Nippon Life Nature Finance Approach

2025.8

Nippon Life Insurance Company

Introduction

- Nippon Life has set a priority issue “Passing on indispensable Earth to the future” in the area of “Environment,” which is one of the three key areas under our sustainability management and we have been promoting initiatives in both our business activities and asset management field.

- In terms of climate change in our priority issue, we published a methodology for transition finance (Nippon Life Transition Finance Framework) in June 2024. However, to achieve a sustainable global environment, we also need to address issues related to nature restoration, just like climate change.

- Regarding efforts toward the restoration of nature, although the urgency of action is extremely high, we recognize that they have been more gradual than desired in the world and society as a whole due to its complexity compared to climate change, which has an absolute metric such as GHG emissions.

- Under these circumstances, we believe that indicators to evaluate efforts are important in order to further promote financing for the nature restoration, and we have developed **Nippon Life Nature Finance Approach** which contains practical and simple indicators based on a scientific perspective.

- We developed this Approach as one of the concepts to visualize the direction and impact of efforts toward nature restoration, however, we do not recognize that this is the “final form of the solution.” Rather, we consider it a work in progress that will evolve through ongoing discussions with various stakeholders, including constructive criticism. We hope it will serve as a foundation for active discussions linking corporate activities to nature restoration.

Key Considerations in Developing this Approach

NISSAY

- As nature is highly complex, it is challenging to translate it into concrete actions for practical implementation. Nevertheless, to promote steadily progress in industry and finance sector toward nature restoration, we developed this approach with the following considerations as priorities.

1. Ensure that the contribution of a given financing activity to global goals (e.g., Planetary Boundaries) can be measured quantitatively.

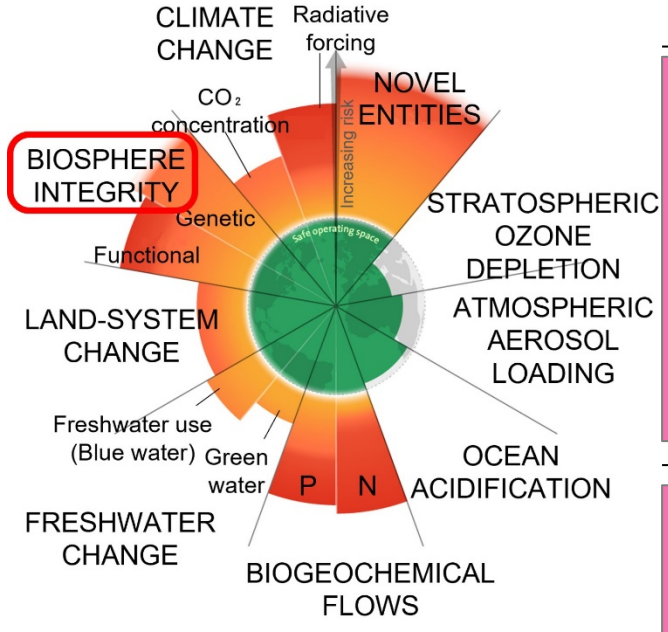
2. To enable companies and financial institutions to take concrete action, the implementation should be as simple as possible while maintaining scientific validity and legitimacy.

3. Design a framework applicable to a wide range of sectors, not only the ones that are directly related to nature-oriented businesses such as agriculture and forestry.

- With these elements incorporated into this Approach, we hope to create significant financial flows by involving as many companies as possible with a clear “vector (=a sense of direction and distance)” toward a nature positive future.

Basic Concept（Planetary Boundaries）

- Using the Planetary Boundaries (PB) that indicate critical thresholds for the Earth, we considered “to what kind of state should nature be improved?” Specifically, we utilized two indicators representing the boundary of Biosphere Integrity: 1) HANPP/NPP for ecosystems, and 2) the number of extinctions for species.
- We promote nature finance for corporate businesses or initiatives that contribute to the ultimate goal of getting our planet back to a safe operating space for humanity.



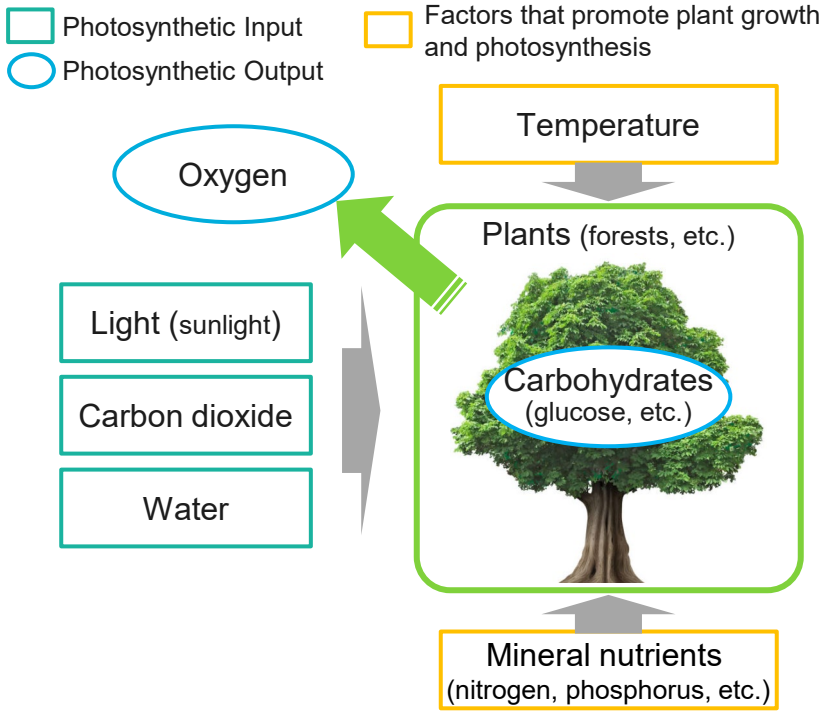
Source: “Planetary Boundaries”, Stockholm Resilience Centre
(Prepared by the company based on the source)

