


Green Infrastructure
Creating Social Infrastructure with Nature

Recommendations for Green Infrastructure Projects and Finances

～Toward the Promotion of Investment in Urban Development and City Planning through Visualization of Economic Benefits～




September 2024

Research Group on the Economic Value of Green Infrastructure in the Marketplace

Ministry of Land, Infrastructure, Transport and Tourism (Secretariat)

Introduction

- Green infrastructure initiatives are being implemented globally as concerns over biodiversity loss and tremendous, frequent natural disasters due to climate change intensify.
- The Green Infrastructure Promotion Strategy 2023, formulated by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) in September 2023, sets out seven perspectives for further promoting the spread of green infrastructure and its full-scale implementation into various sectors. Among these perspectives, this recommendation focuses on the two perspectives, Evaluation and Financing, to stimulate investments in green infrastructure for urban development and city planning.
- To date, there has been an accumulation of green infrastructure practices in urban development and city planning; however, further promotion of investment involves systematic and visible analysis and organization of economic value, certification systems, fund-raising mechanisms, and other elements to foster a common understanding among a wide range of market participants.
- In light of this background, this recommendation(introductory book) has been compiled to promote investment by showing the diverse economic benefits of green infrastructure, not just to pioneering city planning companies and investors but particularly to local city planning companies and financial institutions, and by providing an easy-to-understand introduction to evaluation and certification systems and financing mechanisms for green infrastructure.
- As biodiversity initiatives progress rapidly, this recommendation will be revised accordingly based on its progress.

Introduction (Target and Intended Use of This Document)

○ This document extensively details a wide range of information, including diverse economic benefits derived from green infrastructure and evaluation/certification systems and financing mechanisms. It is intended to be utilized not just by pioneering city planning companies who are pioneering green infrastructure initiatives and investors but also by local city planning companies, financial institutions, and others, depending on their specific interests.

○ Upon promoting green infrastructure, it is expected to be promoted by cooperating with various stakeholders.

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Global and Domestic Trends

Global and Domestic Trends

○ The trend on climate change has been accelerating towards carbon neutral/net zero since the Paris Agreement in 2015. As for the disclosure frameworks, the Taskforce on Climate-Related Financial Disclosures (TCFD) recommended in 2017 the disclosure of four elements (Governance/ Strategy/ Risk management/ Metrics and Targets) on climate-related risks and opportunities. There is also a global trend towards mandatory disclosure of climate change-related information (see Page 6.)

○ Regarding biodiversity, the Kunming-Montreal Biodiversity Framework was adopted during COP15 (in December 2022), and the Nature Positive initiatives have become a global trend. As the so-called "SDGs Wedding Cake Model" shows, economic and social activities are built on natural capital, and it is now globally accepted that any depreciation in natural capital will have a negative effect on these activities (see Pages 6 and 7.)

○ Regarding the disclosure framework, the Taskforce on Nature-related Financial Disclosures (TNFD) published the final version of its recommendations in September 2023, it recommends disclosure of 14 items, including modifications and additions as nature-specific items, aligned with the TCFD's four pillars. Similar to climate change, an era is approaching in which companies are strongly required to take measures to preserve natural capital and biodiversity, and the business sectors' activities in this area are also accelerating (see Pages 8 and 9.)

○ In response to this global trend, Japan has also formulated various laws, strategies, plans, and other policies to realize nature positive, including the *National Biodiversity Strategy and Action Plan 2023-2030* (March 2023, approved by the Cabinet). Regarding disclosure, an increasing number of companies implements not only TNFD-recommended but also TCFD-recommended disclosures consistent with the general requirements and recommendations for disclosure, explaining the results of their deliberations based on the LEAP approach. (Pages 8,9,10)

*At the World Economic Forum Annual Meeting 2024 (commonly known as the Davos Conference), Japanese companies made up 80 of the 320 early adopters of the TNFD disclosure recommendations, the highest number by country. Regionally, Asia ranked second only to Europe in the number of registration.

◯ To achieve nature positive, the green infrastructure initiatives are expected as they utilize the diverse benefits of the natural environment for social capital development and city planning. Globally, these initiatives are being actively promoted as Nature-based Solutions (NbS) (see Pages 11 and 12.)

- The U.S. and the EU makes efforts to mobilize private financing for NbS (green infrastructure) by utilizing a blended finance.
- The UK is making BNG mandatory under the Biodiversity Net Gain (BNG) to attract private investment through the introduction of biodiversity credits and subsidies.
- Singapore is using subsidies to help expand its sustainable finance market and provide private capital for green projects.

[Green infrastructure investment market]

○ The United Nations is calling for investment in NbS to be tripled from the current levels (approximately $133 billion, or approx. 20 trillion yen) by 2030 and quadrupled by 2050. It is predicted that investment in green infrastructure will increase globally in the future (see page 13).

○ According to an estimate by the Ministry of the Environment based on the World Economic Forum (2020), the scale of business opportunities created by the transition to a nature-positive economy in Japan is estimated to be approximately 47 trillion yen by 2030. Furthermore, according to the "Report on Market Size, Employment Size, etc. of the Environmental Industry (Ministry of the Environment)," the size of Japan's environmental market related to natural environment conservation is estimated to be approximately 8.3 trillion yen, and the market size is expected to continue to expand in the future (see page 14).

Global Trends Towards Decarbonization and Biodiversity (Coexistence with Nature)

○ Nature positive initiatives are now becoming a global trend alongside decarbonization, following the adoption of the Kunming-Montreal Biodiversity Framework (December 2022) and the publication of the final TNFD Recommendations (September 2023).

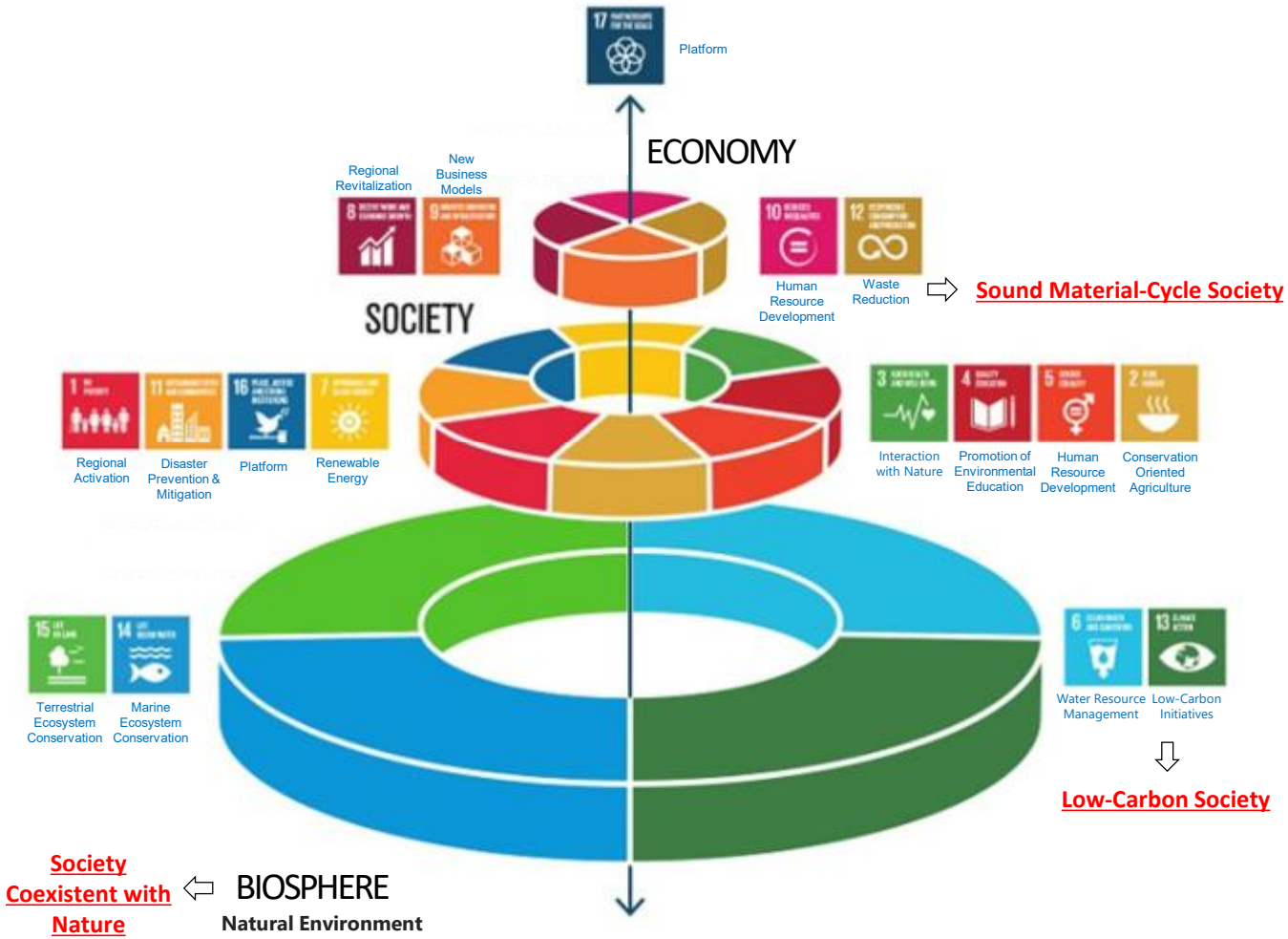
Decarbonization		Biodiversity (Coexistence with Nature)	
1992	● The United Nations Framework Convention on Climate Change was adopted [at the Rio Summit] .	1992	● The Convention on Biological Diversity was adopted [at the Rio Summit].
1997 1999	● The 3rd Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) ✓ *The Kyoto Protocol* was adopted. ○ *Act on Promotion of Global Warming Countermeasures* was enforced.	1995	○ The *National Biodiversity Strategy of Japan* was decided (by the Environment Agency).
		2008 2010 2012	○ *Basic Act on Biodiversity* was enacted. ○ *National Biodiversity Strategy 2010* was formulated (approved by the Cabinet of Japan) ● The 10th Conference of the Parties to the Convention on Biological Diversity [COP10] ✓ *The Aichi Biodiversity Targets* were adopted. ○ *National Biodiversity Strategy 2012-2020* was formulated (approved by the Cabinet of Japan).
2015 2016 2017 2019 2020	● The 21st Conference of the Parties to the United Nations Framework Convention on Climate Change [COP21] ✓ **Paris Agreement was adopted.** ● Taskforce on Climate-related Financial Disclosures (TCFD) was launched. ○ *Global Warming Countermeasures Plan* was formulated (approved by the Cabinet of Japan). ✓ **GHG reduction target: 26% down by fiscal 2030 (compared to fiscal 2013)** ● Recommendations by the TCFD (Final Report) ○ *The Long-term Growth Strategy under the Paris Agreement* was formulated (approved by the Cabinet of Japan). ○ Prime Minister's Policy Speech: *Achieving Carbon Neutrality and Decarbonized Society by 2050*.		
2021	○ *The Plan for Global Warming Countermeasures, the Basic Energy Plan, the Long-term Growth Strategy under the Paris Agreement*, and other related documents were amended (approved by the Cabinet of Japan). ✓ **GHG reduction target: 46% reduction by fiscal 2030 (compared to Fiscal 2013)** ○ *Green Growth Strategy for Carbon Neutrality by 2050* was formulated (In cooperation with relevant ministries and agencies). ● The 26th Conference of the Parties to the United Nations Framework Convention on Climate Change [COP26] ✓ **Glasgow Climate Pact stated that it aims to limit global warming to 1.5 degrees above pre-industrial levels.**	2021	● *Taskforce on Nature-related Financial Disclosures* (TNFD) was established. ● G7 committed to becoming "Nature Positive" by 2030 in the G7 Nature 2030 Compact.
2022	○ TCFD disclosure became mandatory (for companies listed on the Japan's Prime Market).	2022	● The 15th Conference of the Parties to the Convention on Biological Diversity [COP15] ✓ **The Kunming-Montreal Biodiversity Framework was adopted.** ○ Japan's *30by30 Roadmap* was published.
2023	○ *GX Promotion Act* was enforced. ○ *GX Promotion Strategy* was enforced (approved by the Cabinet of Japan)	2023 2024	○ National Biodiversity Strategy 2023-2030 was formulated (approved by the Cabinet of Japan) ✓**2030 Mission - Nature Positive: Regenerating Nature**. ○ *Green Infrastructure Promotion Strategy 2023* was formulated (complete revision). ● *The final TNFD Recommendations v1.0* was published. ○ *Transition Strategies toward Nature Positive Economy* was formulated. ○ *Act on Promoting Activities to Enhance Regional Biodiversity* was enacted. ○ *Act Partially Amending the Urban Green Space Act* was enacted.

Legends: ●Overseas Trends / ○ Domestic Trends

Environment and Natural Capital as Foundation of Socio-Economic Activities

- The recent emergence of environmental crises has led to a global recognition that economic and social activities are founded on natural capital (the environment) and that damage to natural capital negatively affects economic and social activities.
- The environment and the economy are no longer in conflict or contradiction; instead, the environment, which is a base, and the economy, which is founded on it, should be in the process of synchronization and co-evolution, so to speak.

SDGs Wedding Cake Model



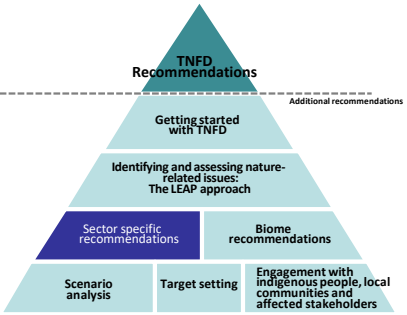
Source: Ministry of the Environment (2024), The Sixth Basic Environment Plan (2024), Outline of the Sixth Basic Environment Plan, Regional Development Starting from Forests, Villages, Rivers, and Seas: A Guide to Building a Regional Circulatory and Coexistence Zone, modified by the Ministry of the Environment to the for Stockholm Resilience Centre's illustration (Credit: Azote for Stockholm Resilience Centre, Stockholm University CC BY-ND 3.0.)

The Final TNFD Recommendations

○ In September 2023, the final recommendations of the TNFD (Taskforce on Nature-related Financial Disclosures) showing a framework for companies and financial institutions around the world to assess and disclose risks and opportunities related to natural capital and biodiversity were compiled. Similar to a decarbonization, it has now entered into an era when companies are strongly required to make efforts towards a framework to preserve natural capital and biodiversity.

< TNFD Disclosure Metrics >

✓ The TNFD published a discussion paper on proposed sector disclosure metrics in December 2023.
✓ While sector-specific recommendations have already been published for several sectors, this recommendation presents disclosure metrics for those engaged in infrastructure and real estate,. These metrics are expected to be finalized after a public consultation period ending on March 29, 2024 (metrics other than the sector core disclosure metrics are listed in the reference materials).



Structure of TNFD Disclosure Metrics

	Dependance and Impact	Risks and Opportunities
Core global metrics for disclosure	Comply or explain with the reason for non-compliance	
Core sector metrics for disclosure	Strongly recommended Comply or explain, once final	
Additional measurement metrics	Recommended for disclosure.	

