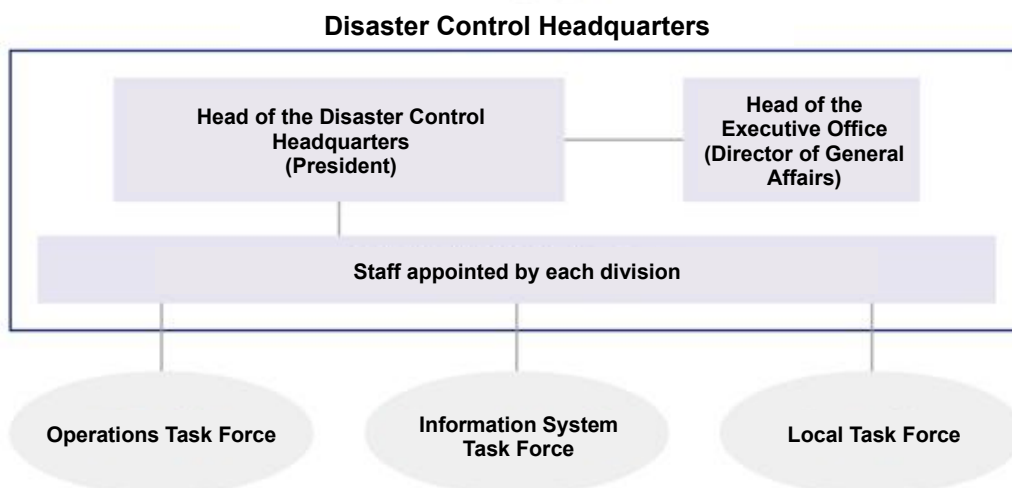
III. Disaster preparedness and BCP initiatives

Outline

Amid growing risks caused by climate change and natural disasters, KDDI has formulated a Business Continuity Plan (BCP) against major natural disasters so that we can provide a stable communications service, whatever the circumstance, as a designated public organization under the Disaster Countermeasure Basic Act. We are collaborating with relevant organizations to implement the plan, including developing disaster-ready systems and promptly supporting affected areas.

We have formulated a Business Continuity Plan (BCP) against major natural disasters based on our basic policy of "ensuring the safety of our employees and their families," "fulfilling our responsibility to provide communications services as a designated public organization continuously," and "supporting our stakeholders." We verify the effectiveness of our disaster preparedness drills, held twice a year, and are working to build a stronger foundation for disaster preparedness by repeating the PDCA cycle annually.

Fig. 16 Disaster response system



Results and Future Outlook

In case of a disaster, we offer communication services by securing communications, coordinating prompt recovery efforts, and installing public wireless LAN and recharging facilities at evacuation shelters.

We also provide additional support activities customized for the recovery phase and the specific issues in the affected areas. This includes fundraising for disaster relief, volunteering in the affected regions, providing community-building support, and supporting young people who will lead the next generation.

[Disaster preparedness initiatives](#)

[Assistance in affected areas](#)

IV. Supply chain sustainability activities jointly promoted by NTT, KDDI, and SoftBank

Outline

Nippon Telegraph and Telephone Corporation ("NTT"), KDDI, and SoftBank Corporation ("SoftBank") have discussed joint initiatives to standardize supplier engagement activities in the telecommunications industry.

We have agreed to standardize the sustainability questionnaire for our suppliers and use it as a common Self-Assessment Questionnaire (SAQ) for all three companies to use in their supplier engagement activities. We believe implementing this common SAQ will help alleviate the workload for our suppliers. The SAQ will check suppliers' efforts in the environment, human rights and labor, health and safety, fair trade and ethics, quality and safety, and information security. We will work with suppliers to make further improvements by providing feedback on the findings.

Results and Future Outlook

NTT, KDDI, and SoftBank will contribute to solving social issues and realizing a sustainable society with the understanding and cooperation of our suppliers to achieve a sustainable supply chain.

[NTT, KDDI and SoftBank's promotion of joint supply chain sustainability activities \(Japanese only\)](#)