Two Aspects of the “Biosphere”	Global goals (PB)		Nippon Life’s review indicators and perspectives
	Indicators	Target Value	
Functional (=Ecosystem)	• **HANPP** (**H**uman **A**ppropriation of global terrestrial **N**et **P**rimary **P**roduction) = Amount of NPP used by humans →The residual from the overall NPP is energy available to ecosystems	• 5.6 billion tonnes = less than 10% of the preindustrial Holocene century-mean NPP	• Reduce HANPP • Increase NPP (contributing to biodiversity enhancement)
Genetic (=Species)	• **E/MSY** (**E**xtinctions per **M**illion **S**pecies-**Y**ears)	• <10 E/MSY	• Increase population size and number of species (focusing on endangered species)

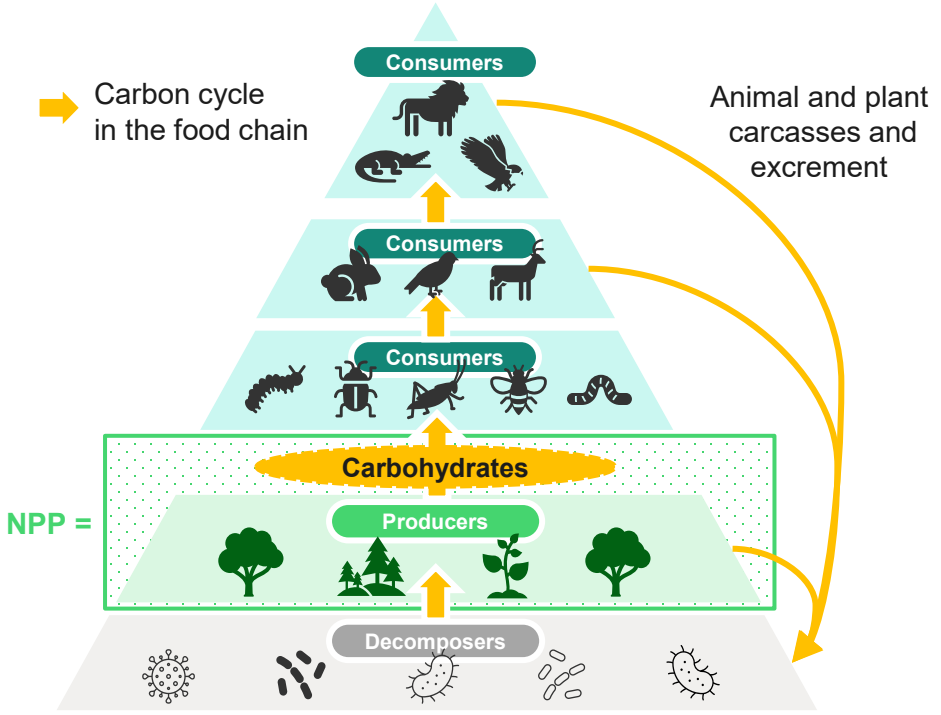
Ref.) What is NPP (Net Primary Production)?

- NPP refers to the carbohydrates produced by plants through photosynthesis, and it represents “ the amount of energy that all biological species use for their survival and growth.”
- The NPP produced by plants plays a central role in nutrient cycling as the starting point of the food chain among all living things, as it is consumed by various animals, large and small.

Production of carbohydrates (=NPP) through photosynthesis



Circulation of carbohydrates through the food chain



- As a life insurance company, we apply NPP, which represents the amount of energy, **a fundamental source of “Life”**, to investment activities. We hope that this initiative will inspire many companies across various sectors to generate new nature-friendly business, energizing the economy.

Concept of our Nature Finance

- By incorporating the concept of reducing HANPP into the evaluation structure, it can cover a wide range of corporate initiatives across various sectors.
- To ensure enhanced biodiversity, an increase in NPP must be accompanied by an increase in species populations.
- Although the nature's realms include ocean, this time, we target land as a first step.

Target Area	Types of Nature Restoration	Projects (Examples)	Perspectives of eligibility assessment: HANPP/NPP	Species	DNSH
Terrestrial Plants (Forest)	Decrease in HANPP	1 **Projects that mitigate or avoid the expansion of agricultural lands and pasture with deforestation** ➢ Agriculture or husbandry that efficiently uses lands (e.g., regenerative agriculture) ➢ Development of alternatives to agricultural or livestock products (e.g., alternative protein)	Avoided HANPP *Evidences are needed for this claim	N/A *Due to difficulty in observing the avoidance of species decrease	No significant negative impact from the environmental and social perspectives
		2 **Projects that mitigate or avoid the development and use of natural resources (minerals, fiber, rubber, water, etc.) with deforestation** ➢ 3R[1] projects or initiatives for relevant natural resources ➢ Development of alternatives to natural resources (e.g., synthetic minerals, etc.)			
		3 **Projects that mitigate or avoid urban infrastructure development with deforestation** ➢ Projects that develop high-rise residential buildings in cities that expand into surrounding forested areas ➢ Development of alternative infrastructure (e.g., alternative transportation networks to roads utilizing air and sea routes, etc.)			
	Increase in NPP	4 **Forest conservation and reforestation (e.g., afforestation, tree thinning)** ※Covers a wide range of profitable forestry projects[2] that are not limited to public or charitable activities	Increased NPP	⊕ Increased population of target species *Put a focus on endangered species	

If a project results in even a small decrease in HANPP, or a small increase both in NPP and species populations, it will qualify for our Nature Finance.