This document includes:
- Sector-specific recommendations for all metrics
- Proposed metrics for each sector

Core Sector Metrics for Disclosure

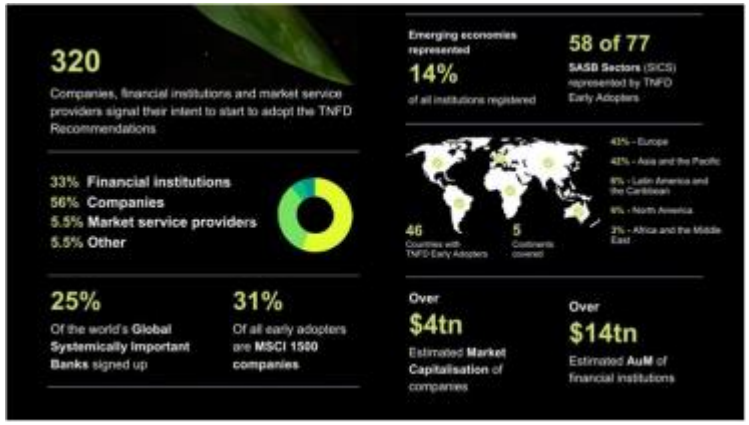
Metrics	Core sector metrics for disclosure
Changes in ecosystem connectivity	Type, width (e.g., lanes/track (m)) and length by surface (km) of linear infrastructure (e.g., railways, roads, fences) built in extra-urban areas
Changes in ecosystem connectivity	Number of ecosystem fragmentation mitigation measures constructed for linear infrastructure (e.g., animal crossing points)
Pollutant runoff	A national or company's discharge classification method or discharge of diesel, paint, solvents and toxic chemicals by the affected ecosystem type
Amount of high-risk natural resources procured from land/marine/freshwater	Percentage of timbers procured from endangered species

Source: TNFD, Discussion paper on proposed sector disclosure metrics (2024), Taskforce on Nature-related Financial Disclosures (TNFD) Recommendations (2023).

< TNFD Early Adopter >

✓ At the World Economic Forum Annual Meeting 2024 (commonly known as the Davos Conference), Japanese companies made up 80 of the 320 early adopters of the TNFD disclosure recommendations, the highest in the world by country. Regionally, Asia ranked second only to Europe in the number of registration. Among the early adopters, 57 companies plan to make integrated TNFD disclosures in line with financial statements in fiscal 2024, and 23 companies plan to make them in fiscal 2025.

TNFD Early Adopter Statistics



Number of Registered Companies by Country

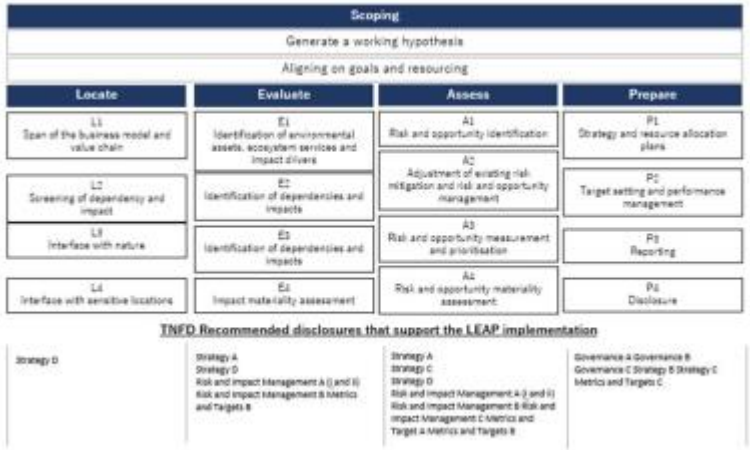
No.	Country/Region	Number of companies
1	Japan	80
2	UK	46
3	France	19
4	USA	14
4	Taiwan	14

Source: TNFD Secretariat website , https://tnfd.global/320-companies-and-financial-institutions-to-start-tnfd-nature-related-corporate-reporting/
Source: TNFD Consultation Group Japan Secretariat press release, 80 Japanese companies register as 'TNFD Early Adopters' working to disclose nature-related financial information.

< LEAP Approach>

✓ In the LEAP approach, preparations for TNFD disclosure are made through scoping, following the four steps - Locate, Evaluate, Assess, and Prepare.

Scoping → Locate → Evaluate → Assess → Prepare



Source: Ministry of the Environment, Explanation of LEAP/TNFD (2023)

Domestic Activities Following the final TNFD Recommendations

○ Following the final TNFD recommendations, business entities are increasingly disclosing their TNFD information in Japan. Some of them disclose TNFD information in combination with the TCFD information. For example, in the real estate sector, Tokyu Fudosan Holdings Corporation, a registered "TNFD Early Adopter“, published a report in line with the final TNFD recommendations (January 2024).

<Examples of TNFD disclosure>

TNFD Report - Tokyu Fudosan Holdings Group‘s Contribution to Nature Positive - (Tokyu Fudosan Holdings Corporation)

<Report Overview>

- After evaluating the importance of the impacts and dependencies on nature of the Group's overall business, priority locations were selected from the perspective of the importance of biodiversity and others.
- The subject of this analysis was urban development projects in the greater Shibuya area, which is a priority location due to its particularly large scale and significant impact on nature. After conducting a quantitative assessment of the impact on biodiversity, the project organized risks and opportunities as well as measurement indicators and targets.

Source: 2nd Workshop, Tokyu Fudosan Holdings Corporation, [TNFD Report] (2024), provided by Megumi Matsumoto of Tokyu Land Corporation.

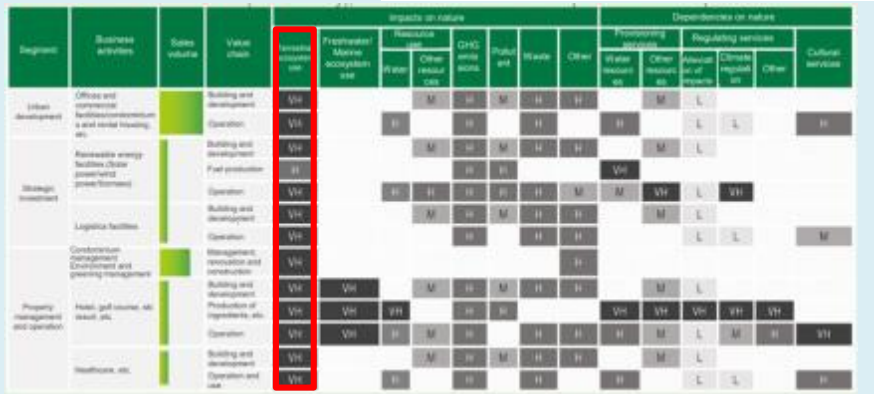
<TNFD Recommendations and Information disclosed in the report>

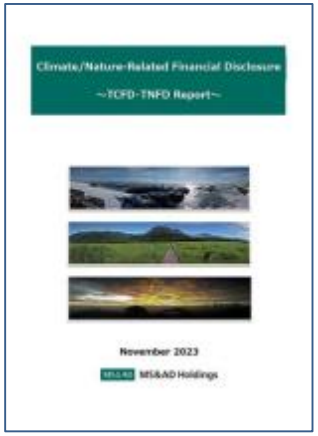
TNFD Recommended Disclosure	TNFD Recommended Items for Disclosure	Information disclosed recently (TNDF disclosure at the Company)
Governance	• **Governance structure** for nature-related dependencies, impacts, risks and opportunities that includes oversight structure for Board of Directors, and roles of management • Stakeholder Engagement	• Governance structure for the Company's nature-related issues • Human rights policy and stakeholder engagement
Strategy	• **Identified nature-related dependencies/impacts and risks/opportunities** • Effects of risks and opportunities on businesses, strategy and financial plans • Resilience of strategy with scenarios taken into consideration • **Priority locations in organization**	• **Overview of nature-related dependencies and impacts in Group overall** • **Priority locations at sites directly operated by the Company** • **Nature-related dependencies/impacts and risks/opportunities examined for businesses in the "greater Shibuya area"* set forth as a priority locations** • Nature-related risks and opportunities envisioned at current point in time, including those in other businesses
Risk & Impact Management	• **Process for identifying, evaluating and managing** nature-related dependencies, impacts, risks and opportunities and actions taken in light of management process • Integration of above process with group risk management process	• Relationship between process of Group identifying, evaluating and managing nature-related dependencies, impacts, risks and opportunities and group-wide risk management • **Concrete initiatives for responding to dependencies/impacts and risks/opportunities**
Metrics & targets	**Measured metrics and targets** for evaluating and managing nature-related dependencies, impacts, risks and opportunities and **performance relative to targets**	• Metrics and targets of Group

*: The greater Shibuya area refers to the area within a 2.5 km radius from Shibuya Station as set forth in the Group's community development strategy. In the Report, the greater Shibuya area has been set forth as a priority area.

<Summary of dependencies and impacts>

VH Very High　H High　M Medium　L Low



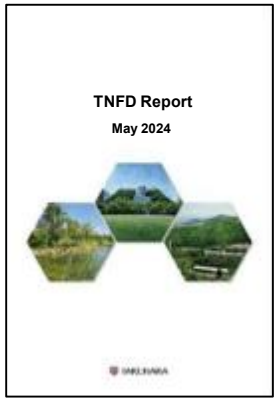


Climate and Nature-Related Financial Disclosures ~TCFD・TNFD Report~
(MS&AD Holdings)

NEC TNFD Report 2023
(NEC Corporation)

Kyuden Group
TNFD Report 2023
(Kyushu Electric Power Co., Inc.)

SMBC Group TNFD Report 2023
(Sumitomo Mitsui Financial Group, Inc.)



TNFD Report
(Takenaka Corporation)

Environmental Report 2023
(Kirin Holdings Company, Limited)

Business Risks and Opportunities on Biodiversity
- TNFD case study with Location analysis -
(Kao Corporation, Accenture Japan Ltd.)

Domestic Trends of Nature Positive (Government/MLIT)

[Government-Wide Efforts]

National Biodiversity Strategy and Action Plan 2023-2030

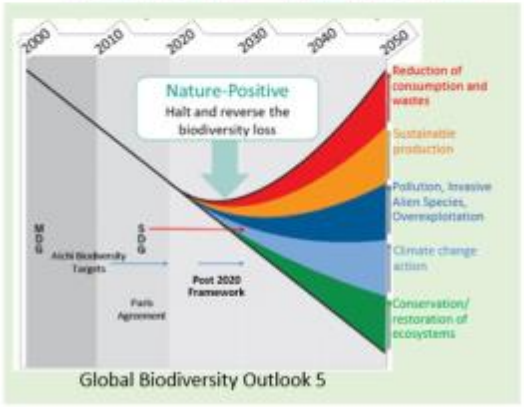
✓ In March 2023, Japan's National Biodiversity Strategy and Action Plan 2023-2030 was approved by the Cabinet, setting "Achieving nature positivity (nature regeneration)" as the goal for 2030.

Act on Promoting Activities to Enhance Regional Biodiversity

✓ In April 2024, the Act on Promoting Activities to Enhance Regional Biodiversity was enacted, which stipulates the formulation of basic guidelines by the competent minister and the creation of a certification system for plans related to such activities in order to promote activities by companies and other entities to enhance biodiversity in local areas. In addition, starting from fiscal year 2023, the Ministry of the Environment has been certifying "areas where biodiversity conservation is being promoted through private and other initiatives" as "nature coexistence sites."

Transition Strategies toward Nature Positive Economy

✓ The "Transition Strategies toward Nature Positive Economy" was formulated in March 2024, outlining three points: 1) specific examples of corporate value creation processes and business opportunities, 2) elements that companies should keep in mind when transitioning to nature-positive management, and 3) backing from government policies. It aims to enable behavioral change in individual companies and realize a transition to a nature-positive economy as a whole.



Global Biodiversity Outlook 5

(Reference)

The Sixth Basic Environment Plan

✓ In May 2024, the 6th Basic Environment Plan was approved by the Cabinet, which clearly specifies the purpose as "environmental conservation and the "well-being/quality of life" of each individual citizen now and future through it." As a direction for development, it calls for large-scale investment in natural capital that serves as a foundation and in the capital and system that support it, adding high value to the entire economy utilizing "environmental value," and other measures.

[MLIT's Initiatives]

Act Partially Amending the Urban Green Space Act and Related Act

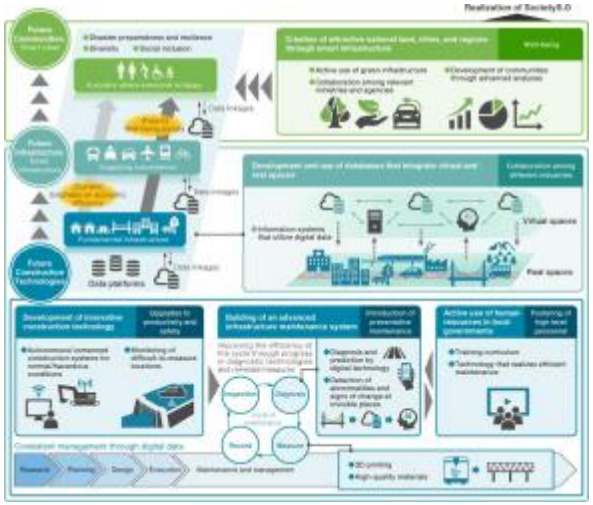
✓ In May 2024, Act Partially Amending the Urban Green Space Act and Related Laws was enacted to create a mechanism to support the efforts of local governments and private businesses to secure the quantity and quality of green spaces in cities, strongly promote the introduction of renewable energy and efficient energy use and realize a good urban environment to solve issues such as climate change countermeasures, preserving biodiversity, and improving well-being.

Basic Land Policy

✓ The Basic Land Policy was approved by the Cabinet in June 2024, which clearly states that the focus will shift away from land policies based on residential development and instead take a broad, long-term perspective to comprehensively promote policies with the goal of "achieving sustainable land use and management," which will promote land use conversion and proper management of the country's limited land area, and also positions the comprehensive and systematic promotion of green infrastructure, etc.

Smart Infrastructure Management System (SIP)

✓ Research into green infrastructure is being conducted as a sub-theme of the third phase of the Smart Infrastructure Management System, with the aim of incorporating the functions of natural capital into the social capital management system through the use of digital transformation, etc., to promote the development of social capital that provides diverse benefits, as well as to create an economic and social system that encourages the expansion of not only public investment but also private investment.



(Reference)

Nature-positive Initiatives in Rivers and River Basins

✓ At the Ministry of Land, Infrastructure, Transport and Tourism Green Society Realization Promotion Headquarters held in May 2024, future approaches to river development were outlined, including the position of quantitative goals for river environments in river development plans and certification of environmental activities in river basins by private companies and others.