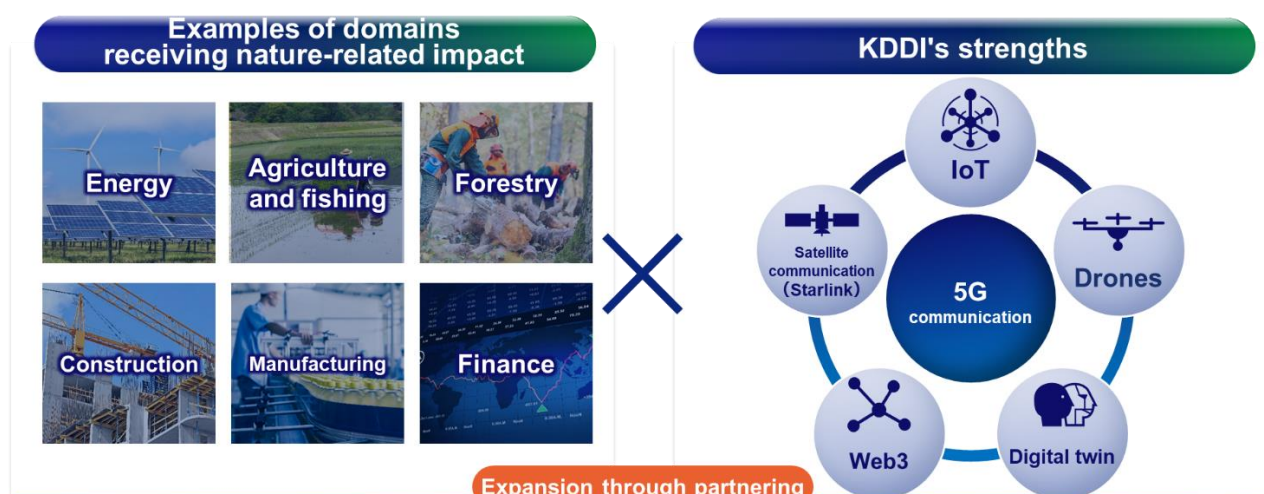
(3) Opportunities

As part of our opportunity analysis, we conducted an evaluation based on the worlds outlined in Scenario I and Scenario III from our scenario analysis. We evaluated the impact on our business in three levels: 'High,' 'Medium,' and 'Low.' The results suggest that opportunities related to natural capital, including biodiversity, represent areas where KDDI can leverage our unique strengths. KDDI owns many solution technologies that can contribute to region co-creation and solutions to environmental issues, such as Starlink, that can set up communication environments in mountainous areas and islands where such facilities could not be built before, as well as IoT technologies that can be utilized for data collection. We believe we will be able to establish ourselves as an advanced sustainability brand by incorporating into these initiatives the perspective of natural capital, including that of biodiversity, and by exercising leadership early on. We are currently evaluating various ideas referencing the World Economic Forum's report "New Nature Economy Report II The Future Of Nature And Business" etc., looking at the potential nature-related market size and KDDI's strengths. Going forward, we will hold further discussions with relevant divisions and external experts to materialize these ideas.

Table 4 Identification of opportunities based on Scenario Analysis

category	Factors and Impact Areas	Size of Impact		Impact to finance	Details of Services
		Scenario I	Scenario III		
products - Service	Increased business demand for visualizing ecosystem services	middle	middle	Sales Increase : Growth in sales of our products and services related to the visualization of biodiversity	Remote underwater photography by a sea-to-air drone Initiatives to survey seaweed beds using aquatic drones and to build an automatic blue carbon measurement system Invasive alien species survey using AI-based biological data visualization application "Biome" and Starlink
	Increased business demand related to regional revitalization based on biodiversity	small	middle	Sales Increase : Growth in sales of our products and services related to regional revitalization based on biodiversity	Urban development in harmony with nature and biodiversity utilizing ICT/IoT Realization of sustainable primary industries (agriculture and fisheries) utilizing ICT/IoT

Fig. 17 Conceptual diagram of the opportunities



1-1 Examples of initiatives responding to opportunities

I. Remote underwater photography by a sea-to-air drone

Outline

In recent years, a labor shortage has become a serious concern in aquaculture and aquatic infrastructure inspection due to the declining birthrate and aging population. The need for underwater drones to facilitate work in water has increased, but conventional underwater drones require boat transportation to inspection sites.

Sea-to-air drones were developed by KDDI Smart Drone Inc. ("KDDI Smart Drone"), KDDI Research, Inc. ("KDDI Research"), and ProDrone Co., Ltd. to save labor and ensure safety during dam and port facility inspections as well as fishing ground monitoring.

The sea-to-air drone comprises an airborne base unit and an underwater sub-unit capable of video transmission and sonic positioning. It flies through the air, has a component that dives into the water, supports mobile communications, and is capable of autonomous flight, remote control, and real-time transmission of images from airborne and underwater cameras.

We conducted underwater photography using the sea-to-air combined drone to inspect offshore wind power generation facilities and survey the status of seaweed beds that serve as fish reefs. Previously, capturing underwater photos required sending a large boat and divers to take pictures. However, the sea-to-air drone succeeded in safely and efficiently taking pictures, and is expected to reduce costs and time in the future.

Fig. 18 Image of inspecting offshore wind power generation facilities and surveying of seaweed beds that serve as fish reefs using the sea-to-air drone

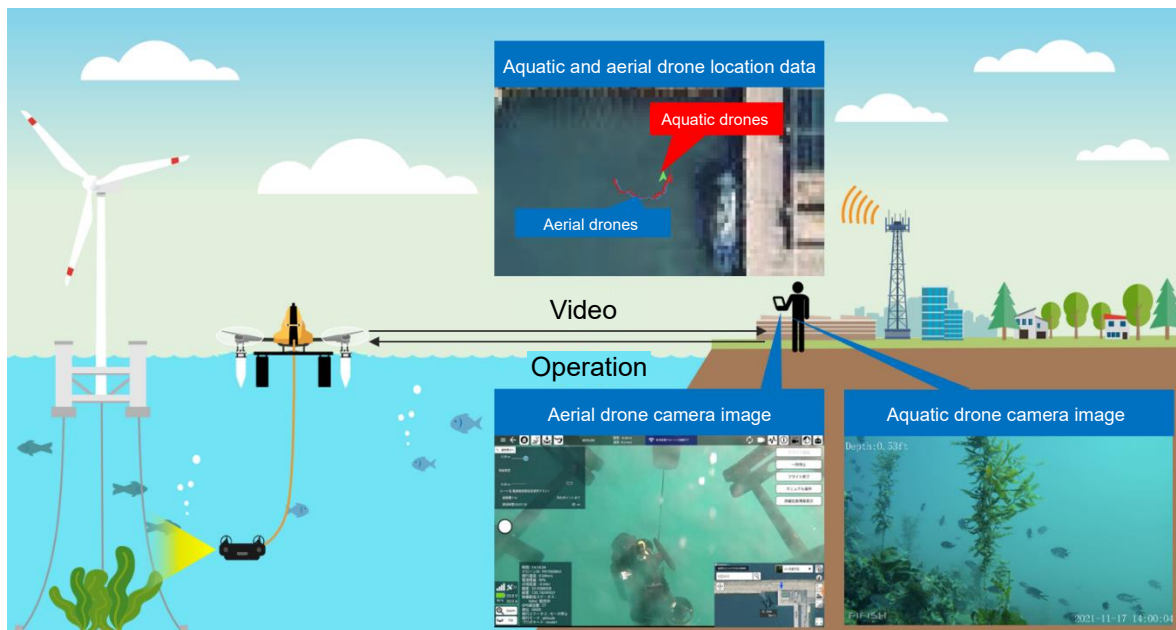


Fig. 19 Base unit (left) The sub-unit separates from the base unit and dives underwater (right)