1. 3R= Reduce, Reuse and Recycle, 2. Wood and pulp, carbon credits, beverages from water sources recharged by forests, real estate with natural landscapes, nature-related recreational services ,etc.

Eligibility Assessment ① (Benefits): HANPP/NPP

- By using HANPP as an impact indicator, not only forest conservation and reforestation projects but also various industries and companies can be covered by this Nature Finance.
- If a project leads to even a small decrease in HANPP or a small increase in NPP, it will potentially qualify for this Nature Finance (the criteria for subsequent Eligibility Assessments ② and ③ must also be met to achieve full eligibility).

NPP, HANPP in 2020	Criteria for eligibility	Potentially eligible sectors or business
Total NPP 71.4 billion tonnes	• Even a small increase in NPP is eligible	• Mostly, forest conservation and reforestation
HANPP 16.8 billion tonnes → **HANPP Target 5.6 billion tonnes**	• Even a small reduction in HANPP is eligible toward the target of less than 5.6 billion tonnes HANPP per year	• A wide range of sectors, which have interface with forests through their business operation (including supply chains)

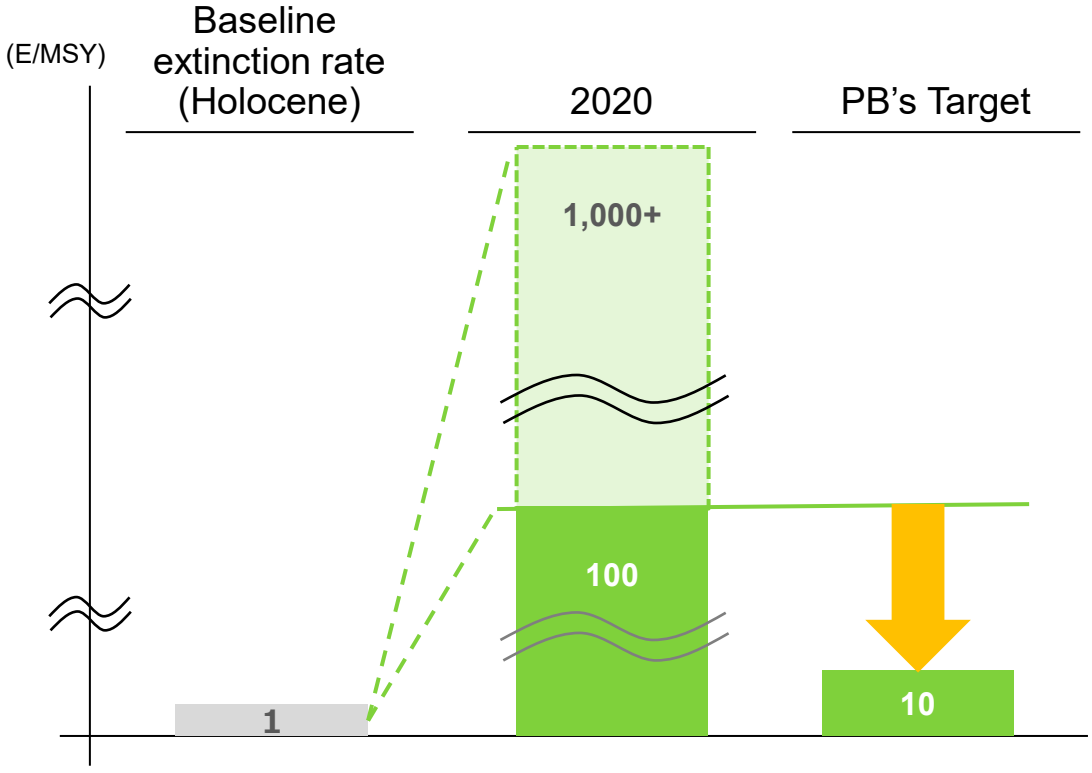
Source: Earth beyond six of nine planetary boundaries | Science Advances

Eligibility Assessment ② (Benefits): Species

➢ For forest projects involving tree planting and/or thinning, we check whether the population of key species (including endangered species) at the site has increased −even slightly− based on actual field survey measurements. This is important to ensure that the increase in NPP seen in the Eligibility Assessment ① is linked to biodiversity enhancement.

Trends in extinction rate per a million species

Today, land use & changes involving deforestation by humans are accelerating the rate of species extinction



Criteria for eligibility

- Even a small increase in the population of listed species compared to before the investment is eligible.
  Especially, attention will be given to endangered species in relation to the PB's target.
- In a project for nature restoration through afforestation, it is necessary to be checked if species in the project site increase their population, not just an increase in NPP.

Eligibility Assessment ③ (Risks): DNSH

- For the eligibility assessment, we cover not only benefits (decrease in HANPP, or increase both in NPP and species), but also risks.
- With the DNSH (Do No Significant Harm) Principles, we check if there is no significant negative impact (e.g., controversy cases) at the corporate level as well as at the business or project level.