“Green Infrastructure Promotion Strategy 2023”
(published by Ministry of Land, Infrastructure, Transport and Tourism in September 2023)

◆Green Infrastructure Promotion Strategy 2023

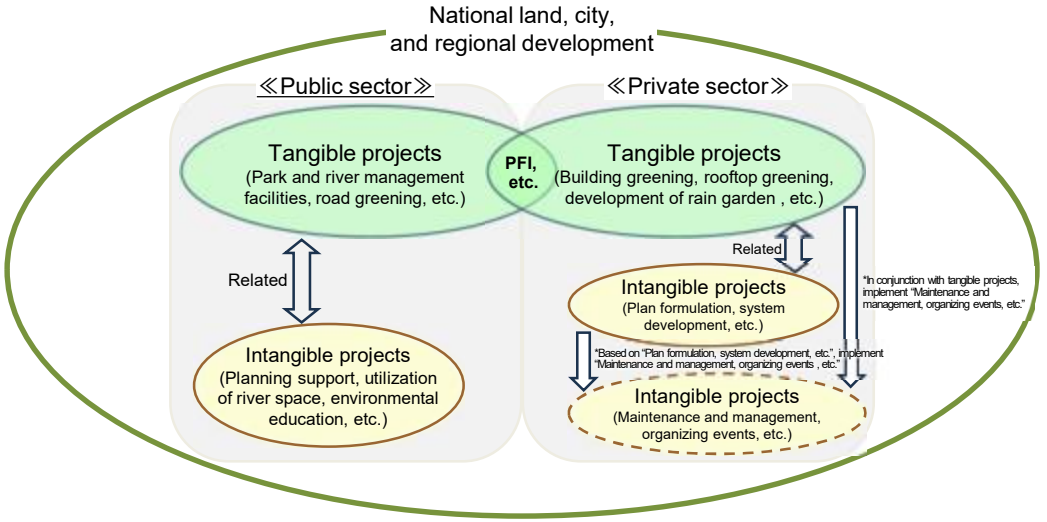
In September 2023, the Ministry of Land, Infrastructure, Transport and Tourism released its “Green Infrastructure Promotion Strategy 2023,” detailing its vision and initiatives for promoting and implementing green infrastructure across various sectors, with collaborative efforts from both public and private sectors.

Definition of green infrastructure
(Green Infrastructure Promotion Strategy 2023)

||

Green Infrastructure is a nature-based initiative to create sustainable and attractive national land, cities, and regions in both tangible and intangible aspects, such as social infrastructure development and land use.

- Green infrastructure extends beyond public projects, encompassing initiatives that private companies, organizations, and citizens can all participate in.
- Public initiatives include the development of urban parks and green breakwaters as tangible projects and formulating various plans related to greenery as intangible projects. Private sector initiatives encompass on-site greening in private urban development as tangible projects and environmental education led by the private sector as intangible projects.
- Green infrastructure offers benefits beyond individual gains, such as enhancing societal sustainability, making it crucial to promote initiatives through public-private partnerships.



Note: The above “tangible” and “intangible” projects are limited to those that utilize (or are intended to utilize) the diverse functions of the natural environment.

～ Tangible projects that fall under green infrastructure

～ Intangible projects that fall under green infrastructure

Initiatives to Promote NbS in Various Countries

○ Green infrastructure initiatives are being promoted globally as a form of nature-based solutions.
○ For example, in the US, EU, UK, and Singapore, various budgetary measures, financial support, and regulatory and other measures are being implemented based on plans and policies formulated by the governments to promote NbS.

	US	EU	UK	Singapore
Strategy	✓ A roadmap has been developed for green infrastructure utilization by announcing policies for updating policies and securing financing. ✓ IIJA and IIRA budgets are utilized to promote investments for NbS.	✓ Recognizing NbS as the key to achieving the European Green Deal, case studies are collected, and financing methods are considered. ✓ The European Investment Bank has implemented pilot loans for NbS.	✓ UK expressed a strong commitment to investing in green infrastructure at COP26. ✓ Biodiversity Net Gain (BNG) has become mandatory for development projects, and support tools are also provided.	✓ The Singapore Government announced a ten-year plan and works on environmental policies under multiagency collaboration. ✓ The "City in Nature" vision was launched as a key area to implement its green plan and other measures.
System	✓ In the roadmap, focusing on key strategic areas, the Federal government policies and recommendations are updated to encourage consideration and adoption of NbS by government and private sector.	✓ The European Commission and the European Investment Bank are implementing the Natural Capital Financing Facility (NCFF) to provide loans to green infrastructure projects and encourage private financing.	✓ Biodiversity Net Positive by 2030 has been set out. ✓ The UK Government announced in 2023 that developers must deliver a BNG of 10%.	✓ According to the *Singapore Green Plan 2030*, specific goals were set, for example, tree planting and green roofs.
Budget/ Taxation	✓ The scale of the investments for the IIJA's climate change measures are estimated to exceed USD150 billion. ✓ The IRA allocates USD391 billion on climate change provisions over next 10 years.	✓ The budget of the EU-funded "LIFE" program is utilized. ✓ The NCFF will contribute up to EUR125 million and guarantees for loans.	✓ In preparation for implementing mandatory BNG requirements in small-scale development projects in 2024, GBP16 million has been allocated for capacity-building and other support for local authorities in the UK.	✓ A certain percentage of the national budget has been continuously allocated to green policies. ✓ In the 2024 budget, SGD178.4 million for development expenditures has been estimated for the National Parks Board (Npark)
How to mobilize private financing	✓ NbS Roadmap introduces combining private and federal government funds to support grant programs. ✓ The US positions the blended finance as an innovative procurement method for NbS.	✓ The European Investment Bank's NCFF provides financial support to the green infrastructure to attract private financing.	✓ Under the Biodiversity Net Gain (BNG) Policy, the BNG is mandated and biodiversity credits are introduced. ✓ Private investments are attracted through subsidy programs.	✓ Subsidies have been introduced to promote sustainable financing and encourage the market expansion for financing green projects.

Global Trends in NbS Investment

○ The United Nations has called for investment in Nature-based Solutions (NbS) to triple the current levels (approximately USD133 billion or JPY20 trillion) by 2030 and quadruple by 2050. In the future, investments in green infrastructure are expected to increase globally.
○ In Europe, the percentage of green investment in land and real estate (investment dedicated to solving environmental problems/not limited to green infrastructure) is significant, but the proportion in Japan is relatively small.

Trends in Green Infrastructure Investment

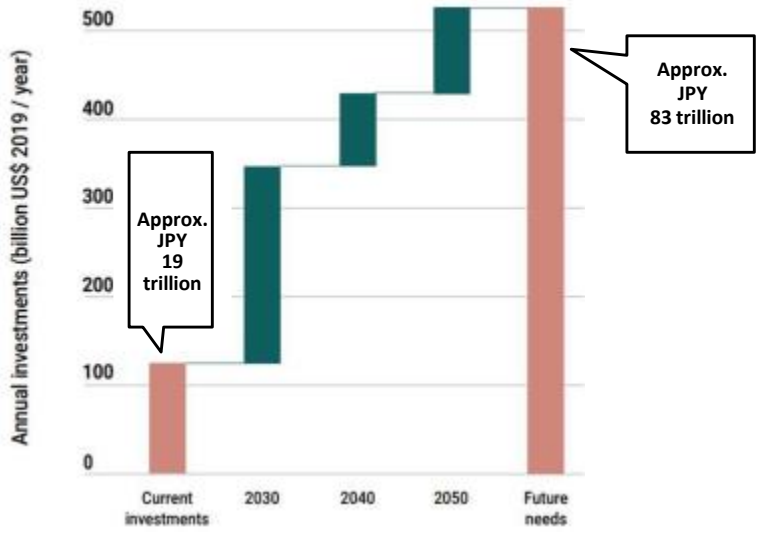
✓ "Public and private investment in green urban infrastructure such as parks, forests and rooftop gardens is expected to increase from US$606 billion (approx. JPY90 trillion) globally in 2022 to US$978 billion (approx. JPY145 trillion) in 2030, according to ABI Research.“
✓ “The analyst firm forecast the average percentage of global urban areas covered by green infrastructure will increase from 15 percent in 2020 to 18.2 percent in 2030."

(Source: Cities Today online article, December 13, 2022)

✓ "On Friday May 19, 2023, the New York City Department of Environmental Protection held a press conference to announce modifications to its Green Infrastructure Program, the product of a 2012 Consent Order agreed to between New York City and New York State to reduce citywide combined sewer overflows (known as “CSOs”)"
✓ "The 2023 Citywide Green Infrastructure Modification requires NYCDEP to expand an additional $2 billion on green infrastructure to reduce CSOs by 1.67 billion gallons by 2040 on a citywide basis"

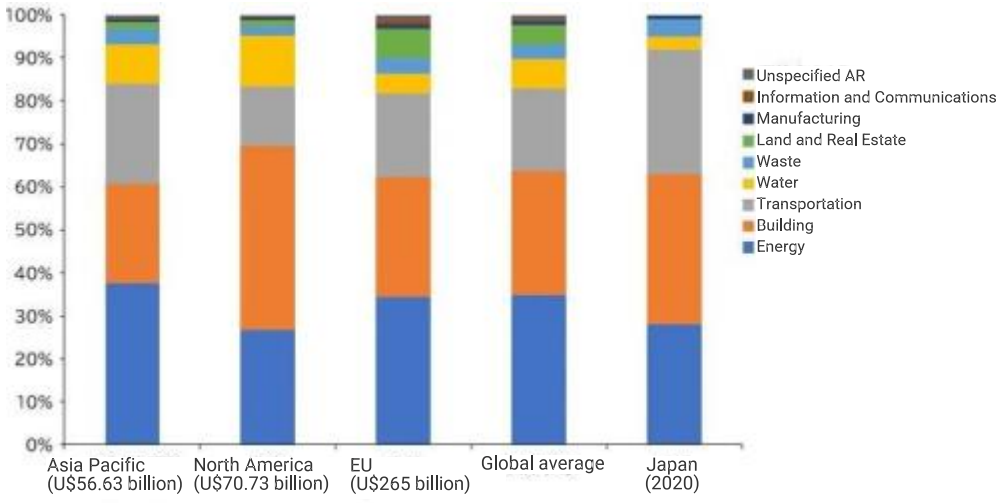
(Source: Riverkeeper online article, May 23, 2023)

Future Investment Needs for NbS



[Source: UNEP (2021), *State of Finance for Nature 2021*]

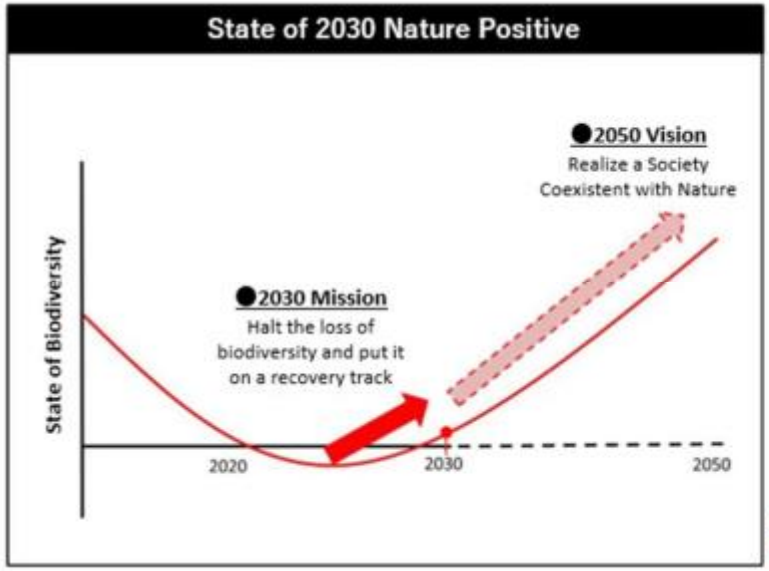
International Comparison of Green Investment in the Land And Real Estate Sector



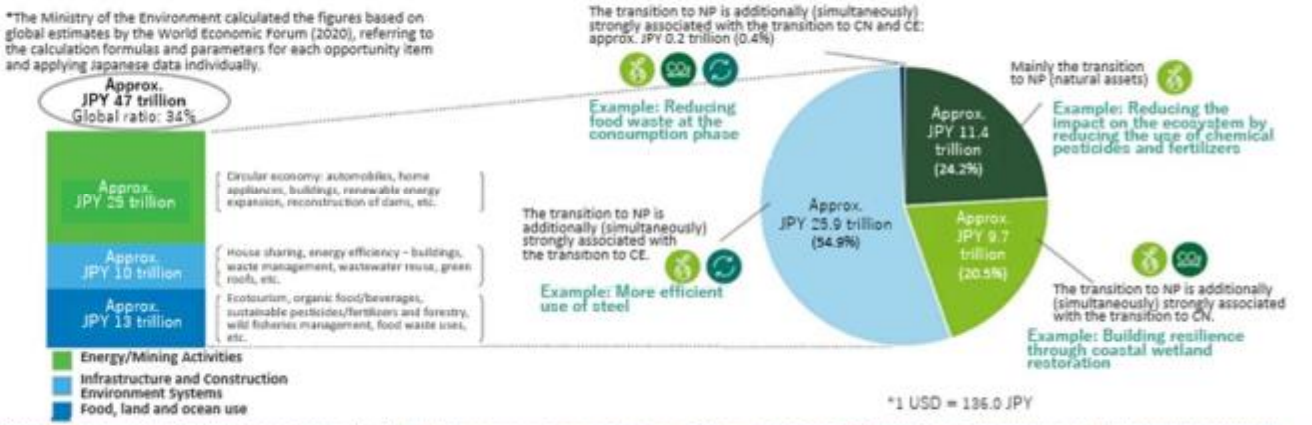
[Source: Mitsubishi Research Institute website, "ESG investment trends in Japan and around the world"]

Market Size of Nature Positive Economy in Japan

○ The "Transition Strategies toward Nature Positive Economy" (published in March 2024 by the Ministry of the Environment, the Ministry of Economy, Trade and Industry, the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Land, Infrastructure, Transport and Tourism) states that the dependence of economic activity on natural capital and its loss are clear risks to socio-economic sustainability, and that a transition to nature-positive management is necessary to make socio-economic activities sustainable.
○ According to an estimate by the Ministry of the Environment based on the World Economic Forum (2020), the scale of business opportunities created by the transition to a nature-positive economy in Japan is estimated to be approximately JPY47 trillion by 2030.



Estimated value of nature-positive business opportunities in Japan in 2030
(Relationship with carbon neutral and circular economy)



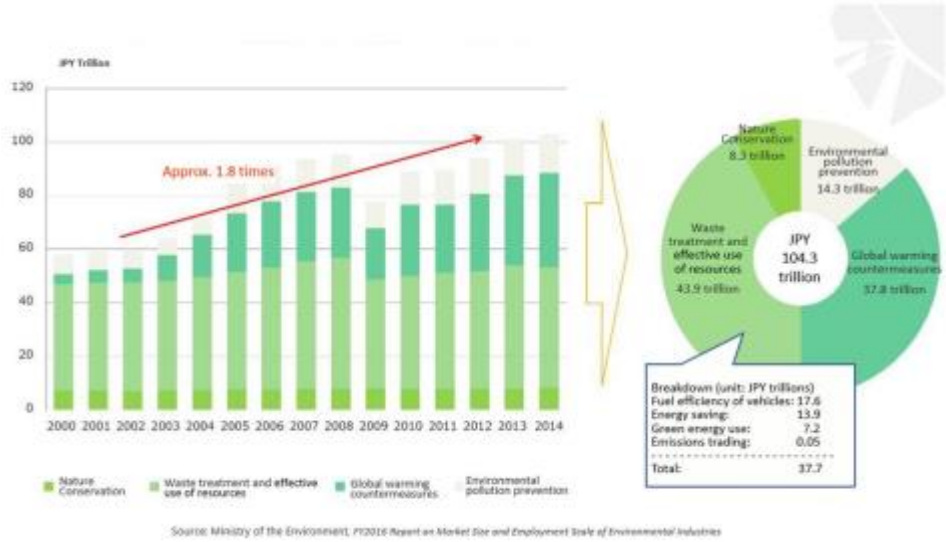
Source: Estimated by the Secretariat using World Economic Forum (2020) "New Nature Economy Report II: The Future Of Nature And Business", AlphaBeta (2020) "METHODOLOGICAL NOTE TO THE NEW NATURE ECONOMY REPORT II: THE FUTURE OF NATUREAND BUSINESS", Eora26 (2015), Cabinet Office (2021) "National Economic Accounts (GDP Statistics) Annual GDP Performance", Cabinet Office (2022) "Economic Outlook for FY2022 and Basic Stance for Economic and Fiscal Management (Cabinet decision) Overview."