Results and Future Outlook

Since the sea-to-air drone can check underwater conditions from the coast, it is expected to be used for a variety of applications, including fisheries monitoring, where boats are routinely used to check aquaculture farms and pound nets, offshore wind power, dams, underwater infrastructure inspection such as piers, bilge inspection before sailing, blue carbon measurement, and more. As we advance, we will expand the field of activity of smart drones to the underwater realm through sea-to-air drones.

[The drone can fly autonomously to inspection sites, where underwater conditions can be remotely checked. \(Japanese only\)](#)

[The world's first sea-to-air drone successfully took underwater photography. \(Japanese only\)](#)

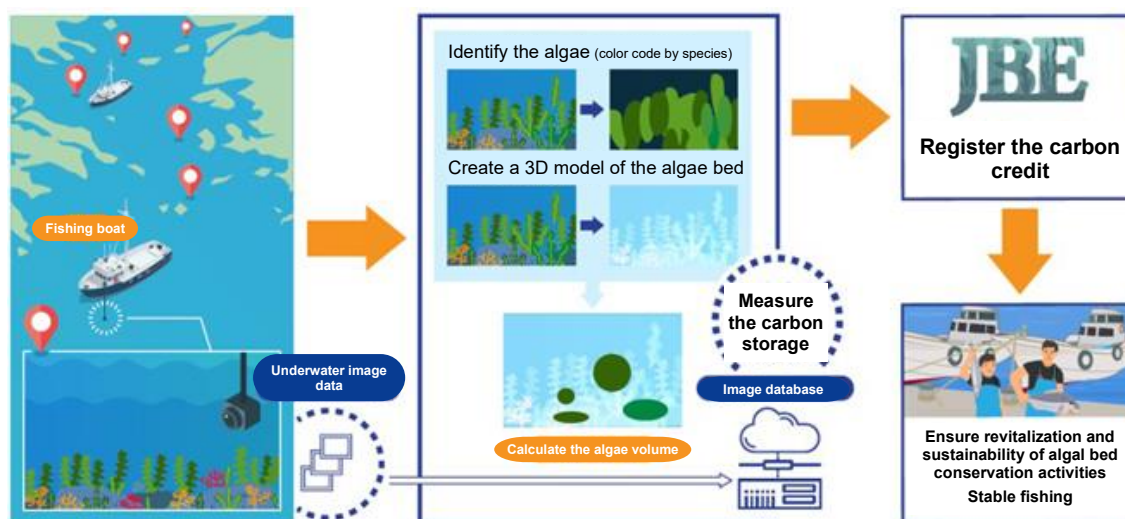
II. Initiatives to survey seaweed beds using aquatic drones and to build an automatic blue carbon measurement system

Outline

The marine environment has significantly changed in recent years due to various factors, including climate change. Catches continue to decline in the fisheries industry due to declining fishery resources and seaweed beds. There is an urgent need to conserve and restore the environment where fishing takes place so as to establish a fisheries industry that is both sustainable and profitable. Specifically, the revival of seaweed beds is essential because they provide the basis for the growth of various marine organisms, including fishery resources. We used aquatic drones to survey seaweed beds to improve the efficiency of the survey, as the widespread use of J Blue Credit^{®11}, a quantifiable and tradable blue carbon¹², will help restore them.

KDDI Research, KDDI, and the Toba City Government in Mie Prefecture surveyed seaweed beds in June 2022 using aquatic drones to improve the efficiency of seaweed bed surveys. Six organizations, including the National Institute of Technology, Toba College, the Graduate School of Bioresources at Mie University, and the Mie Prefectural Fisheries Laboratory, are collaborating on developing an automated blue carbon measurement system that employs machine learning. Images and location data captured by underwater camera sensor devices attached to fishing boats are integrated into an automatic blue carbon measurement system, which uses machine learning to identify algae types and calculate the location and volume of algae growth, thereby automatically measuring the amount of blue carbon stored in the region.

Fig. 20 Efforts to build an automated blue carbon measurement system



¹¹ An independent credit issued and managed by the Japan Blue Economy Association after review and validation by an independent third-party committee. Source: "What is J Blue Credit[®]?" (Japan Blue Economy Association) (<https://www.blueeconomy.jp/credit/>) <https://www.blueeconomy.jp/credit/>

¹² Blue carbon is carbon absorbed by the ocean through marine organisms such as seaweed, algae, and phytoplankton. Source: "What is blue carbon?" (Ministry of Land, Infrastructure, Transport and Tourism) (https://www.mlit.go.jp/kowan/kowan_tk6_000069.html)