How to apply the DNSH Principles

Corporate Level

- Conduct a comprehensive review of a target company's activities to identify any significant controversies in the nature domains
  - Source 1: The company's TNFD disclosure
  - Source 2: Data and reports from ESG risk data providers

Business or Project Level

Environmental

- Review a specific project to check if there are material issues using frameworks such as SBTN's "Pressures on Nature[1]"
  - **e.g. 1)** No issues of waste, soil or water pollution for a real estate project
  - **e.g. 2)** Free from the introduction of invasive alien species for an afforestation project

Social

- Ensure that Indigenous Peoples and Local Communities (IPLCs) are not significantly disadvantaged by the project

1. Five categories of "Land/Water/Sea Use Change", "Resource Use (Exploitation)", "Pollution", "Climate Change", and "Invasive Alien Species"

Measurement and Calculation of NPP/HANPP

- NPP and HANPP are calculated by “Change in forest area” x "NPP per unit area”.
- In the NPP calculation, the information about actual planted areas is used. On the other hand, in the HANPP calculation, it needs to be confirmed with certainty that a decrease in forest areas has been avoided.

Changes in forest areas × **NPP per unit area** = **Changes in NPP or HANPP**

NPP Increase

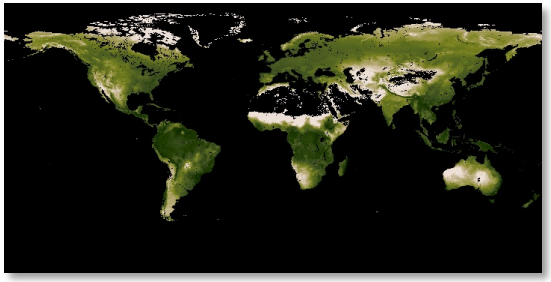
Pre-project	Post-project	Change in Forest area
Vacant lot		+ xxx ha (km^2)

HANPP Avoidance

Pre-business reform (or plan)	Post-business reform	Change in Forest area
Hypothetical Scenario		No Change (hypothetically the “minus” level would have been restored to “zero”)

- NPP is not the same everywhere on earth but varies depending on local vegetation and environment.
  (According to NASA data, the darker the green color is, the greater the NPP is.)

NASA’s NPP data



- Calculate NPP per unit area using a GIS software based on the location of forest affected by the project
  (500m x 500m granularity in NASA data)

○○ tonnes of increase in NPP

XX tonnes of avoidance of NPP decrease

1. NPP data and land cover type data, which are available free of charge.

Measurement of Species

- Check changes in species population (incl. endangered species) at the project site before and after the investment.
- Before investing, a candidate company needs to demonstrate that species populations are expected to increase using a forecast or its forest management plan details.
- As species populations often change due to various factors or take time to increase, it is important to take a stance that pursues positive outcomes over a long period (e.g., 10 years).

Before Investment

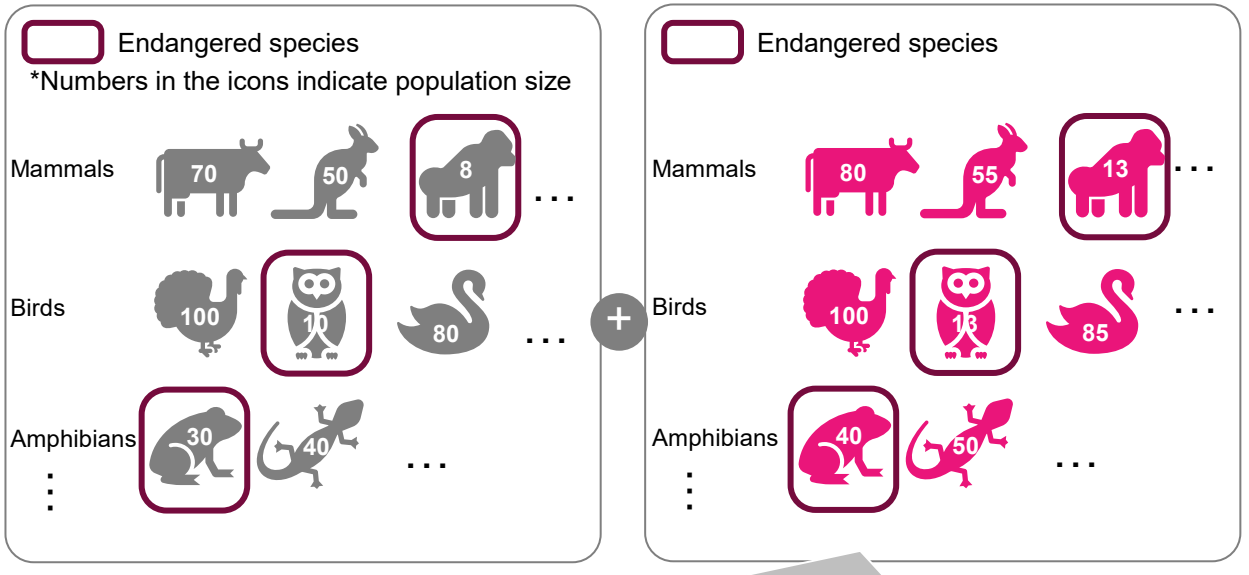
- Listing species to be surveyed
- Setting a baseline by a survey