○ According to the Ministry of the Environment, the size of Japan's environmental market related to natural environment conservation is estimated to be approximately JPY8.3 trillion, and the market size is expected to continue to expand in the future.

Size of Japan's Environmental Market

Source: Ministry of the Environment, FY2023 Report on Market Size and Employment Scale of Environmental Industries

Expansion of Environmental Industry Market and Expectations



Source: Ministry of the Environment, FY2016 Report on Market Size and Employment Scale of Environmental Industries

Examples of Economic Effects of Green Infrastructure

Examples of Economic Effects of Green Infrastructure

○ Regarding green infrastructure, various effects including economic effects such as an increase in the number of visitors, higher land prices, higher store sales, higher value-added agricultural products, and increased productivity, as well as social effects such as an improved quality of life, and safety/security of the local community, have been confirmed according to the contents of initiatives.（P17-P30）

○ In this recommendation, the cases have been organized based on regional characteristics and primary use, making them more accessible for entities considering the implementation of green infrastructure.（P17）。

○ In many cases, economic effects were achieved through dialogue with various parties by utilizing organizations that can serve as regional hubs, such as local governments and local financial institutions, and by emphasizing networks with existing green spaces.（P18-P30）

* The effects observed in these cases include many factors beyond those resulting from green infrastructure efforts. Therefore, in the following sections on the logic model and economic value analysis, we focus on the real estate sector and an attempt to visualize the specific impacts of green infrastructure initiatives (as described later).

* Regarding the conceptual diagram of the "definition of green infrastructure" presented on P11, an attempt has been made to organize which specific public and private sector initiatives (hard measures) correspond to the functions of green infrastructure.（P31）

Realizing the Economic Benefits of Green Infrastructure: Case Examples

- Various effects of green infrastructure have been confirmed, depending on the nature of the initiatives, including economic effects such as an increase in the number of visitors, higher land prices, increased store sales, higher value-added agricultural products, improved labor productivity, and reduced costs, as well as social effects such as an improved quality of life and safety/security of the local community.
- Here, major examples of economic effects are summarized from the perspective of regional characteristics and main uses. In many cases, economic effects were achieved through dialogue with various parties by utilizing organizations that can serve as regional hubs, such as local governments and local financial institutions, and by emphasizing networks with existing green spaces.

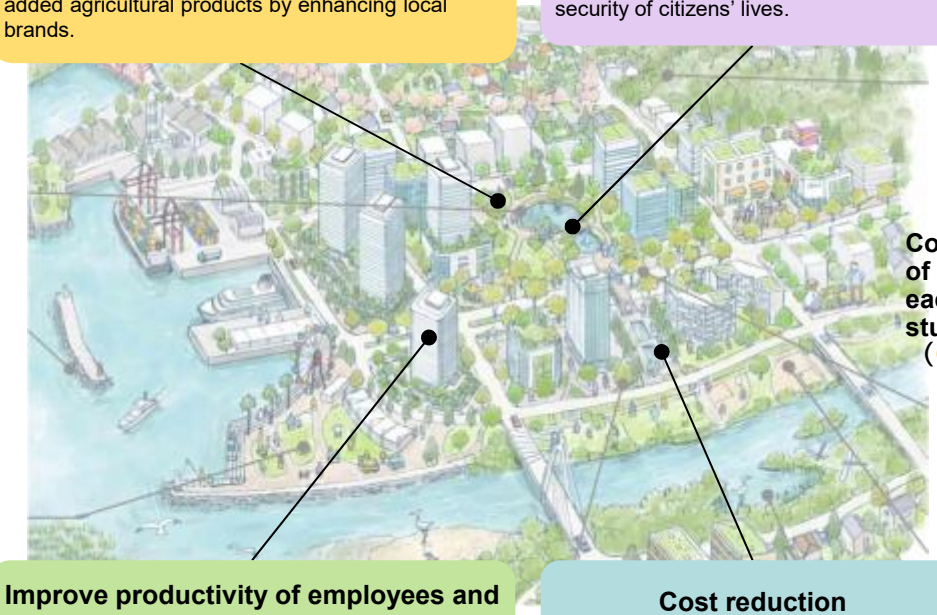
Major economic effects of green infrastructure applications

Revitalization of the local economy

As the area is used as a new public space by local residents and tourists, the number of visitors to the area is expected to increase, thereby increasing the sales of nearby stores and raising land prices. In some cases, this will contribute to higher value-added agricultural products by enhancing local brands.

Reduction of flood risk

By improving rainwater storage and infiltration functions, it is expected to minimize flood damage to businesses and other entities. It is also expected to contribute to ensuring the safety and security of citizens' lives.



Confirmation of effects for each case study
(🟡🟢🟣🔵)

Improve productivity of employees and quality of life for citizens

There have been cases where the psychological stress of employees has been reduced, and their ability to concentrate has been improved, as well as cases where the quality of life for citizens has improved, and interest in nature conservation has been fostered.

Cost reduction

There have been cases where the load on sewage facilities has been reduced by controlling rainwater runoff and cases where controlling indoor temperature increases has contributed to the energy-efficient operation of A.C.

Note: These effects are interrelated and cannot be strictly categorized.

Examples of green infrastructure in Japan show economic benefits in urban and living spaces.

Main use		Urban area	Rural area
Facility-related	Commercial and business facilities	🟡Futako Tamagawa Rise 🟡🟣Minami-machida Grandberry Park 🟢🔵Tokyo Portcity Takeshiba 🟡Azabudai Hills 🟢🟣🔵Otemachi Forest 🟢🔵Shinkashiwa Clinic and surrounding facilities	🟢🔵AEON MALL Toyokawa 🟡🟢Nigiwai no Mori 🟢Kita Alps Shinano-no-Mori Water Plant 🟢Branch Moriya
	Logistics facilities	🟢ALFALINK Nagareyama	🟢🔵GLP Fukuoka Ogori
	Residential housing	🟢Sunvarie Sakurazutsumi 🟣🔵Green Infrastructure Model (Misawa Park Tokyo) 🟢🟣Matsubara Housing Complex	🟢🔵Kanon no Mori
Infrastructure-related	Parks	🟡Minami-Ikebukuro Park 🟣Shin-Yokohama Park	—
	Roads /Streets	🟡OMIYA STREET PLANTS 🟣Shijo Rain Garden Development Project 🟡Marunouchi Street Park	—
Satoyama (village-vicinity woodland), Coast, etc.		—	🟡Maruyama River Direct River Improvement Project 🟡🟢Earthquake restoration and watershed area creation in Moune district, Kesennuma City 🟡🟢Sandy beach revitalization town development in Oya Beach
Underutilized land		🟢Kashiniwa Program	🟡Aohata Fruit Research Center

Realizing the Economic Benefits of Green Infrastructure: Case Examples

Commercial and business facilities

Case ① Futako Tamagawa Rise (Setagaya Ward, Tokyo)

Revitalization

【 Motive 】 Urban redevelopment around the train station

【Details of initiatives】

・Facility architecture integrated with the Kokubunji Escarpment and the Tamagawa River

・The green space ratio is approximately 30% of the site area, with over 95% of the vegetation composed of native species.

・Providing a safe and stress-free pedestrian space.

【Economic effects】 **The number of station users has increased by approximately 30% over the past 10 years, and the public land price around the station (average value) has risen to about 1.33 times the level of fiscal year 2012 in fiscal year 2019.** This confirms the enhancement of real estate value through investments utilizing the natural environment and the attraction of talent. **Events** organized by external companies have been increasing, successfully **creating vibrancy and enhancing the area's brand**. Additionally, it has strengthened the city's resilience against flooding and other disasters, contributing to sustainable urban development.

Source: Tokyu Corporation website, "First Winner of the 25th Global Environmental Award (Grand Prix)""Concrete Measures for Climate Change", Ministry of Land, Infrastructure, Transport and Tourism (2016)"Guide to Enhancing Building Appeal through Greenery."

Case ② Aeon Mall Toyokawa (Toyokawa City, Aichi Prefecture)

Productivity Quality Cost reduction

【 Motive 】 The city's commitment to regional revitalization × Urban development project on the site of the former Suzuki Toyokawa Factory, driven by AEON Mall's commitment to regional contribution

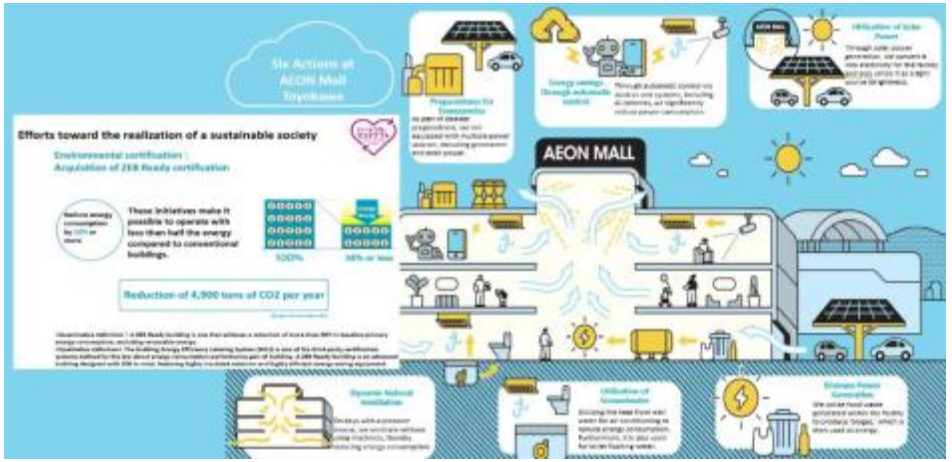
【Details of initiatives】

・Establishment of **a central park** where visitors can experience nature.

・Approximately 16,000 trees of 61 species, **mainly native to the region,** were planted together with local residents.

・A “walking course” was opened to visitors for health and fitness purposes.

【Economic effects】 Taking advantage of the characteristics of Toyokawa City, which is surrounded by nature with no large buildings nearby, natural ventilation was utilized throughout the building, exceeding 500 meters in length, during the spring when pleasant breezes blow, **achieving both improved indoor comfort and energy efficiency.**



Source: AEON Mall Co., Ltd. "Received the Grand Prize, the Minister of the Environment Award, at the 1st 'Decarbonized City Development Award'" Initiatives Towards Realizing a Sustainable Society"

Realizing the Economic Benefits of Green Infrastructure: Case Examples （Domestic）

Commercial and Business Facilities

Case ③ Minami-Machida Grandberry Park(Machida City, Tokyo)

Revitalization　Risk reduction

【 Motive 】 Pursuing a new suburban approach to address regional issues such as the aging of old facilities and response to torrential rainfall.

【Details of initiatives】

・Roads that once segmented the city were reconfigured into a cohesive network of spaces, **enabling barrier-free, comfortable pedestrian access** from the station to **commercial facilities to nearby city parks.**

・Standardization of signages that enhance recognition of green infrastructure elements such as bioswales and rain gardens as unifying themes for the area

・**Diverse plants, the majority of which are native to Japan**, were introduced in pedestrian areas and plazas.

【Economic effects】 The **annual passenger count at the station rose to 133% YoY** following the facility's inauguration. It has been quantitatively verified that the rain gardens and bioswales effectively infiltrate rainwater, thereby **aiding in the management of rainwater runoff.**

Source: Green Infrastructure Public-Private Partnership Platform (2024) Green Infrastructure Case Collection'、Ministry of Land, Infrastructure, Transport and Tourism (2024) "Summary of Results for Green Infrastructure Creation Promotion Project Development Support", Tokyu Corporation Website "Passenger Boarding and Alighting Numbers for FY 2018" and "Passenger Boarding and Alighting Numbers for FY 2019".

Example: Nigiwai no Mori (Inabe City, Mie Pref.)

Revitalization　Productivity /Quality

[Motive]

To establish a base for developing the community, human resources and to make use of abandoned forests

[Details of initiatives]

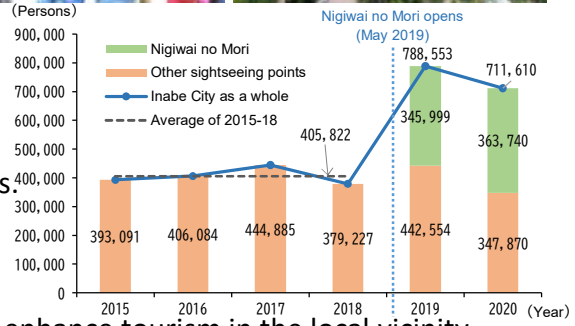
・In conjunction with the construction of the new government building, green space was created by utilizing existing trees in the abandoned forest nearby.

・Green Creative Inabe , a company established to promote public-private partnerships, manages and operates the facility.

・Design of commercial facilities, open space, and walkways within the green space.

[Economic effects]

・The number of visitors to Inabe City doubled following the opening of Nigiwai no Mori, contributing to a significant increase in the number of visitors. According to the questionnaire survey results, about 30% of the visitors to Nigiwai no Mori stopped by other facilities, thus suggesting that it is expected to enhance tourism in the local vicinity.



・About 72.1% of government office staff answered that "the scenery is good" as their impression of Nigiwai no Mori, which is the highest percentage. The impression by users of the facility was "comfortable" at 68.1%, which was the highest percentage.

・28.0% of government office staff answered that they felt that using Nigiwai no Mori improved their work productivity. 49.2% of the respondents felt their productivity had increased compared to the previous building.

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure , " Inabe City (2023) "Nigiwai no Mori Effectiveness Verification"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Commercial and Business Facilities

Productivity /Quality　Cost reduction

Example: Tokyo Portcity Takeshiba

(Minato Ward, Tokyo)

[Motive]

Proposals for work and lifestyle practices that capitalize on abundant natural resources, strategies for urban flood prevention, the development of cooling areas, and enhancing biodiversity.

[Details of initiatives]

- ・Building greening, wall greening
- ・Takeshiba New Eight Views , where vegetables can be cultivated without pesticides
- ・Adoption of native species based on surveys of habitat organisms in the surrounding area
- ・Establishment of open workspace with lush greenery (120 or more seats indoors and outdoors)

Reception space surrounded by greenery

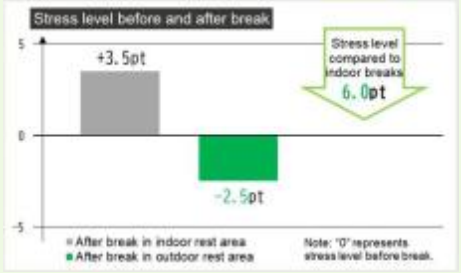
[Economic effects]

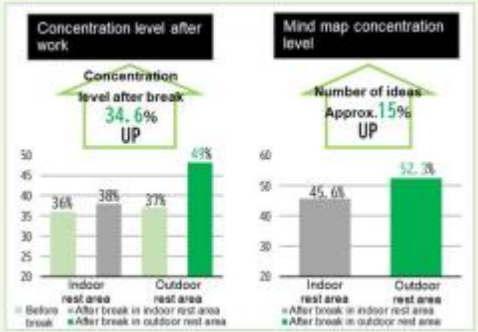
- ・An EEG study comparing the effects of working in environments with and without greenery showed a 12% decrease in stress levels and a 35% increase in concentration, leading to more positive inspiration. Additionally, by collecting rainwater for underground storage and reusing it for toilets and other needs, water consumption is expected to be reduced by about 4 to 5%.