Fig. 21 Overview of an aquatic drone

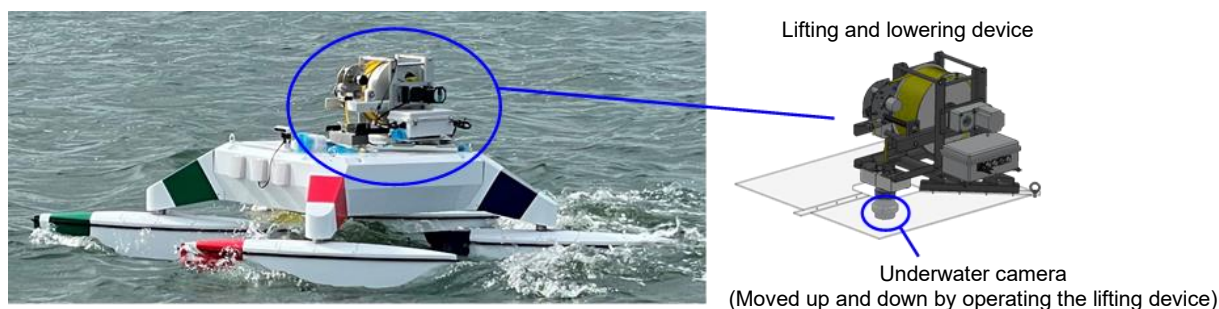
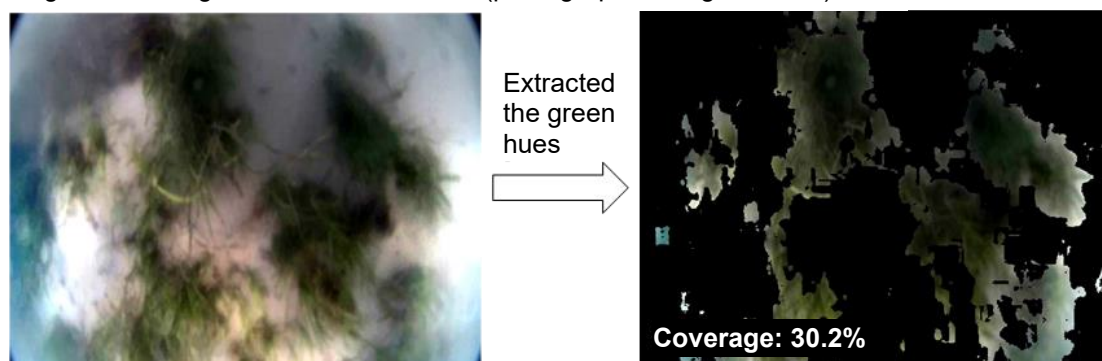


Fig. 22 Image analysis of seaweed beds

Algae bed along the Toshi Island coast (photographed eelgrass, etc.)



Results and Future Outlook

The seaweed bed survey using aquatic drones received the Minister of Internal Affairs and Communications Award at the 31st Global Environment Awards in March 2023.

We aim to begin operating an automated blue carbon measurement system, and through it, create partnerships with urban businesses to establish fishing villages.

[Successful survey of seaweed beds using aquatic drones \(Japanese only\)](#)

[Efforts to develop an automatic blue carbon measuring system toward decarbonizing and improving profits of fishing villages \(Japanese only\)](#)

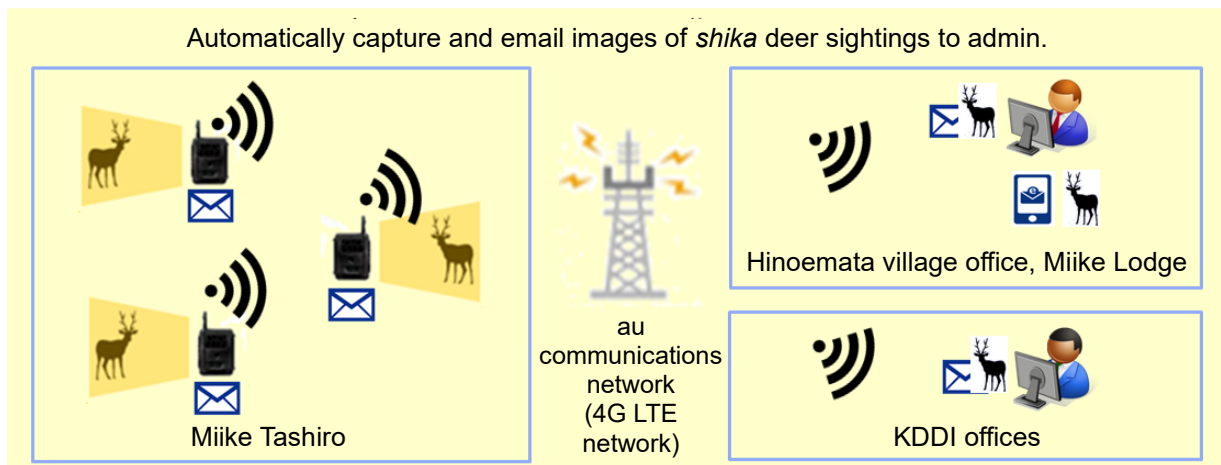
III. Measures to protect Oze National Park from deer using motion-activated cameras

Outline

The *shika* deer population has been rising rapidly in recent years, causing significant damage to ecosystems, agriculture, and forestry throughout Japan. In Oze National Park, an increase in the number of *shika* deer has caused significant damage to marshland vegetation, and officials have resorted to capturing and driving them off the park. Hinoemata village in Fukushima Prefecture has been chasing away *shika* deer at night, but it was necessary to understand their ecology to improve work efficiency.

In 2018, KDDI and the village installed three 4G-LTE-enabled trail cameras to see if it is possible to capture *shika* deer utilizing automatically taken images and then email them in real-time, and what can be learned from those images. The team conducted tests for about a month and successfully captured photos of *shika* deer. The images not only indicated the date, time, and temperature, but also enabled the team to identify the species (males, females, etc.) and directions of the deer's movements. These details could be helpful in studying ways to chase the deer away.

Fig. 23 Trail camera monitoring configuration in Oze National Park



Results and Future Outlook

We proposed a solution to the problem by installing au 4G-LTE-ready trail cameras in areas with damage caused by deer. The KDDI Group's assets will be used with its mobile phone coverage to solve regional issues, thus revitalizing the region, reducing drop damage, and cooperating in disaster response.