+

- Setting predicted value

Endangered species

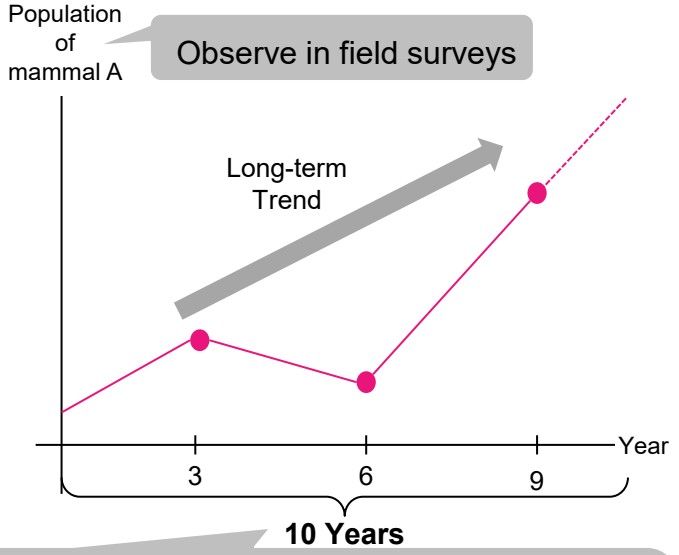
*Numbers in the icons indicate population size



- Estimate using biodiversity big data (AI)
- If difficult, substitute it with the explanation of the forest management plans

After Investment

- Conduct monitoring



- Conduct measurements on a multi-year cycle (around 3 years) rather than annually
- Take a long-term perspective of about 10 years (Need to be patient even if expected outcomes are not observed in the middle phase.)

Conclusion

- The loss of nature and biodiversity is becoming more severe every moment, making it urgent to mobilize financial resources and accelerate efforts toward nature restoration. To that end, we sought to provide a foundation for visualizing the relationship between corporate activities and nature restoration, and to initiate new investment and financing activities .
- We understand that what we present here is by no means final, as the discussions on natural capital, nature positive, and how to measure them are ongoing at the international level. On the other hand, we also humbly believe our Approach is right on target as a general direction.
- We will treat this Approach as “version 1.0”. Through communication with various stakeholders from industry, government, and academia, we will try to continuously improve it into a enhanced version.
- If this Approach leads to “Field-Building” for active discussions across policy, business, finance and academia, and contributes to the development of widely accepted nature finance in the international community, we would be truly delighted.

"Since the adoption of the Kunming-Montreal Global Biodiversity Framework in 2022, efforts by private sector have advanced, and engagement of them has become a norm. Expectations are high for the financial sector, with their cross-sectoral influence. At such a critical juncture, "Nippon Life Nature Finance Approach" is a pioneering initiative aiming for developing indicators for the “State of Nature” ahead of Japan's financial sector. Focusing mainly on NPP, I appreciate that this Approach organizes and presents impact indicators for ecosystems and species with the simplicity necessary for practical application. Further understanding of methodology is awaited. Currently, the IPBES "Business and biodiversity assessment" is underway which will assess the methodologies and their best estimate. I hope that the Approach here will lead to further participation by a wide range of sectors while incorporating discussions from assessments”.

Ryo Kohsaka

Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo

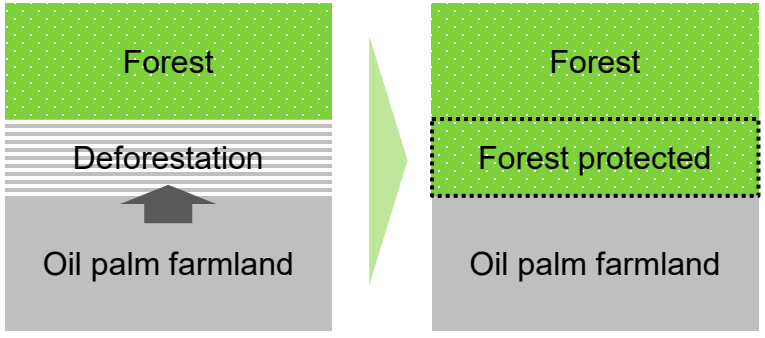
Appendix

Case 1: Increasing productivity of oil palm farmers[1] (HANPP Reduction)

【Case overview】

- Oil palm production, which provides the raw material for palm oil used in a wide range of daily necessities (food, detergents, etc.), has long been discussed as a serious environmental issue due to its role in deforestation. One of the main drivers is the expansion of farmland with deforestation by small-scale farmers with less productivity.
- Food manufacturer A has launched an initiative to provide support to 1,000 small-scale farmers from whom it sources, with the aim of increasing their productivity by an average of 1.5 times. Currently, the target farmers produce 6,000 tonnes of palm oil on 3,000 ha of farmland. Company A's support measures to improve the farmers' productivity can be interpreted as avoiding the expansion of farmland that would have caused additional deforestation.

Change in forest area	×	NPP per unit area	=	Change in HANPP
Before: • Hypothetically, additional expansion of farmland would reduce forest. After: • Avoid deforestation of 1,500ha (=15km ^{2})		• 1,100 tonnes/km^2		• 16,500 tonnes of HANPP reduced



Derived from the average NPP of Indonesian forests (evergreen broadleaf trees) based on NASA data

Eligibility Assessment

Benefit

- Reduce 16,500 tonnes of HANPP per year
- Contribute to keeping global HANPP below 5.6 billion tonnes

DNSH

- Confirm that there are no significant harms such as pollution by this project

Eligible

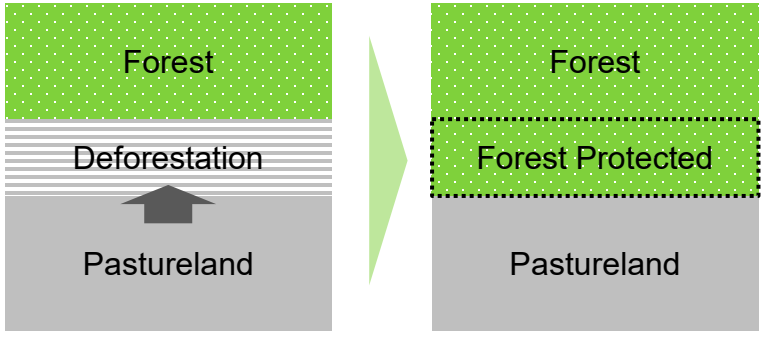
1. Farmers with 100% RSPO certification

Case 2: Manufacturing alternative protein products (HANPP Reduction)