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

<(Reference) Examples in other urban developments>

It has been quantitatively confirmed that taking breaks in spaces with plants reduces stress and enhances concentration levels.
(Hibiya Park Front / Chiyoda Ward, Tokyo)





Source: TOKYU LAND CORPORATION website "GREEN WORK STYLE"

Case ⑥　Kita Alps Shinano-no-Mori Water Plant

（Omachi City Nagano Pref.）

Productivity /Quality

【 Motive 】Forest conservation, water-based urban development, creation of local employment, raising awareness of initiatives to preserve nature, enhancing brand value, and more.

【Details of initiatives】

- ・**Planting plan based on existing vegetation and topographical surveys**
- ・Utilization of locally sourced timber
- ・Ensuring the diversity of understory vegetation
- ・Preservation by pre-excavating local seedlings before construction work, nurturing them in a nursery, and **replanting them within the site**.
- ・Development of a planting maintenance management policy
- ・Conclusion of a comprehensive partnership agreement with local governments
- ・**Exchange of ideas for job creation with local businesses**

【Economic effects 】According to a survey for employees, **"employee awareness of conservation for watershed recharge forests through field maintenance" had increased by 20%** compared to other production sites. Expansion to other sites and a **32% improvement in production efficiency** are expected.

Nature Guide by Field Staff

Synergistic Effects of Conservation of Watershed Recharge Forests

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Commercial and Business Facilities

Case ⑦ Azabudai Hills（Minato Ward, Tokyo）

Revitalization

【 Motive 】Since the planned site required development of urban infrastructure, the Type 1 Urban Redevelopment Project was implemented to develop infrastructure such as roads and parks, thereby updating urban functions in terms of crime prevention and disaster management.

【Details of initiatives】

・A vast central plaza is positioned at the heart of the city**, seamlessly integrating diverse urban functions** such as offices, residences, hotels, international schools, commercial facilities, and cultural institutions.

・Surrounded by overwhelming greenery and harmonizing with nature, a new community is formed where diverse people gather and live more humanely.

【Economic effects】 The high efficiency of energy supply and the development of high-quality and extensive urban green spaces were highly praised. They received the 1st Decarbonized Urban Design and Development Awards program's highest honor, the Minister of Land, Infrastructure, Transport and Tourism Award. The area is expected to see an increase **in surrounding land prices** in the future.

Source: Mori Building Co., Ltd. website "Azabudai Hills", "Azbuka Hills Wins Top Prize 'Minister of Land, Infrastructure, Transport and Tourism Award' at the 1st Decarbonized City Development Grand Prize" PRESTIGE Co., Ltd."Azabudai Hills Opens on November 24" "Impact of Large-Scale Redevelopment on Real Estate Investment", various articles

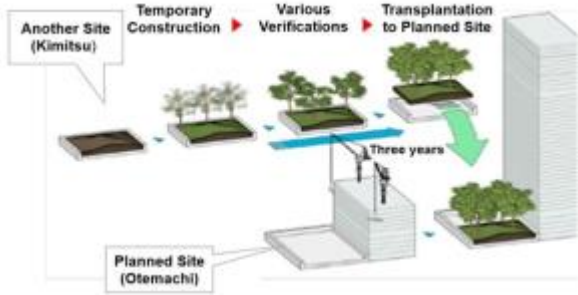
Case ⑧ Otemachi Forest（Chiyoda ward, Tokyo）

Productivity /Quality　Risk reduction　Cost reduction

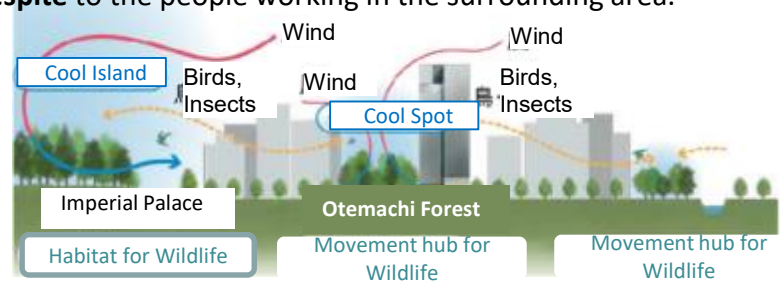
【 Motive 】Under the development concept of "revitalizing nature while regenerating the city," the project aims to **create an authentic forest** that restores the area's original natural environment, in tandem with urban revitalization through measures such as the development of a pedestrian network.

【Details of initiatives】

・A temporary green space was established in Kimitsu City, Chiba Prefecture, where construction and maintenance methods were tested and refined over a period of approximately three years. The vegetation cultivated during this trial was later transplanted to Otemachi, where a true forest was recreated across roughly 3,600 square meters—covering about one-third of the entire site.



【Economic effects】 By creating a natural forest near the Imperial Palace, which nurtures a rich ecosystem, the area serves as a hub for the movement of various living creatures, thereby **enhancing the urban ecosystem**. The shade provided by the trees, along with their transpiration and the soil's water retention capacity, contributes to **the mitigation of the heat island effect**. Rainfall on rooftops and artificial ground is used for irrigation of the plants, promoting the recycling of water. Additionally, the soil on the artificial ground serves as a primary rainwater storage facility, **helping to prevent runoff during heavy downpours.** Also, it **provides relaxation and respite** to the people working in the surrounding area.



Source: Otemachi Forest website "Overview of the Forest", "Learning about Urban and Nature Regeneration at Otemachi Forest ", various articles

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Commercial and Business Facilities

Case ⑨ Shin-Kashiwa Clinic and Surrounding Facilities
（Kashiwa City, Chiba Pref.）

Productivity /Quality　Cost reduction

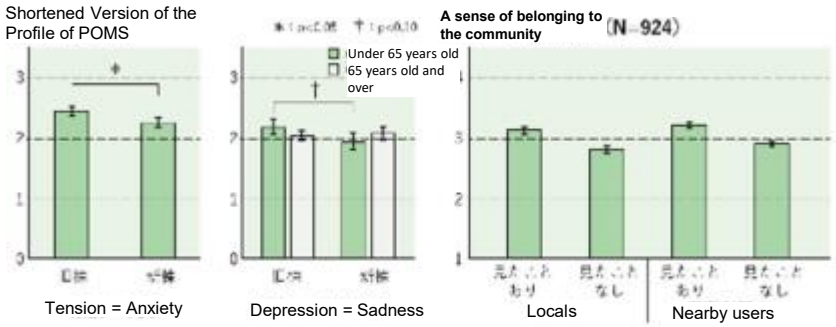
【 Motive 】"Providing the best medical care **in the best environment, contributing to patients**."

【Details of initiatives】

・A rehabilitation garden rich in greenery where exercise therapy tailored to each patient's symptoms and physical strength can be practiced.

・Constructing a clinic with wooden structures where **patients can enjoy forest bathing.**

【Economic effects 】In terms of contributions to health, **the project enhanced patients' QOL and fostered a greater sense of belonging and health awareness among local residents**. Moreover, as a contribution to healthcare management, the reconstruction created an opportunity **to increase the number of nurses and staff,** despite the severe labor shortages in the medical and welfare sectors. Furthermore, **the costs** previously incurred for recruitment through newspaper advertisements and medical staffing agencies **were eliminated**. The installation of a rain garden on the site helped **reduce the burden on the public sewer system.**



The wooden environment in the clinic was suggested to have a calming effect on patients' negative moods.

People who have directly seen the future of diabetes have significantly higher community belongingness.

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Case ⑩ BRANCH MORIYA（Mito City, Ibaraki Pref.）

Productivity /Quality

【 Motive 】 Addressing population growth resulting from station area redevelopment and the formation of new communities.

【Details of initiatives】

・BRANCH PARK MORIYA（Open space）: **Green space making up roughly 50% of the site.** Flexible usage enabled by unique regulations.
As part of its community contribution, the facility includes disaster preparedness measures for use in emergencies.

・BRANCH MORIYA（Retail facility）: Four single-story buildings with 17 tenants.
Attracting community-based tenants to offer a well-rounded shopping and living environment.

・Hosting collaborative events with local organizations.

【Economic effects】

The open space in front of the station **serves as a community gathering place**, linking generations for future connections. Local food specialty shops, rather than national chain stores, occupy the spaces, and through cooperation with regional organizations and the city of Moriya, a community has been established around the plaza.

BRANCH MORIYA

BRANCH PARK MORIYA　The event scene

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Logistics Facility

Case ⑪ GLP ALFALINK NAGAREYAMA
（Nagareyama City, Chiba Pref.）

Productivity Quality

【 Motive 】Utilizing abandoned farmland to create a place that contributes to regional economic revitalization and promotes interaction across generations.

【Details of initiatives】
・Approximately 180,000 trees were planted across all buildings, greening 20% of the site area.
・Supporting biodiversity by utilizing the retention pond, installed during development, as a biotope.
・Cherry trees were planted to ensure the connection with the surrounding rural scenery was not disrupted.
・The facility's common areas are open to the public and used to host various events.

【Economic effects 】With around 60 companies occupying the site and approximately 6,000 jobs created, the facility has achieved a **91% 'intention to continue use' rating** in customer satisfaction surveys. The shared biotope has also been offered as a research site for a local waterfowl study group, **supporting both community well-being and interaction among residents.**

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Case ⑫ GLP FUKUOKA OGORI（Ogori City, Fukuoka Pref.）

Productivity Quality Cost reduction

【 Motive 】In line with the company's sustainability efforts, the facility aims to enhance the quality of life for employees and residents, support tenant business growth, and build a community-oriented environment that contributes to long-term, sustainable development.

【Details of initiatives】
・ **A living lab has been established, designed to integrate a lush green entrance with an open, semi-outdoor wooden deck.**
・The space serves as a place where both workers and residents can easily come together, relax, and engage, contributing to the seamless integration of business and local life.
・**Development funding was raised through a green loan from Fukuoka Bank.** Upon completion, the project received environmental certifications, such as CASBEE A and Nearly ZEB certifications.

A living lab that provides a relaxing space

【Economic effects】 Providing a comfortable working environment. Additionally, over 2,000㎡ of the site has been greened **to prevent heat infiltration into the building.** Furthermore, the project has obtained environmental certifications, including CASBEE A certification and Nearly ZEB certification.

←A living lab integrated with a semi-outdoor wooden deck.

Source: GLP Website 'Completion of GLP Fukuoka Ogori in Ogori City, Fukuoka Prefecture,
Fukuoka Bank 'Announcement of Green Loan Execution.'

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Housing

Case ⑬ Saint-Vallier Sakurazutsumi（Musashino City, Tokyo）

Productivity Quality

【 Motive 】A city planning approach that prioritizes the conservation and continuation of green areas in the housing complex and the natural revitalization of the Senkawa River.

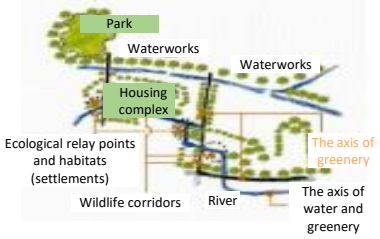
【Details of initiatives】

・**The Senkawa River improvement project**, which runs through the housing complex, **and the redevelopment of the Sakurazutsumi housing complex are being carried out together as a coordinated effort** (Tokyo Metropolitan Government, the city, and UR).

・The creation of a biotope pond utilizing rainwater within the housing complex, with **a system to channel overflow water into the Senkawa River,** contributes to the revitalization of the aging local community.

・Maximizing preserved trees through careful building placement.

・Revitalization of the aging local community through workshops held in collaboration with the neighborhood association.




Pre-renovation


Post-renovation

【Economic effects 】Following events like wildlife observation sessions and information-sharing at the biotope pond, **a resident survey revealed that 92% gave positive feedback about the pond, with many appreciating the chance to encounter wildlife. This has helped foster a better understanding of biodiversity conservation among residents.**

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Case ⑭ Kanon no Mori (Kumagaya, Saitama Pref.)

Productivity Quality Cost reduction

[Motive]

Addressing severe heat, decrease in the amount of greenery, and lack of greenery awareness activities.

[Details of initiatives]

・In the shop-cum-residence, the architecture and garden are designed as a cohesive unit to naturally regulate temperature—maximizing airflow from southern breezes in the summer and minimizing northern winds in the winter, thereby reducing the need for A.C.

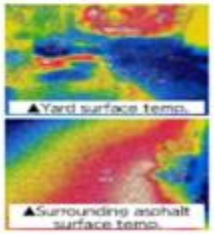
・**Deciduous jolcham oak trees** are planted around the property to **provide shade during the summer and allow sunlight through during the winter as they shed their leaves.**

・**Monthly workshops** offer participants practical lessons on integrating nature into daily living.

[Economic effects]

・Participants report **significant lifestyle improvements** from monthly classes on herb cultivation and culinary uses, indicating these activities have contributed to establishing their healthy and comfortable lifestyles.

・These practices foster a healthy living environment, enabling residents to comfortably forgo A.C. even during intense summer heat. As the vegetation matures, the green coverage increases annually, enhancing shade and comfort with each passing year.



Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Housing

Case ⑮ Green Infrastructure Model（Suginami Ward Tokyo）

【 Motive 】Measures for extreme rainfall and managing power demand during disasters.

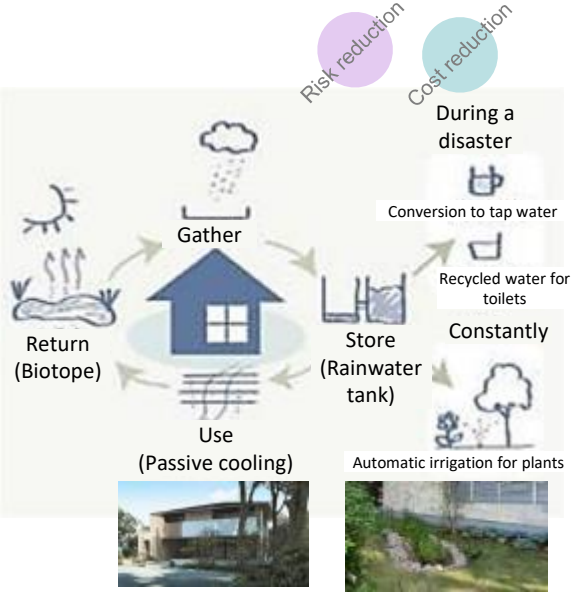
【Details of initiatives】

・Storage in rainwater tanks and birdbaths, and **installation of bioswales.**

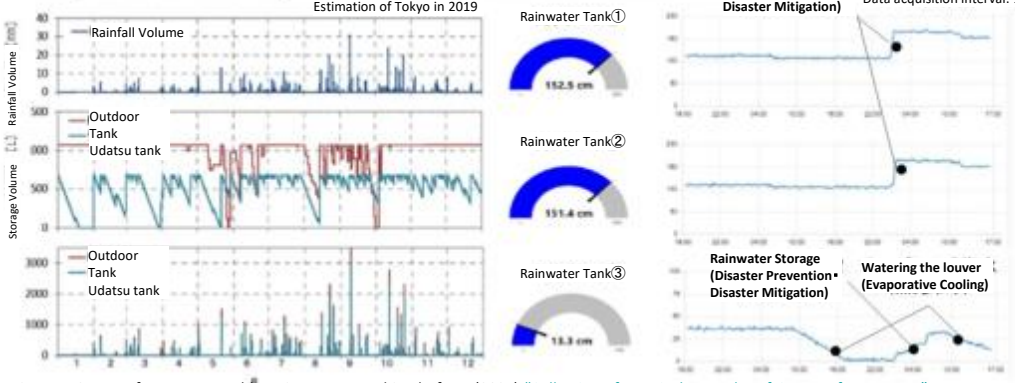
・Passive cooling utilizing IoT technology linked with weather Data

.・**Automatic irrigation for plants** and secondary water storage for the biotope.