[Took measures using motion-activated cameras to protect Oze National Park in Hinoemata, Fukushima Prefecture, from deer \(Japanese only\)](#)

IV. Invasive alien species survey using AI-based biological data visualization application

"Biome" and Starlink

Outline

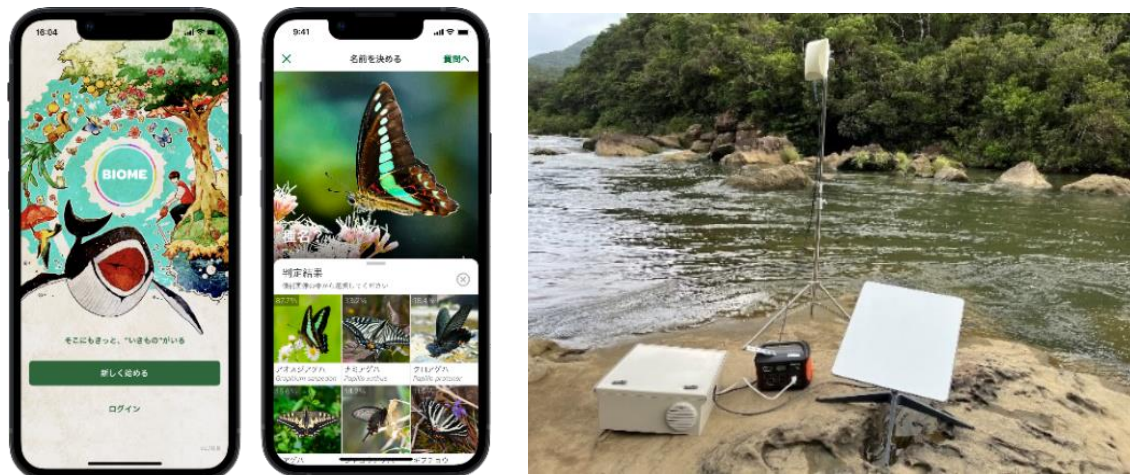
Through the KDDI Green Partners Fund, which invests in startup companies that address environmental issues, KDDI has invested in Biome Inc. ("Biome"), which provides a platform for visualizing biological data. The company supports collecting biological data in biomes by utilizing communication and IoT technologies.

Iriomote Island, a World Natural Heritage site, is home to many endemic species, including the critically endangered Iriomote cat. However, the invasion and establishment of invasive alien species have raised concerns about their impact on the island's unique ecosystem, and a survey of alien species is required. Field surveys and surveys utilizing fixed-point cameras with IoT devices have been conducted in the past. However, the amount of data collected has been insufficient, and communication can be unstable in areas with rich natural surroundings. As a result, the progress in ascertaining the necessary data has been inadequate.

In September 2023, KDDI and Okinawa Cellular Telephone Company ("Okinawa Cellular Telephone") conducted survey on invasive alien species using Biome's Biome smartphone application and Starlink Business. In the survey, an Internet access line was established by Starlink Business in an area with unstable mobile communication, and distribution data of invasive alien species was collected using Biome. For those who are not experts on plants and animals, Biome's cutting-edge name recognition AI recognizes the species of both plants and animals, enabling a highly accurate survey with just a photo.

The survey was conducted in collaboration with the Ministry of the Environment's Okinawa Amami Nature Conservation Office, the Okinawa Prefectural Department of the Environment's Nature Conservation Division, and the Taketomi town government as part of the Okinawa Nature Conservation Project, a project that helps to conserve the natural environment.

Fig. 24 Ikimono Collection app Biome (left) Conducting a survey (right)



Results and Future Outlook

The data collected from this survey is shared with the Ministry of the Environment, Okinawa Prefectural government, and Taketomi town government for environmental conservation and controlling invasive alien species on Iriomote Island, thereby supporting the biodiversity conservation efforts. This survey will help us understand the distribution of invasive alien species in Okinawa Prefecture and help to preserve Okinawa's biodiversity.

[An invasive alien species survey is conducted using Starlink and the AI-based biological data visualization app Biome. \(Japanese only\)](#)
[Okinawa Nature Conservation Project \(Japanese only\)](#)

V. Labor-saving paddy management using IoT

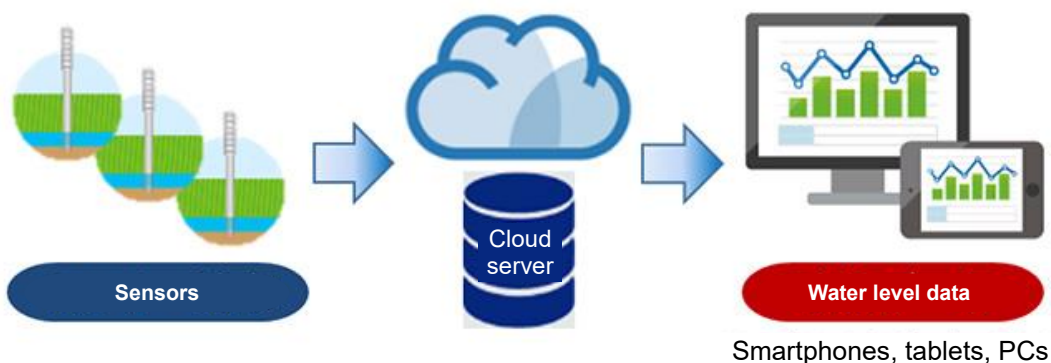
Outline

The city of Toyooka in Hyogo Prefecture is engaged in the artificial rearing of storks. Toyooka is focusing on an agricultural method that nurtures storks without exposing them to pesticides or chemical fertilizers, because storks require a natural environment with a diverse range of creatures to survive outdoors. However, this farming method requires watering for a longer period than usual to increase the number of frogs and dragonfly larvae that the storks eat. Because managing this water requires a lot of labor, labor-saving management has become a challenge.