【Case overview】

- Beef, for which demand is increasing due to global population growth and dietary changes, requires vast areas of land to raise cattle on pasture. Therefore, the expansion of new pastureland is sometimes seen as a problematic factor in deforestation.
- Company B is a start-up that primarily produces beef-type meat substitutes (patties, steaks, etc.) using alternative proteins derived from atmospheric carbon. The company produces 400 tonnes of these beef-type meat substitutes annually.
- If producing one ton of beef requires approximately 20 ha of pastureland, Company B's efforts can be interpreted as avoiding pasture expansion that would otherwise have led to up to 8,000 ha of deforestation.

Change in forest area	×	NPP per unit area	=	Change in HANPP
Before: • Hypothetically, additional expansion of pastureland would reduce forest. After: • Avoid deforestation of 8,000ha (=80km^2)		• 1,000 tonnes/km^2		• 80,000 tonnes of HANPP reduced



Derived from the average NPP of forests in major beef cattle-producing countries (United States, China, Brazil, and Argentina) based on NASA data.

Eligibility Assessment

Benefit

- Reduce 80,000 tonnes of HANPP per year
- Contribute to keeping global HANPP below 5.6 billion tonnes

DNSH

- Confirm that there are no significant harms such as pollution and resource use (e.g. water) by this project

Eligible

Case 3: Recycling rare metals (HANPP Reduction)

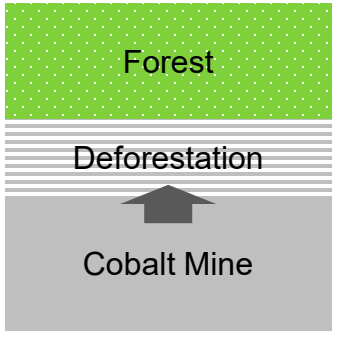
【Case overview】

- Demand for rare metals is increasing across various industries, as exemplified by cobalt which is used as a cathode material in lithium-ion batteries for cell phones, laptops, and electric vehicles. On the other hand, deforestation caused by mine development has been an issue.
- Electronics manufacturer C, which manufactures and sells PCs, promotes a recycling business and collects a total of 15 tonnes of cobalt annually from 300,000 units (approximately 50g of cobalt per unit). Considering that the average deforestation area due to cobalt mining is estimated at 0.01 ha/tonnes, this recycling project can be interpreted as avoiding 0.15 ha of deforestation.

Change in forest area	×	NPP per unit area	=	Change in HANPP

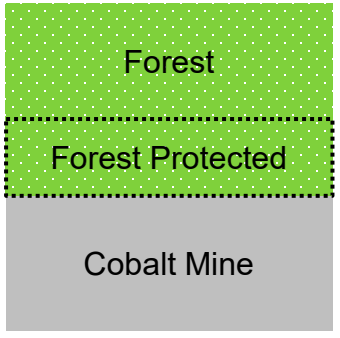
Before

- Hypothetically, additional development of cobalt mine would reduce forest.



After

- Avoid deforestation of 0.15ha (=0.0015km ^{2})



- 1,200 tonnes/km^2

Derived from average NPP of forests in Democratic Republic of the Congo (evergreen broadleaf, deciduous broadleaf, and mixed forests) based on NASA data.

- 1.8 tonnes of HANPP reduced

Eligibility Assessment

Benefit

- Reduce 1.8 tonnes of HANPP per year
- Contribute to keeping global HANPP below 5.6 billion tonnes

DNSH

- Confirm that there are no significant harms such as leakage of chemicals from e-waste

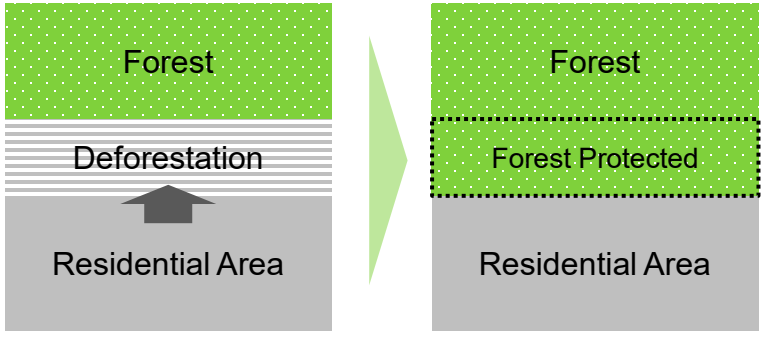
Eligible

Case 4: Developing high-rise multi-family residences (HANPP Reduction)

【Case overview】

- The world's population was 8.2 billion in 2024 and is expected to exceed 10 billion by the 2050s. In particular, population growth in Africa is significant, and the need to provide housing along with employment, food, and other necessities will increase. On the other hand, there is a concern that the development of residential land without order will lead to the destruction of forests and other resources in the vicinity of urban areas.
- Real estate developer D is planning to build a high-rise residential complex for 25,000 people in a major African city. By increasing the height of the buildings to use land more efficiently, only one-fourth of 100 ha of land (the average area needed for 25,000 people) is used. As a result, Company D's efforts can be interpreted as avoiding the development of residential area with deforestation up to 75 ha.