・Calculation of tank capacity based on purpose and monitoring of storage levels.



【Economic effects 】The reduction of rainwater runoff to nearby areas and public sewers during heavy rain, combined with effect measurement through monitoring, has contributed to **disaster prevention and mitigation**. It has been confirmed that, in summer, the evapotranspiration effect helps **reduce the surrounding temperature and improve indoor thermal comfort.**



Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Case ⑯ CONFORL MATSUBARA・Matsubaradanchi Memorial Park（Soka City, Saimata Pref.）

【 Motive 】 Creating attractive housing that meets diverse needs and reducing rainwater runoff.

【Details of initiatives】

・**Selecting preserved trees and other related matters in consultation with the neighborhood association.**

・**Making use of the environmental assets** cultivated in the pre-redevelopment housing complex, such as greenway areas and preserved trees.

・**Restoring and inheriting the rural landscape** from before the housing complex was built.

・Development of highly naturalistic landscape ponds and facilities.

・Development of the 'Green Promenade' linking the station to the park and the 'Wind Path' connecting the city blocks.

・A playlot integrated with a Kleingarten (community garden).

・**A rain garden** utilizing a depression of about 50 cm along the greenway.

【Economic effects 】Community activities, such as summer festivals along the Green Promenade and Wind Path, have fostered **intergenerational interaction between new and long-term residents**. Additionally, **a citizen-driven wildlife survey** is regularly held at the park's pond. The rain garden **also helped prevent pathway flooding and control rainwater runoff.**

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Park

Revitalization

Case ⑰ Minami-Ikebukuro Park（Toshima Ward, Tokyo）

【 Motive 】Park redevelopment to address aging facilities and create a high-quality relaxation space as well as a lively atmosphere around the park.

【Details of initiatives】

・As part of the park's renewal, **workshops with participation from local shopping districts and other community members** were conducted to discuss fundamental ideas and visions.

・Developed as the city's living room, featuring **a large lawn area**.

・Equipped with a café-restaurant that serves as a lively hub in daily life and provides meal support during disasters.

・A portion of the café-restaurant's sales is directed as community contribution funds, supporting the park's operations under the Park-PFI scheme.

【Economic effects】 Initiatives are being carried out in coordination with the Green Boulevard strategic zone, **drawing 6,000 visitors on weekdays and significantly improving safety compared to the past.** Consequently, **it is estimated that property values within a 300-400 meter radius have risen by about 10%.**

Additionally, **new stores such as convenience stores and trendy shops are emerging around the park**.

Source: PRILIT (2024)'Survey on the Utilization of Public Spaces and Sustainable Regional Management,' PRILIT Materials, Landscape Plus Co., Ltd. Website 'Minami Ikebukuro Park.'

Risk reduction

Case ⑱ Shin-Yokohama Park（Yokohama City Kanagawa Pref.）

【 Motive 】Measures during heavy rainfall

【Details of initiatives】

・Development within the Tsurumi River multipurpose retention basin

・It is used as a park by many people during normal times and functions as a flood control facility during times of flooding.

・A facility designed to temporarily draw in river water when the water level of the Tsurumi River rises, storing part of the floodwater to reduce flood damage in the downstream areas.

【Economic effects】 During the heavy rainfall caused by Typhoon No. 19 that passed on October 12, 2019, the water level of the Tsurumi River rose, and the Tsurumi River multipurpose retention basin temporarily **stored about 940,000 cubic meters of floodwater.** The water level at the recently installed Kamenoko Bridge Water Level and Flow Observation Station rose to 6.58 meters. **However, if the Tsurumi River multipurpose retention basin had not been in place, the water level would have risen by approximately 0.3 meters more, surpassing the flood danger level.** Additionally, on October 13, the day after the typhoon passed, the final match of the Rugby World Cup 2019 pool stage was successfully held at Nissan Stadium, contributing to flood control measures for surrounding facilities.

Ministry of Land, Infrastructure, Transport and Tourism (2014),Tsurumi River Branch Office Newsletter; Climate Change Adaptation Information Platform web site, "Shin-Yokohama Park within the Tsurumi River Multipurpose Retarding Basin"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Road

Revitalization

Case⑲ OMIYA STREET PLANTS（Saitama City, Saitama Pref.）

【 Motive 】The lack of spaces for people to stay in the city and the continuation of maintenance and management.

【Details of initiatives】

・Establishment of a platform consisting of regional banks, local park and green space associations, and other stakeholders.

・Installation of plants and fixtures through the acquisition of road occupation and road use permits for a period of 3 to 6 months.

・Maintenance of plantings (watering and cleaning) by roadside owners, tenants, and others.

・Revenue-generating activities (sponsorship/ sales) in public spaces by urban regeneration promotion corporations.

・Crowdfunding accessible via a QR code displayed on the plantings.

・Nursery growers from Saitama Prefecture, near Omiya, **provide plantings for the streets.**

・The plantings installed for a period of 3 to 6 months will undergo maintenance at the production site.

【Economic effects 】During the implementation period, over a 3-hour lunch break, there was a pedestrian traffic volume of 648 people/3h, **with a total of 87 minutes of stay behavior (e.g., eating, resting).** By integrating the use of roadside stores with open terraces and green stay spaces (street plants), **the spatial planning that takes into account store formats** such as take-out is expected to have a positive ripple effect on surrounding businesses.

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Saitama City Website –"About the Omiya Station Green Infrastructure Public-Private Partnership Platform"

Risk reduction

Case⑳ Shijo-Horikawa Intersection Rain Garden Development Project（Kyoto City, Kyoto Pref.）

【 Motive 】The desire of citizens to increase greenery and the response to road flooding.

【Details of initiatives】

・Development of a rain garden featuring a tidal flat for stormwater retention and infiltration, along with a planting strip incorporating elements of a traditional Japanese garden, characteristic of Kyoto.

・Some of the management is carried out in collaboration with local volunteers.

【Economic effects 】**A total of 17.0 cubic meters of temporary rainwater storage capacity was secured** across the three developed sites.

Case㉑ Marunouchi Street Park 2020（Chiyoda Ward, Tokyo）

【 Motive 】Proposing a new approach to green infrastructure in urban centers.

【Details of initiatives】

Revitalization

・Marunouchi Naka-dori was **transformed into a grassy promenade and made accessible to the public 24/7**.

・Expansion of outdoor seating for restaurants, along with the installation of Wi-Fi and power outlets.

【Economic effects 】The grass-covered roadway attracted **more people who stayed longer than those on the sidewalk. Restaurants that expanded their outdoor seating saw an increase in sales compared to the month before the initiative,** with some establishments experiencing **a sales increase of up to 224%.**

Slow ~2km/h ⟷ Fast 4~8km/h

Cumulative pedestrian speed data from August 6th (Thursday) to 10th (Monday, public holiday) using flow sensors

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Satoyama, coastal areas, etc.

Case㉒ Maruyama River National Government-Managed River Improvement Project（Toyooka City, Hyogo Pref.）

Revitalization

【 Motive 】Ecological restoration to support the reintroduction of the Oriental white stork.

【Details of initiatives】

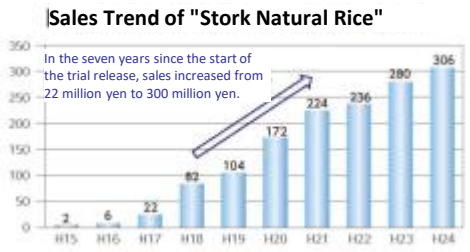
・Restoration of the Maruyama River's wetland environment and **regeneration of its ecosystem network in collaboration with local initiatives.**
（Development of a 13-hectare rice field biotope using fallow farmland and other areas within the city.）

・Development of rice field biotopes and establishment of the 'Stork-Supporting Farming Method' with no or reduced pesticide use.

・Creating a hub that recreates landscapes where humans and nature coexist, **while generating local vibrancy**.

・Encouraging corporate volunteers and utilizing the site as **a center for environmental education and research.**

【Economic effects 】The stork-supporting rice, produced while nurturing wildlife, is traded at a premium as a branded rice. In the 2019 planting season, the cultivation area expanded to 428 hectares, accounting for 14.5% of the city's total cultivated land. According to a visitor survey at the Hyogo Park of the Oriental White Stork, **the economic ripple effect of stork-related tourism in Toyooka City is estimated to be approximately 1 billion yen per year**. In addition, as a wetland and park, **it attracts around 7,000 to 8,000 visitors annually**, including students, researchers, local government officials, and birdwatchers.



Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Case㉓ Disaster recovery and watershed area development in the Moune district of Kesennuma City.（Kesennuma City, Miyagi Pref.）

Revitalization Productivity /Quality

【 Motive 】Disaster recovery, the crisis of maintaining communities, and the decline of marine resources.

【Details of initiatives】

・**Consensus building within the community.**

・**Creation of a multi-natural river** by ensuring fish habitats through frame revetments and the placement of crushed stone.

・**Restoration of saltwater wetlands and tidal flats.**

【Economic effects 】The new elevated area improved sunlight and the while maintaining the settlement structure, resulting in extremely high evaluations from residents and enabling the revitalization of the local community. In addition, compared to 2010, before the disaster**, the number of visitors to Moune has surged.** Although not a tourist destination, the environmental project had similar effects to tourism **and contributed to regional revitalization**.

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Case㉔ Community development through the restoration of Oya Beach sandy beach（Kesennuma City, Miyagi Pref.）

Revitalization Productivity /Quality

【 Motive 】Disaster recovery and beach restoration.

【Details of initiatives】

・Construction of seawalls based on community consensus.

・Integrated development from the sandy beach to the hinterland.

【Economic effects】 The roadside station, developed in conjunction with the sandy beach, **saw a significant increase in visitors** thanks to its expanded retail space, easy access to the beach, and its location offering a full view of the ocean. The number of register transactions in July and August reached 150,000, **4.6 times higher than the previous year**.

Source: Green Infrastructure Public-Private Partnership Platform (2024) "Collection of Practical Examples of Green Infrastructure"

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Domestic）

Underutilized land

Case㉕ Kashiniwa（Kashiwa City, Chiba Pref.）

Productivity /Quality

【 Motive 】Utilization of vacant land

【Details of initiatives】

・**By acting as an intermediary between landowners and local organizations, the municipality transforms** nearby vacant lots into community gardens accessible to residents.

・The main uses of Kashiniwa are 'Open Gardens,' where individuals open their private gardens to the public, and 'Community Gardens' and 'Satoyama,' where leased land is opened to the public by local organizations.

Open Garden

Satoyama

Community Garden①

Community Garden②

【Economic effects】In a survey regarding the Kashiniwa system's operational donation, **54% of respondents said they would donate 100 yen.** The most common reason for the donation was the opinion **that "the creation of community gardens is important."** The development and utilization of the space are expected to **enhance the appeal of the community.**

Source: Kashiwa City Official Website,"Kashiniwa Program";、MLIT(2014) "FY2014 Demonstration Survey on the Planned Formation of Green Environments for Compact City Development"

Case㉖ Aohata Fruit Research Institute（Miyoshi City, Hiroshima）

Revitalization

【 Motive 】Utilization of idle land and the establishment of a domestic research and development center for strawberries by Aohata, a food manufacturer specializing in processed strawberries.

【Details of initiatives】

・**A matchmaking initiative facilitated by Hiroshima Bank, connecting companies seeking idle land with local governments that own such land.**

・A 1.5-hectare plot of **idle land**, formerly used for growing greenhouse vegetables, was converted into a large-scale glasshouse research facility for studying strawberry cultivation techniques and varieties.

・Currently, out of the seven glasshouses, four are used as research and development facilities for trial cultivation of various strawberry varieties, while the remaining three are leased to Hirata Tourist Farm, which operates fruit-picking and other agritourism activities.

【Economic effects】

・The project is expected to **generate synergies such as job creation, boosted tourism, community contribution, and enhanced public visibility.**

・There is **potential for multifaceted business development** that leverages the respective expertise of Aohata and Hirata Tourist Farm. In addition, integration with nearby hot spring facilities could further contribute to the **revitalization of the entire region**.

Source : Aohata Official Website,"In 2018, Aohata Established the Aohata Fruit Research Institute in Miyoshi City, Hiroshima Prefecture"General Incorporated Association – Regional Banks Association of Japan, "Regional Revitalization Case Studies" Aohata(2023) "Aohata CSR Report 2023"; Various Articles

Realizing the Economic Benefits of Green Infrastructure: Case Examples（Abroad）

Examples from Abroad

Case ㉗ High Line（New York City, U.S.）

Revitalization

【 Motive 】The deteriorated elevated railway was initially slated for demolition in the 1990s, but growing preservation efforts led to a change in policy. The structure was repurposed, and a 2.3-kilometer-long linear park was developed along the former railway line.

【Details of initiatives】

・Offering **a multifunctional public space that integrates experiences of nature, art, and design.**

【Economic effects】

・Between 2003, before the development, and 2011, after the development, **the market price of residential land within a 5-minute walk of the High Line increased by 103% (i.e., 2.03 times),** a significant change compared to the overall market in Manhattan.

• The market price of land for the apartment complex adjacent to the elevated railway (completed in 2011) increased by 52% between 2011 and 2016.

• It has also contributed **to increased sales for nearby restaurants and retail stores, as well as job creation**.

Source:General Incorporated Association Green Infrastructure Institute Official Website, "Towards the Era of Green Infrastructure"; HighLine Official Website,"Visitor Info"

Case ㉘ Portland（City of Portland, U.S.）

Revitalization Risk reduction Cost reduction

【 Motive 】Maintenance of the aging sewer system, over one-third of which—out of a total length of 2,500 miles—has been in place for more than 80 years.

【Details of initiatives】

・To reduce stormwater runoff and promote more efficient use of the sewer system, the city is advancing **the implementation of green infrastructure such as green streets and eco-roofs.**

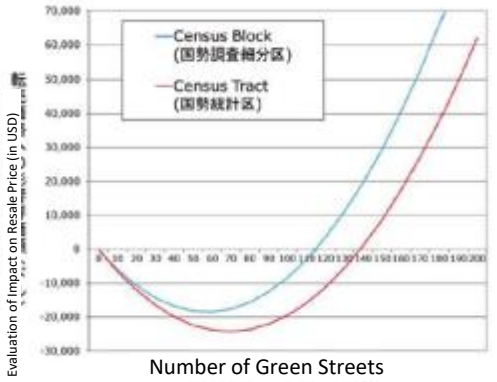
・Measures include providing construction incentives, relaxing floor area ratio regulations, utilizing dedicated funds, and offering discounts on sewer charges.