Installing paddy sensors using communication lines in farmer-managed paddies enables farmers to monitor water levels on their smartphones, saving labor and money by reducing the number of rounds and time spent making those rounds.

Fig. 25 Overview of the paddy sensor



Results and Future Outlook

In addition to labor-saving water management, we continue to investigate ways to eliminate uneven growth of rice crops, thereby improving yields and stabilizing quality. We anticipate that using new agricultural technology for farmers will help spur the younger generation's interest in agriculture.

[Labor-saving paddy management using IoT in Toyooka, Hyogo Prefecture \(Japanese only\)](#)

1-2 Initiatives which KDDI is joining

KDDI is participating in the following initiatives in support of each natural capital philosophy. We will accelerate the company's efforts toward nature positivity by participating in the activities of each initiative.

■ Taskforce for Nature-related Financial Disclosures (TNFD) Forum

KDDI and Okinawa Cellular Telephone have joined the TNFD Forum, which promotes TNFD activities. Going forward, KDDI will organize the relationship between its business and natural capital (dependence and impact) as well as risks and opportunities, and promote proactive disclosure from the four perspectives recommended by the TNFD, namely governance, strategy, risk management, and metrics and targets, based on the TNFD disclosure framework.



[KDDI joins the Taskforce on Nature-related Financial Disclosures \(TNFD\) Forum \(Japanese only\)](#)



■ 30by30 Alliance for Biodiversity

KDDI, Okinawa Cellular Telephone, and au Jibun Bank have joined "30by30 Alliance for Biodiversity," an initiative led by Japan's Ministry of the Environment, to create a framework for meeting targets to maintain and conserve over 30% of land and sea as healthy ecosystems. By joining this alliance, KDDI, Okinawa Cellular Telephone, and au Jibun Bank will help to maintain and manage highly biodiverse areas with our experience in biodiversity-conserving activities and with our IoT technologies.



[KDDI joins "30by30 Alliance for Biodiversity" \(Japanese only\)](#)



■ ANEMONE Consortium

The ANEMONE Consortium aims to create a society in harmony with nature through ANEMONE, a large-scale environmental DNA observation network from Japan. This platform enables individuals from different fields, such as industry, government, academia, and the private sector, to unite, engage in collaborative efforts, and share information. Its main goal is to facilitate the development of environmental DNA observation, related technology research, and the implementation and dissemination of these technologies in practical applications.

To accelerate the KDDI Group's initiatives in biodiversity, KDDI and KDDI Smart Drone, and KDDI Research joined the ANEMONE Consortium (*5), which aims to build an environmental DNA database, in November 2023 and in January 2023, respectively. We aim to conserve ecosystems by leveraging the assets of the KDDI Group, including the development of a drone system dedicated to environmental DNA surveys.

[About the ANEMONE Consortium \(Japanese only\)](#)



1-3 Declaration on natural capital conservation

■ TNFD Adopter

TNFD is seeking organizations to serve as TNFD Adopters to provide TNFD disclosures in parallel with the adopters' FY2024 or FY2025 financial statements. At the World Economic Forum (WEF) in January 2024, it announced that 320 companies or organizations in 46 countries (including 80 Japanese companies) have been registered as Early Adopters.

KDDI registered as a TNFD Adopter in November 2023. As one of the first companies to comply with TNFD disclosure, we will actively disclose information related to biodiversity and natural capital.

[TNFD Adopters – TNFD](#)

5. Risk management

(1) Processes for identifying and evaluating nature-related risks, etc.

KDDI identifies and assesses nature-related risks, etc., in its value chains. We qualitatively assessed risks mainly in the business domains presented in the Medium-Term Management Strategy, considering the relationships between business sizes and nature and evaluating nature-related risks, etc., mainly for our telecommunications business. First, we categorized the telecommunications businesses to be assessed into mobile devices, base stations, communication cables, and data centers. We have considered the upstream (procurement of raw materials), direct operation (production, construction, installation) and downstream (use and disposal) areas of each item's value chain and identified key raw materials, where they come from, where production/construction/installation takes place, and where they are used and disposed of. We then conducted a qualitative assessment of dependency and impact by country in the value chain. The assessment items were scored by the level of dependency and impact, geographical significance, and by the state of ecosystem-related laws and regulations in the given country. Furthermore, we created a heatmap to reflect the scored results and assessed key projected risks for high-scoring countries and impacted items.

We also evaluated the impact of the telecommunication business on biodiversity, targeting base stations, data centers, and other locations in Japan. We narrowed our focus to sites where at least 10% of the 1-km circumference is covered by natural land and are located within 1 km of the critical area. Species distribution modelling was used to estimate the habitat potential of various invasive alien and rare species and to calculate their impact scores. The rare species impact score was calculated considering the degree of vegetation naturalness surrounding the base stations. Based on this, the sum of the alien and rare species scores was calculated as the final Invasive Alien Species Impact scores. Due to ecosystem endemism, significant locations in each region must be considered. To this end, we selected the top-scoring sites based on regional classifications and identified them as sites that should be considered for priority action.

(2) Management processes of nature-related risks, etc. and integrating the processes into risk management throughout the organization

Risks in all business divisions that have a significant impact on the KDDI Group's financial and business strategies, including those related to climate change and natural capital, are identified biannually by senior management and the Sustainability Management Division. Furthermore, the natural capital risks identified through the environmental ISO framework, such as climate change and biodiversity risks, are managed with an EMS (environmental management system) approach, also utilizing the environmental ISO framework. For the managed risks, qualitative annual targets are set by the divisions in charge and their progress is assessed every quarter. The details of improvement, and risks and opportunities concerning all divisions, are reported, discussed and approved by the Sustainability Committee.