Change in forest area	×	NPP per unit area	=	Change in HANPP
Before: • Hypothetically, additional expansion of residential area would reduce forest. / After: • Avoid deforestation of 75ha (=0.75km ^{2})		• 1,200 tonnes/km^2		• 900 tonnes of HANPP reduced



Derived from average NPP of forests in Nigeria and Democratic Republic of the Congo (selected as representative African countries where rapid population growth is expected) based on NASA data

Eligibility Assessment

Benefit

- Reduce 900 tonnes of HANPP per year
- Contribute to keeping global HANPP below 5.6 billion tonnes

DNSH

- Confirm that there are no significant harms such as pollution (e.g., waste, soil contamination, water pollution) by this project

Eligible

Case 5: Reforestation through a forest fund (NPP Increase)

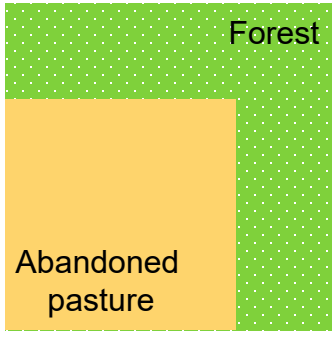
【Case overview】

- As indicated in the GBF Target 3, the “30 by 30” target, which aims to effectively conserve at least 30% of land, freshwater, and marine areas as healthy ecosystems by 2030, is becoming increasingly important.
- Under such circumstances, Forest Fund E, a company engaged in the origination and sale of carbon credits through forest management, carried out a project to plant native tree species on 100 ha of abandoned pastureland in Brazil. With proper management, the trees grew into a mature forest of 100 ha after 8 years.

Change in forest area	×	NPP per unit area	=	Change in NPP

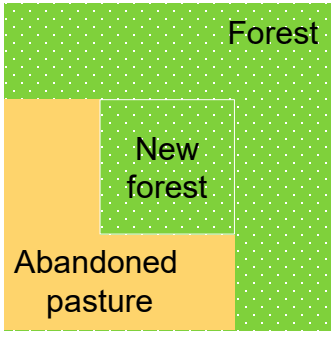
Before

Abandoned pasture spread adjacent to forests



After

Planting on abandoned pasture has resulted in an increase of 100 ha (=1km^2)



- 1,100 tonnes/km^2

Derived from average NPP of Brazilian forests (for evergreen broadleaf trees) based on NASA data

- 1,100 tonnes of NPP increased

Eligibility Assessment

Benefit

- Increase 1,100 tonnes of NPP per year

DNSH

- Confirm that there are no significant harms such as invasive alien species or contamination.

Final eligibility assessment requires confirmation of “increase in species” (Refer to the next page)

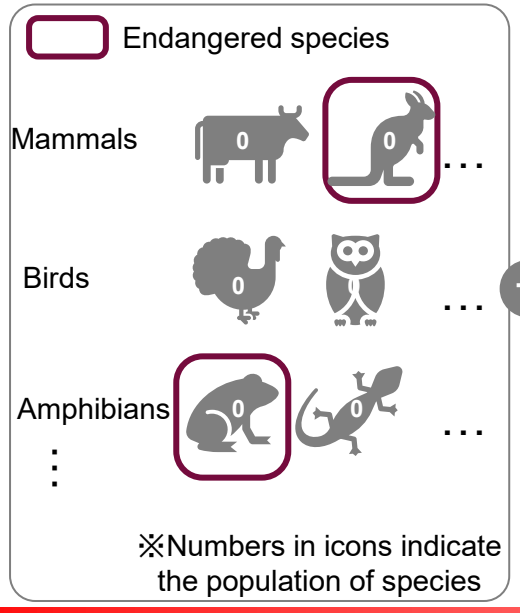
Case 5: Reforestation through a forest fund (Species Increase)

【Case overview (continued)】

- The forest grew steadily through proper management by Forest Fund E. As seen on the previous page, the forest has matured over the 8 years since the start of the project.
- Regarding the species, a total of 15 species of mammals, birds, and amphibians that live in the surrounding forests were selected for continuous observation. Among them, one endangered species was included for both mammals and amphibians. Since the baseline survey was set in the condition of abandoned pasture, the initial population of each species was zero. Based on Company E's forest management plan and biodiversity big data, it was also found that the population of each species is expected to increase.
- During the monitoring phase, the species populations did not increase immediately. There was almost no change at the first field survey (after 3 years), and only a slight increase at the second survey (after 6 years). By the third survey (after 9 years), most species had increased their population. The endangered mammal and amphibian were also identified.