【Economic effects】According to a joint study by Portland State University and Reed College, the presence of the following elements in the vicinity of a home has been reported **to increase its resale value.**

① There are more than 120 green infrastructure installations (such as green streets) per U.S. Census tract.

② Some green infrastructure projects, built more than a decade ago, have matured and significantly increased in vegetation density.

③ More than seven trees are planted at each green infrastructure installation.



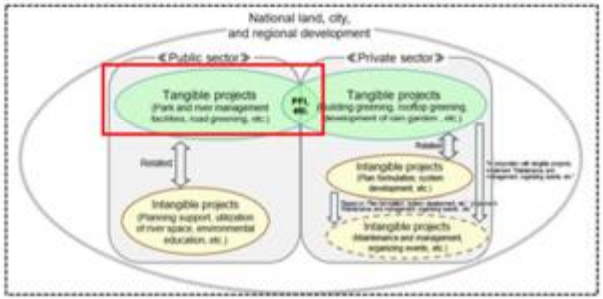
In addition, green infrastructure was incorporated into conventional stormwater management strategies to reduce sewer treatment costs.

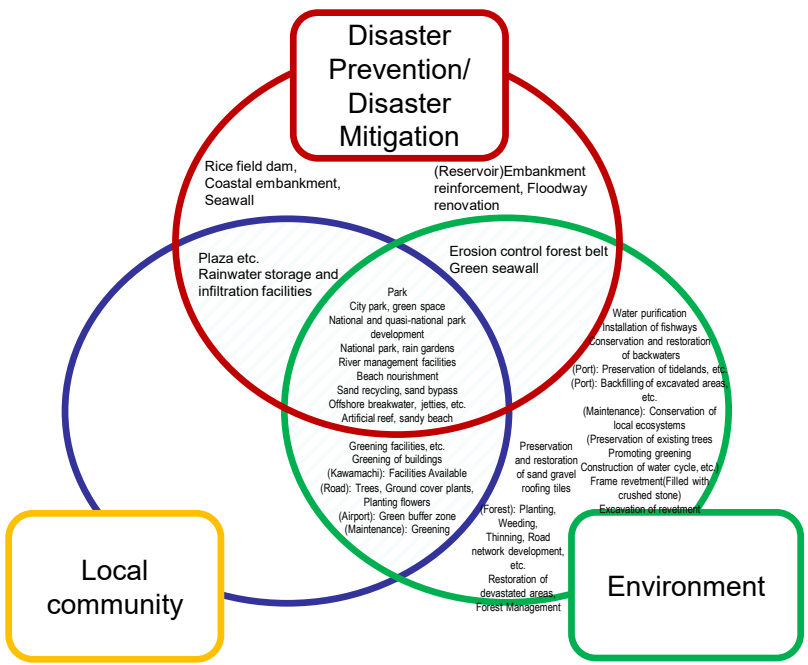
Source : 'Harnessing the Power of Nature for Urban Strength' – Towards the Era of Green Infrastructure" (Green Infrastructure Institute)Original Source: "Green Infrastructure Evaluation of Portland, Oregon"
（Landscape and Urban Planning, No.124）
Development Bank of Japan Inc. (2018) "Recommendations for Sustainable Urban Development Centered on Green Infrastructure"

(Reference) Classification of Green Infrastructure

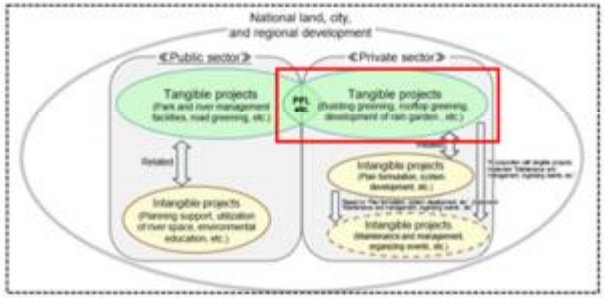
○The relationship between individual green infrastructure initiatives (tangible) and their functions e.g.,

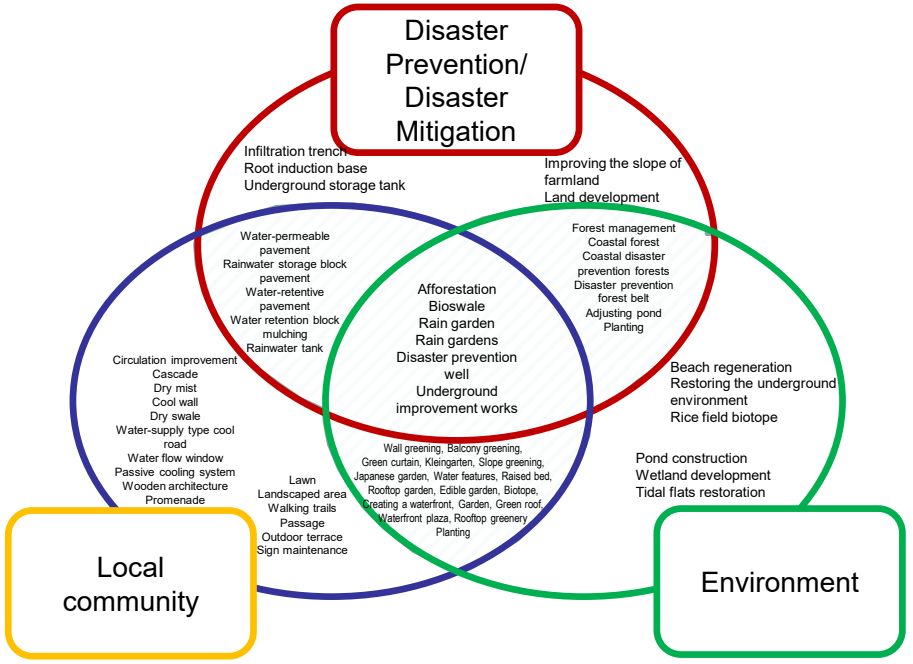
【Public Sector】





【Private Sector】





Effects of Promoting Green Infrastructure in Urban Development, etc. (Previous Research/Interviews)

The Effects of Promoting Green Infrastructure in Urban Development (Previous Research/Interviews)

○ In this section, we outline the expected effects of utilizing green infrastructure in urban development and city planning, areas where the economic impact on the market is particularly significant. This includes the conceptual framework, as well as insights from previous studies and interviews.

（The Effects of Promoting Green Infrastructure in Urban Development and Related Areas）

○ By utilizing green infrastructure in urban development and city planning, companies can expect **internal economic values that lead to their own gains, such as an increase in corporate value through improved brand image, as well as an increase in asset value through higher rent and lower yields.** Furthermore, the utilization of green infrastructure not only enhances internal economic values for companies but also **has a positive impact on external economic values, such as improving citizens' well-being and increasing local value.** As a result, **this is expected to contribute to the improvement of internal economic values, such as increased corporate value (P34)**.

*Regarding the utilization of green infrastructure in urban development and city planning, which brings about a variety of effects as mentioned above, we are organizing evaluative and certification systems that can be utilized, constructing a logic model focused on the real estate sector, conducting economic value analysis, and reviewing available financing options (as described later).

(Progress in Previous Studies on Green Premium)

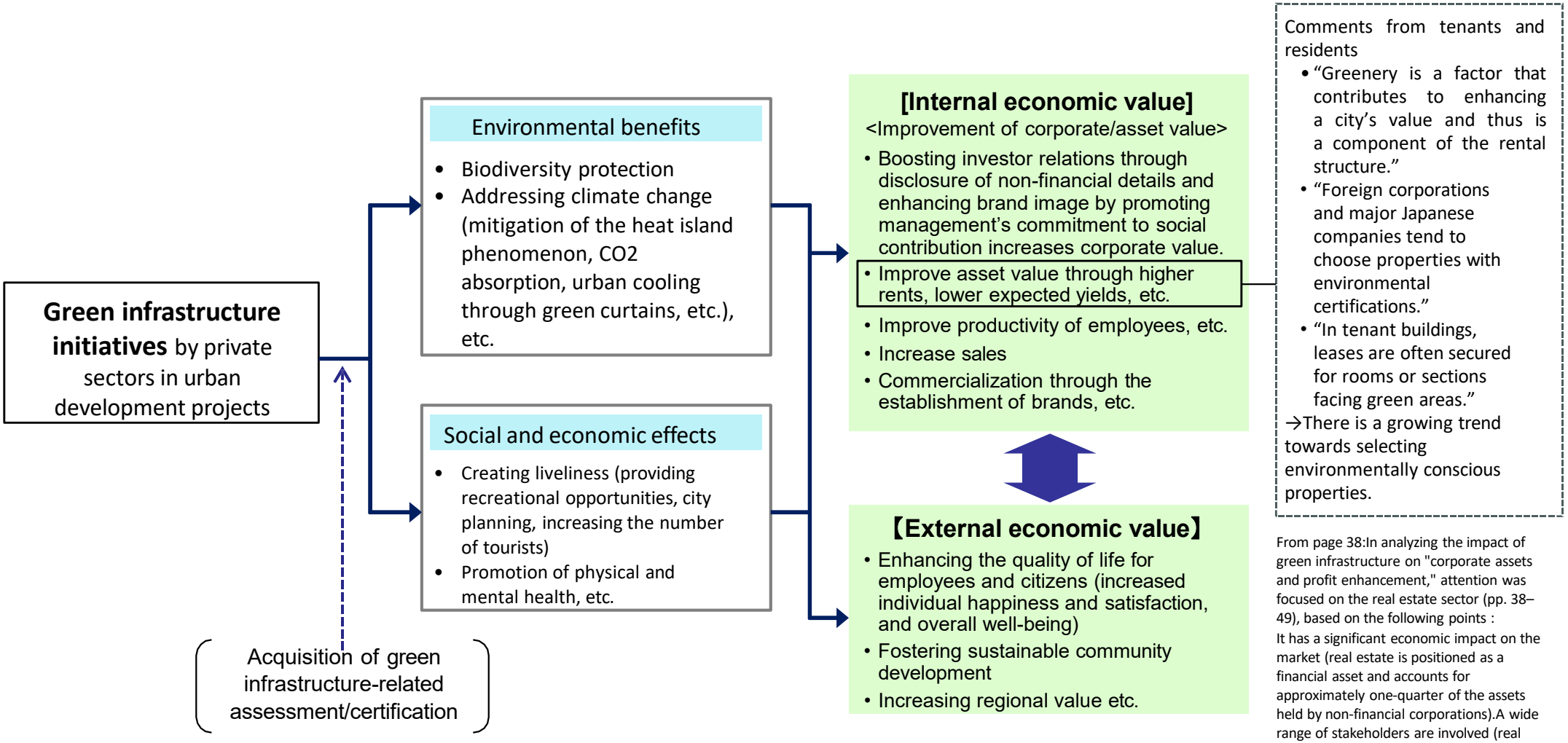
○ In relation to the "increase in asset value through higher rent and lower yields" mentioned above, research on green infrastructure and real estate value has accumulated both domestically and internationally, **covering various aspects such as the positive impact on prices, rents, and yields, as well as studies on environmental real estate and the green premium.** Additionally, **research on the impact of surrounding green spaces on real estate value has also been advancing (P35, 36)**.

（Voices of Real Estate-Related Companies, Organizations, and Investors）

○ Based on **interviews conducted with real estate-related companies, organizations, and investors** regarding market trends in environmental real estate and the economic effects of green infrastructure, opinions varied. Some noted that “**efforts at the individual property level do not seem to significantly influence price determination**” and that “**green initiatives are not yet a major factor in investment decisions.**” On the other hand, there were also comments such as “**green spaces contribute to enhancing the value of a city and are one element in rent pricing,**” “foreign-affiliated companies and major Japanese corporations tend to select properties with environ**mental certifications,” and “the number of investors paying attention to GRESB and sustainability disclosure is increasing.**” **(p.37)**

Ripple Effects on Economic Value from Promoting Green Infrastructure

- In urban development and city planning, utilizing green infrastructure can lead to internal economic benefits for businesses, including enhanced corporate assets and profits. Expected outcomes are increased corporate value through improved brand image, etc., and greater asset values through higher rental incomes and lower capitalization rates , etc. Moreover, applying green infrastructure benefits not only the internal economics of businesses but also positively affects external economic values, such as enhancing citizens' well-being and boosting regional value.
- These aspects are interconnected; improvements in external economic values can further elevate a brand's image, boosting internal economic values.



From page 38:In analyzing the impact of green infrastructure on "corporate assets and profit enhancement," attention was focused on the real estate sector (pp. 38–49), based on the following points :
It has a significant economic impact on the market (real estate is positioned as a financial asset and accounts for approximately one-quarter of the assets held by non-financial corporations).A wide range of stakeholders are involved (real estate serves diverse purposes and is also used by the public).

Previous Studies on Green Premium

〇Various domestic and international studies have explored the relationship between environmental real estate and the Green Premium, noting positive effects on prices, rents, and yields. Research examining the impact of nearby green spaces on real estate values has also been conducted.

■Relationship between environmental real estate and real estate values

＜Studies on selling prices＞

【Research compilation】
- Organized 71 peer-reviewed empirical studies focusing on the Green Premium for income-generating real estate properties. Out of 19 studies specific to sales price premiums, 13 confirmed a **premium ranging from +4.75% to +43%.**
- (Leskinen, N. et al., 2020)

【Yokohama City, Kanagawa Pref.】
- A study targeting condominiums certified under the CASBEE Yokohama system found that a one-point increase in BEE (Building Environmental Efficiency) leads to **approximately a 5.5% increase** in the sales price of newly built condominiums. For existing condominiums, a one-point increase in the BEE score was shown to have **a positive effect of 1.63% per year** on the rate of change in resale prices. (Takada et al., 2020)

＜Studies on yield and risk reduction＞

【Research compilation】
・While empirical studies are scarce, they suggest an average reduction in capitalization yields of about 0.46 percentage points, with variations from 0.36 to 0.55 percentage points.
→Capitalization yields reflect market expectations regarding the future position
of sustainability (Chaney and Hoesil, 2015).

＜Studies on rental prices＞

【U.S. office market 】
- Given the potential to command **higher rents (3%),** investors are inclined to advance green building developments, even if such projects entail cost premiums.(Eichholtz et al., 2010; U.S.)

【Chiyoda Ward, Chuo ward, Minato Ward, Shinjuku Ward, Shibuya Ward, Tokyo】
- A comparison of rental rates before and after obtaining environmental certifications (such as CASBEE, DBJ Green Building, and BELS) for the same building shows that properties rated '5' (as defined by the certification criteria) **experience a 4.6% rental premium.** (Sumitomo Mitsui Trust Bank, 2024)

【Research compilation】
- The study indicated that higher CASBEE scores and ranks are positively correlated with rental levels, and that CASBEE-certified buildings tend to command higher rents. (Ito et al., 2016)

【Research compilation】
- Improvements in environmental performance and energy-efficient renovations led to increased tenant satisfaction, resulting in a rise in rental income (a 13.8% increase in office spaces compared to when the property was acquired).
- An analysis of the correlation with CASBEE evaluation scores indicated that CASBEE-certified buildings have approximately ¥564 higher common area rent per tsubo, and each increase in CASBEE rank corresponds to an additional ¥264 in common area rent per tsubo. (The Japan Association of Real Estate Appraisers, 2019)

○ A significant body of research has examined the relationship between environmental real estate and property value, confirming that real estate with high environmental performance has a positive impact on property value (including sales price, rent, and yield). Note: Environmental performance encompasses factors like energy efficiency, which may not always be directly related to green infrastructure.