6. Metrics and targets

In promoting the conservation of biodiversity, which is one of the key issues presented in "KDDI GREEN PLAN", we have been applying qualitative indicators used for ENCORE, etc., to analyze dependency and impact related to natural capital. We also qualitatively assess the financial impact of risks, such as to sales and costs. In addition to the above, we quantitatively monitor our greenhouse gas emissions (Scope 1, 2, and 3), water resource consumption, the level of industrial waste, etc. as nature-related indicators, and also monitor the number of used mobile phones collected as an indicator to gauge the progress of waste-reduction initiatives.

We have also been promoting activity, using various opportunities as touchpoints to collaborate with external partners, etc. We are actively working to conserve regional environments in collaboration with various stakeholders in the construction of an automated blue carbon measurement system using aquatic drones, biodiversity conservation with Kyoto University's Ashiu research forest, and investment in Biome, which provides a platform for visualizing biological data.

Going forward, we will continue to formulate strategies that address natural capital, including biodiversity, and determine the necessary metrics to achieve our goals in helping to solve social challenges more effectively than ever before. We will do this by actively communicating with external partners through our involvement in initiatives and dialogues with stakeholders.

[KDDI ESG data](#)

Column - Other examples of initiatives concerning the natural environment -

■ Mt. Takao forest conservation

KDDI undertook forest conservation activities at Mt. Takao (Hachioji, Tokyo) with the aim of promoting biodiversity conservation, a priority issue in KDDI's environmental conservation GREEN PLAN. This program has been ongoing since FY2013.

During the 27th session held in October 2024, approximately 100 trees belonging to five species of deciduous broad-leaved trees, namely Katsura, Konara, Hoenoki, Yamaguri, and Yamazakura, were planted. The aim was to turn the mountain into a mixed forest with deciduous broad-leaved trees. The planting was carried out under the guidance of the staff of the Takao Green Club, a nature conservation group that primarily operates around Mt. Takao. Participants found the experience to be meaningful because it provided them with a variety of hands-on activities. It helped them realize the importance of ongoing efforts in cultivating diverse and abundant forests.

Fig. 25 Participants (left) Planting trees (right)



[Mt. Takao forest conservation \(Japanese only\)](#)

■ Biodiversity conservation and education in collaboration with Ashiu research forest of Kyoto University

KDDI and Kyoto University Ashiu Research Forest have signed a comprehensive partnership agreement to help conserve the Ashiu Research Forest's biodiversity and ecosystems, as well as to promote education and research.

The Ashiu Research Forest's invaluable vegetation was severely depleted by foraging by a rising population of Japanese deer beginning in the late 1990s. Not only plants but also insects, fish, soil, and rivers have been affected by the altered ecosystem.

Through this agreement, the two parties are working to conserve the Ashiu Research Forest's ecosystem and biodiversity, conduct educational, research, and public awareness activities related to the forest, and develop and upgrade forest-related activities using DX and communication technologies.

For example, during the COVID-19 pandemic, field education became difficult, so we created a VR video that enables students to experience virgin forests and the damage caused by foraging virtually. This video was not only used for education at universities but also made available to the general public via events and our website for social education and public awareness.

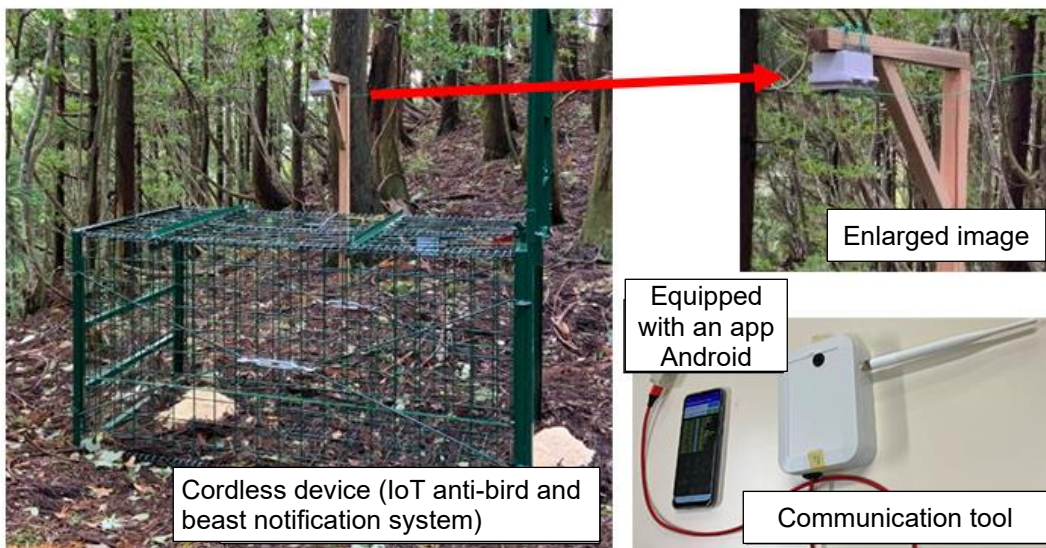
Employee volunteers also install and replace deer barrier fences to protect vegetation and exterminate invasive alien species.

As a demonstration experiment, we also installed cage traps using LPWA (Low Power, Wide Area, a wireless communication technology that enables long-distance data transmission with low energy consumption) and an IoT anti-bird and beast notification system in the mountain forest. Our goal was to capture deer (through licensed capture) in a mountainous forest area that had no cellular phone coverage.