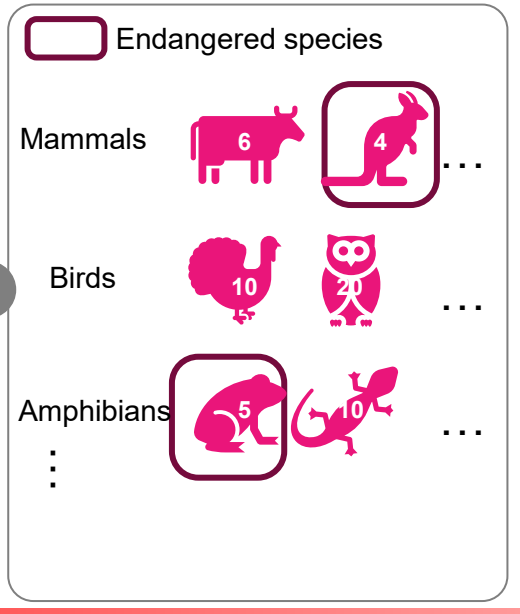
Before Investment

Baseline



※Numbers in icons indicate the population of species

Future Forecast



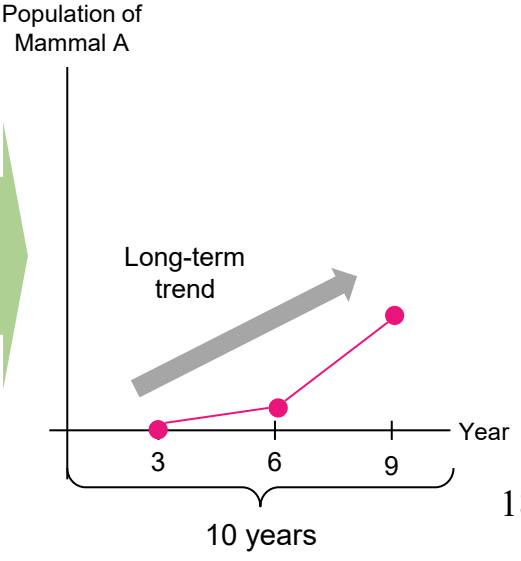
Eligibility Assessment

Together with NPP increase and adherence to DNSH principles

Eligible

After Investment

Monitoring Status

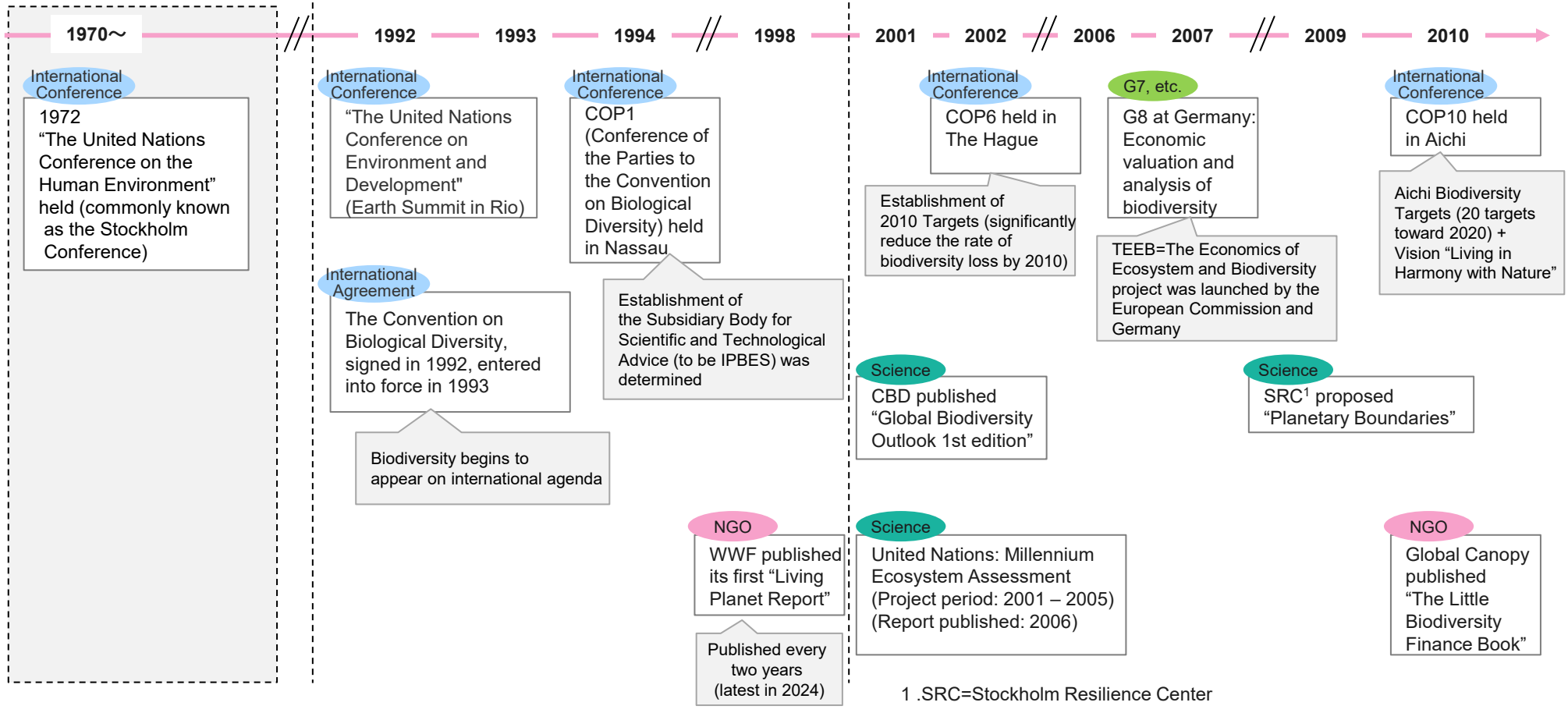


International trends in nature and biodiversity (1/2)

Period when environmental issues were discussed mainly as "human environment"
(e.g., pollution as health-related issues)

New era of international discussions focusing on "biodiversity"

Period for the development of international goals as the prototype of the GBF



1 .SRC=Stockholm Resilience Center

International trends in nature and biodiversity (2/2)

Period of the Aichi Biodiversity Targets
(The launch of various private sector initiatives triggered by international organizations and governments)

Period of the GBF
(Dawn of business and finance involvement)