Fig. 26 Employee volunteers (Group photo in front of the completed deer barrier fence, and work to anchor the fence in place)



Fig. 27 IoT anti-bird and beast notification system



[Comprehensive partnership agreement signed with Kyoto University Ashiu Research Forest toward preserving biodiversity \(Japanese only\)](#)

[Forest conservation volunteer work at Kyoto University Ashiu Research Forest \(Japanese only\)](#)

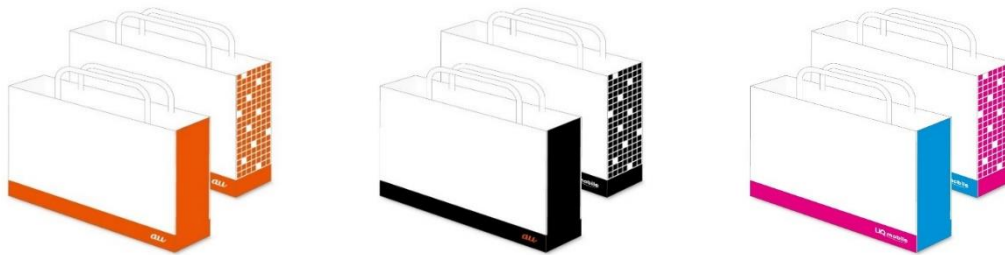
[Ministry of the Environment Biodiversity business contribution project Example of corporate initiative \(Japanese only\)](#)

■ Switch to FSC-certified¹³ plastic-free paper bags

Starting from January 2015, KDDI and Okinawa Cellular Telephone have gradually replaced plastic shopping bags with paper bags at au Shops, au Style, and UQ Spot.

The 5.7 million shopping bags distributed annually at relevant stores are being replaced with FSC-certified paper bags. By using FSC-certified paper made from wood grown in properly managed forests, we will reduce deforestation and conserve the environment. At the same time, we will also switch to using 25% biomass material for rain covers and bags used for carrying catalogs and other items home. We also use eco-friendly inks and FSC paper in some of our printing tools, such as catalogs and in-store tools.

Fig. 28 Designs of paper bags



[Helping to conserve the global environment through the phase-out of plastic handbags at au stores \(Japanese only\)](#)

¹³ Paper made from wood certified by an international initiative that promotes sustainable forestry practices and benefits both producers and consumers. (<https://jp.fsc.org/jp-ja>)

Column - Holding stakeholder dialogue -

KDDI has been actively performing activities to adopt opinions and demands from stakeholders into management and thereby make improvements.

On March 4, 2024, KDDI held a stakeholder dialogue with Mr. Hirotaka Hideshima, an Executive Adviser in The Norinchukin Bank (TNFD taskforce member), concerning KDDI's overall efforts pertaining to nature, etc.

KDDI accepts opinions through dialogues with various stakeholders in a serious manner and attempts to resolve any issues.

Comment from The Norinchukin Bank(March 2024)



I am very grateful to be given this opportunity to provide some comments through the stakeholder dialogue.

For this dialogue, I studied KDDI's policy, activities and disclosures more closely and appreciated that KDDI had been carrying out various advanced practices. I feel that KDDI's efforts to lead Japan and various sectors, such as the issuance of the TNFD report and registration as the TNFD Early Adopter, are superb.

At the World Economic Forum Meeting held in Davos in January this year, 320 companies were announced as Early Adopters. Of that number, 80 were Japanese companies, including KDDI, and Japan was the country with most companies registered as Early Adopters. I think Japanese companies are aware that they fell behind in the actions toward climate change. Japanese companies should work hard to lead this field of nature.

From the viewpoint of further improvements in KDDI's efforts, I hope that KDDI lists nature as one of the items of the company's materiality (which is a key issue) and that it will take a broad view in its considerations and efforts. As you understand through this report and various disclosures, many people may ask why KDDI bends its efforts at nature. I think that clarifying and communicating such story explaining why would lead to a broad range of stakeholders to understand KDDI.

Although the TNFD Recommendation has been published, no international agreement equivalent to the 1.5°C target in the climate field has been concluded in the nature field yet. I consider that the methods for analyses and disclosures are thus still at the stage of development globally. However, we should not wait for a best practice to be devised before initiating actions. It is important that we keep our eyes on domestic and international discussions, assess our current positions, and continue activities and practices to improve the current status, even on a partial or trial basis. This attitude will make preparations for discussions about various parallel issues, including a circular economy and human rights in addition to climate and nature, as well as the construction of frameworks, such as disclosures and regulations.

I understand that this is the second update for KDDI's TNFD report. As a common suggestion to every company, the current level should not be considered sufficient and satisfying. There is the need to continue advancing practices and disclosures.

Finally, I understand that KDDI's presence will be strengthened further in the food value chain. Discussions about agendas combining the climate, nature, and food systems continue throughout the world. I hope that KDDI exercises its capabilities in issues concerning food and the agriculture, forestry, and fishing industries, which are closely relevant to nature.

Mr. Hirotaka Hideshima, Counsellor on Global Strategy to President and the Board of Directors, The Norinchukin Bank (TNFD Taskforce member)

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【Issuance History】

- June 2023 : Released a TNFD report referencing the TNFD Beta Framework v0.4
- December 2023 : Released the TNFD report v1, referencing the TNFD Final Recommendations v1.0.
- March 2024 : Released the TNFD report v2, which includes additional verification regarding biodiversity around communication sites and conducted stakeholder dialogues.
- July 2024 : Updated certain parts of the TNFD report v2.1 regarding the "Risk Analysis Results."
- March 2025 : Released the TNFD report v3, adding the results of the scenario analysis conducted as part of the Ministry of the Environment's Nature Disclosure Practice Project.