Previous Studies on Green Premium

■Relationship between real estate values and surrounding green space

＜Studies on surrounding green spaces＞

【Shinagawa Ward, Meguro Ward, Setagaya Ward, Nakano Ward, Suginami Ward, Nerima Ward】
- **It was found that a higher concentration of nearby forested areas** is associated with **an increase in land prices**. (Kobayashi et al., 2017)

【Edogawa Ward, Tokyo】
- Linear green **spaces increase land prices by a minimum of JPY0.07/m2** per square meter of green space, whereas parks **boost land prices by at least JPY0.01/m2** per square meter of green space. (Watanabe et al., 2012)

【Shanghai, China】
- The study found that **a 1% improvement in access to green spaces corresponds to an average increase of 0.17% in housing prices, while a 1% increase in the proportion of green spaces within the community leads to a 0.46% rise in housing prices**.（Shenglin Ben et al.,2023）

【 Setagaya and Suginami Ward, Tokyo】
- **A 10% increase in scattered green spaces within a 100-meter radius can elevate average condominium prices by 2 to 2.5% (JPY740,000 to JPY930,000)**. (Kuroda et al., 2023)

【Quebec, Canada】
- Research on the influence of landscapes on housing values generally indicates that, provided it is not excessive, **the difference in tree cover between a property and its surrounding area leads to an increase in housing values**.（Des Rosiers et al.,2002）

＜Studies on on-site vegetation, surrounding parks, street trees, flower beds, and other forms of green infrastructure＞

【Hyogo Prefecture (specific area)】
- The study on second-hand condominiums revealed that when landscaping is implemented in vacant areas of the property, the listing price increases substantially. For every 5% rise in the greening rate, **the price increases by an average of ¥400,000 to ¥500,000**. Conversely, it was confirmed that differences in the management of landscaping play a key role in determining pricing, **and that merely increasing the amount of greenery does not necessarily lead to a positive effect on price setting.** (Ishizuka et al., 2009)

【New York City】
- **Community gardens within 300m notably boost real estate selling prices**. Especially in less affluent areas (an increase in real estate value of 9.4%). (Voicu, I., & Been, V., 2008).

【Sapporo, Hokkaido】
- **An expansion of 10m²** in the nearest park correlates with **a land price increase of about JPY0.18/m²**. Furthermore, a **10% increase in green space** within a 500-meter radius is associated with a land **price rise of approx. 0.55%.** (Aikoh et al., 2008).

【New York City】
- Office properties with low to high degrees of street greening, **compared to those with significantly low degrees, command transactions with transaction premiums from 8.9% to 10.5%, and rent premiums from 5.6% to 7.8%**. (Juncheng Yang et al., 2020)

○ Although numerous studies exist on the relationship between green spaces surrounding a property and its value (such as transaction prices), as well as research on on-site greenery and user evaluations (such as the enhancement of residential quality), there is a lack of studies that analyze the relationship between on-site greenery and property value.

○ This study group conducts research on the relationship between on-site green infrastructure and property value (see p. 49).

Voices from Real Estate-related Companies, Organizations, and Investors

○ Based on interviews conducted with real estate-related companies, organizations, and investors regarding market trends in environmental real estate and the economic effects of green infrastructure, opinions varied. Some noted that “efforts at the individual property level do not seem to significantly influence price determination” and that “green initiatives are not yet a major factor in investment decisions.” On the other hand, there were also comments such as “green spaces contribute to enhancing the value of a city and are one element in rent pricing,” “foreign-affiliated companies and major Japanese corporations tend to select properties with environmental certifications,” and “the number of investors paying attention to GRESB and sustainability disclosure is increasing.”

	Real estate development and management companies (Business entity)	Industry Association (real estate industry-related)	Real Estate Management Company (Logistics-focused entity)	Real Estate Brokerage Firms and Others
Trends in Green Real Estate	• The environment has long been a major theme in urban development. • Biodiversity is not typically a direct criterion for tenant selection.	• Efforts toward GRESB are underway, and the proportion of green real estate within J-REITs is increasing.	• All J-REITs are participating in GRESB, and it has become one of the key triggers influencing the market. • In response to the movement toward sustainability disclosure, investor monitoring has been strengthened both in terms of quality and quantity. • The methods for measuring the effectiveness of biodiversity are unclear.	・Foreign companies and Japanese companies that are members of RE100 tend to choose properties with high environmental performance or properties that have obtained environmental certifications. ・Foreign companies are concerned with whether a property has obtained LEED certification, as it is internationally recognized and widely acknowledged. ・There is a common response that biodiversity is still too early to address. The challenge lies in quantifying the analysis.
The Economic Benefits of Green Infrastructure	• Items that are easy to understand in terms of numbers, such as savings on water and utility bills, can appeal to investors.	• It does not have a significant impact on investment decisions. • Green infrastructure may lead to additional maintenance costs.	• In the logistics sector, in addition to economic considerations, there is a tendency for tenants to prefer green buildings due to factors such as comfort and environmental sustainability. • The impact of green infrastructure on price and demand within the site is currently unknown.	・The environmental quality of an area affects real estate prices, and being located in an area with a lot of greenery is a positive factor. ・However, efforts made at the individual property level do not seem to have a significant impact on price determination, and other factors appear to have a greater influence.
Approach to Green Building (GB) Certification	• When conducting joint development with local governments during the development phase, obtaining subsidies and other support is often conditional on meeting certain requirements. • An increasing number of tenants are making Green Building (GB) certification a requirement for occupancy. • Green Building (GB) certification is being pursued with the primary goal of promoting environmentally friendly development, and as a result, it is also leading to opportunities in green finance.	• The increase in obtaining Green Building (GB) certifications may be driven by the goal of improving GRESB ratings as a way to appeal to ESG-focused investors. • There is a notable trend of high Green Building (GB) certification rates, particularly among logistics-focused REITs.	• When acquiring properties, checks are conducted on whether the property has obtained or is likely to obtain Green Building (GB) certification. • For some tenants, the presence or absence of Green Building (GB) certification is one of the criteria for selecting a property to lease. • The acquisition of Green Building (GB) certification is also advancing from the perspective of ESG evaluations, such as GRESB.	・It is difficult to demonstrate the effects of obtaining Green Building (GB) certification to customers. ・Well-being might appeal to investors more than energy efficiency.
Relationship with Green Finance	• When issuing corporate bonds, an increasing number of companies are issuing green bonds to maximize investor demand, with some companies setting target issuance amounts. Additionally, raising funds through green finance is seen as an opportunity to initiate dialogue with investors.	• As financial institutions are actively promoting green finance, the number of cases where companies raise funds through green finance is increasing.	• In addition to financial institutions being proactive in sustainable finance, the availability of products such as sustainability-linked loans that offer interest rate benefits serves as a motivation for raising funds through sustainable finance.	
Perspectives for Conducting Economic Value Analysis	• Rather than considering it in isolation as a single building, the presence of greenery within the broader urban development efforts contributes to the enhancement of the area's value, and is therefore regarded as one element of the rent structure.	• As investors aim for long-term profits, ESG (Environmental, Social, and Governance) initiatives are efforts that help mitigate long-term risks. • From the perspective of tenants' rent affordability, the contribution of green initiatives to employee satisfaction and customer attraction is a key factor.	• There are reports available that explore the relationship between Green Building (GB) certification and office rent premiums. It would be helpful if similar reports were published regarding the impact of GB certification and biodiversity efforts on other asset types as well.	・One of the economic benefits of environmental initiatives is that investors can lower the capitalization rate (cap rate). ・J-REITs include not only rental income and property prices but also yield data, making them data-rich.

Ripple Effect of Economic Value from the Promotion of Green Infrastructure and New Economic Value Analysis

Ripple Effect of Economic Value from the Promotion of Green Infrastructure and New Economic Value Analysis

○ In this context, we are constructing a logic model that outlines the pathways through which the effects of green infrastructure initiatives in urban development, and similar perspectives, translate into economic value. Also, we are conducting a new economic value analysis focusing on the relationship between on-site green infrastructure efforts and real estate value—an area that has been underexplored in existing research.

（Ripple Effect of Economic Value from the Promotion of Green Infrastructure ）

○ First, regarding the logic model, the objectives are twofold: (1) to clarify the ripple effects through which the effects (outcomes) generated by the promotion of green infrastructure translate into economic value, and (2) to incorporate these outcomes into the objective function of the economic value analysis described later. In this process, since the perspectives differ for each stakeholder group—developers/owners/operators, investors, tenants, citizens, and government— the logic model is structured by capturing the relevant stakeholders and organizing the pathways of these effects (P40-P46).

○In addition, the study introduces advanced urban development case studies in which the effects of green infrastructure are organized through a logic model.（P47-P48）。

（New Economic Value Analysis）（P49）

○ While the logic model qualitatively examines how economic value emerges through green infrastructure, the economic value analysis aims to quantitatively assess whether such value is actually realized.

○ For the analysis, we focused on the real estate sector, given its significant economic impact on the market and the involvement of a wide range of stakeholders. Furthermore, since corporate assets and earnings in the real estate sector can be quantitatively assessed, we conducted a current-state analysis focusing on the relationship between “monthly rental income at the end of the fiscal period” and the “percentage of green space on the property.” The data used for the analysis consisted of REIT properties located within Tokyo’s 23 wards. The specific analytical method employed was the hedonic approach, with the percentage of green space on the property used as the explanatory variable representing green infrastructure.

○ As a result of the analysis, no statistically significant relationship was found between the green infrastructure variable and rental income across all 23 central wards of Tokyo. However, within the five central wards (Chiyoda, Minato, Chūō, Shinjuku, and Shibuya), properties with more than 10% green space on-site showed approximately 7.4% higher monthly rental income per tsubo compared to properties with no green space. Furthermore, among these properties, office buildings with more than 10% green space showed approximately 12.4% higher monthly rental income per tsubo compared to office properties with no green space.

○ The limitations and challenges of this analysis include biases in real estate data, the lack of information on green space and volumetric data, as well as the inability to account for qualitative characteristics such as the quality of landscaping management and the usage of the green space (e.g., whether it can be utilized as a space for creating vibrancy). These aspects need to be further investigated and analyzed in future studies.

Understanding Economic Impact Using a Logic Model (Objectives and Assumptions)

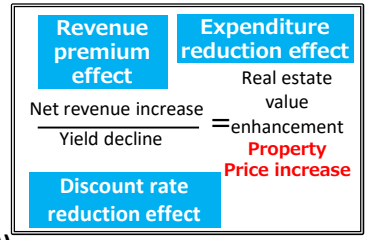
1. Purpose of Creating a Logic Model

○ **To clarify the pathways through which the effects generated by green infrastructure (GI) lead to economic value, and to identify the benefits** of implementing GI initiatives.

2. The Concept of Internal and External Economic Value

○ **The economic impact stemming from GI can be broadly classified into two categories: "internal economic value" and "external economic value."**
Generally, "internal economic value" refers to gains that arise from the inherent characteristics within an individual firm, such as its financing capability, managerial competence, and organizational efficiency. On the other hand, "external economic value" refers to gains generated by external conditions surrounding the firm, such as the development of the industry as a whole or the broader national economy. Based on these definitions, this document defines **"internal economic value" as the economic benefits realized and received by the project entity itself**. Conversely, economic benefits received by parties other than the project entity are defined as "external economic value."

○ In the context of GI, "internal economic value" is primarily considered to be the enhancement of real estate value.
The enhancement of real estate value is defined as the "green premium," which refers to the additional benefits realized through three categories: **the revenue premium effect (yvt), the expenditure reduction effect (Ovt), and the discount rate reduction effect (L(z)).**



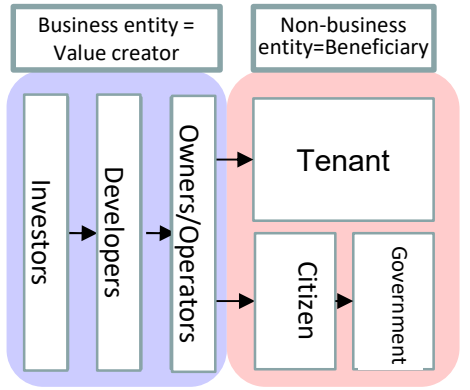
3. Organization of Stakeholders Related to GI

○ In constructing the logic model, **the stakeholders involved in green infrastructure (developers, owners/operators, tenants, citizens, and government)** are defined as follows. Also, in this work, both developers and owners/operators are considered as equivalent entities.

○ Green infrastructure is a concept that encompasses various land use types. However, in this logic model, it is primarily organized with commercial facilities and offices in mind. Additionally, references may also be made to other types such as urban development centered around parks, logistics facilities, and residential areas.

Classification	Name	Specific Entity	Final outcome（KGI）
Business entity（Value creator）	Developer	Developer	Maximizing development profit（=Increase in property value）
	Owner/Operators	Developer, REIT, Asset management company	Maximization of investment returns（=Increase in real estate value ）
	Investor	Institutional investor Financial institution	Securing stable distribution/interest income（=Increase in real estate value ）
Non-business entity（Beneficiary）	Tenant	Occupying・Retail tenants	Improvement of employee well-being Increase in business revenue
	Citizen	Citizen	Improvement of citizens' quality of life
	Government	Government	Improvement of regional value

＜Image of economic value ripple effect＞



4. Other conditions and points to note

○ Although promoting GI may lead to cost increases in terms of expenses (C) such as higher initial costs and maintenance costs, this document will focus on organizing the outcomes related to the benefits (B).

○ In actual implementation, it is essential to give careful consideration to the potential for negative impacts to arise.

【Examples of Negative Impacts 】 Adverse effects on existing ecosystems (e.g., invasive species), Damage caused by wildlife and insects, Obstruction of walkable spaces, Negative effects on sunlight exposure to surrounding buildings

*Source：Alfred Marshall 「Principles of Economics」

Three Pathways of the Green Premium Effect

○ The economic premium of green buildings is realized through three pathways: the “revenue premium effect (yvt)”, which results in higher rents compared to buildings without environmental performance; the “expenditure reduction effect (Ovt)”; and the “discount rate reduction effect (L(z))", where liquidity risk is lower compared to non-green buildings.
Chihiro Shimizu 『Sustainability and Property Market』(2021)

Revenue Premium Effect

- In an empirical study focused on the U.S. office market, **it was found that the presence of an environmental label resulted in a rent increase of approximately 3%.**
- As a background for the rent increase, companies with a strong preference for locations in green buildings were categorized.:
  - Companies in the tertiary sector, where energy cost savings have a significant impact on profit margins.
  - **Companies under strong CSR pressure from shareholders.**
  - Companies that are **sensitive to environmental impact.**
  - Companies with many highly educated employees **engaged in the production of high value-added goods or services.**
  - Government or public institutions.
  - Companies **that are sensitive to consumer behavior.**

Eichholtz “Doing Well by Doing Good? Green Office Buildings”(2010)

- **The location attraction effect of highly creditworthy companies.**

Deng, “The Economic Value of Environmental Consideration in the Tokyo Office Market”(2018)

Expenditure Reduction Effect

- Green buildings are designed to be relatively **more energy-efficient**, resulting in lower utility costs.

Dian and Miranowski
”Estimating the Implicit Price of Energy Efficiency Improvements in the Residential Housing Market---A Hedonic Approach（1989）

Banfi et al “Willingness to Pay for Energy-Saving Measures in Residential Buildings,”（2005）

Discount Rate Reduction Effect

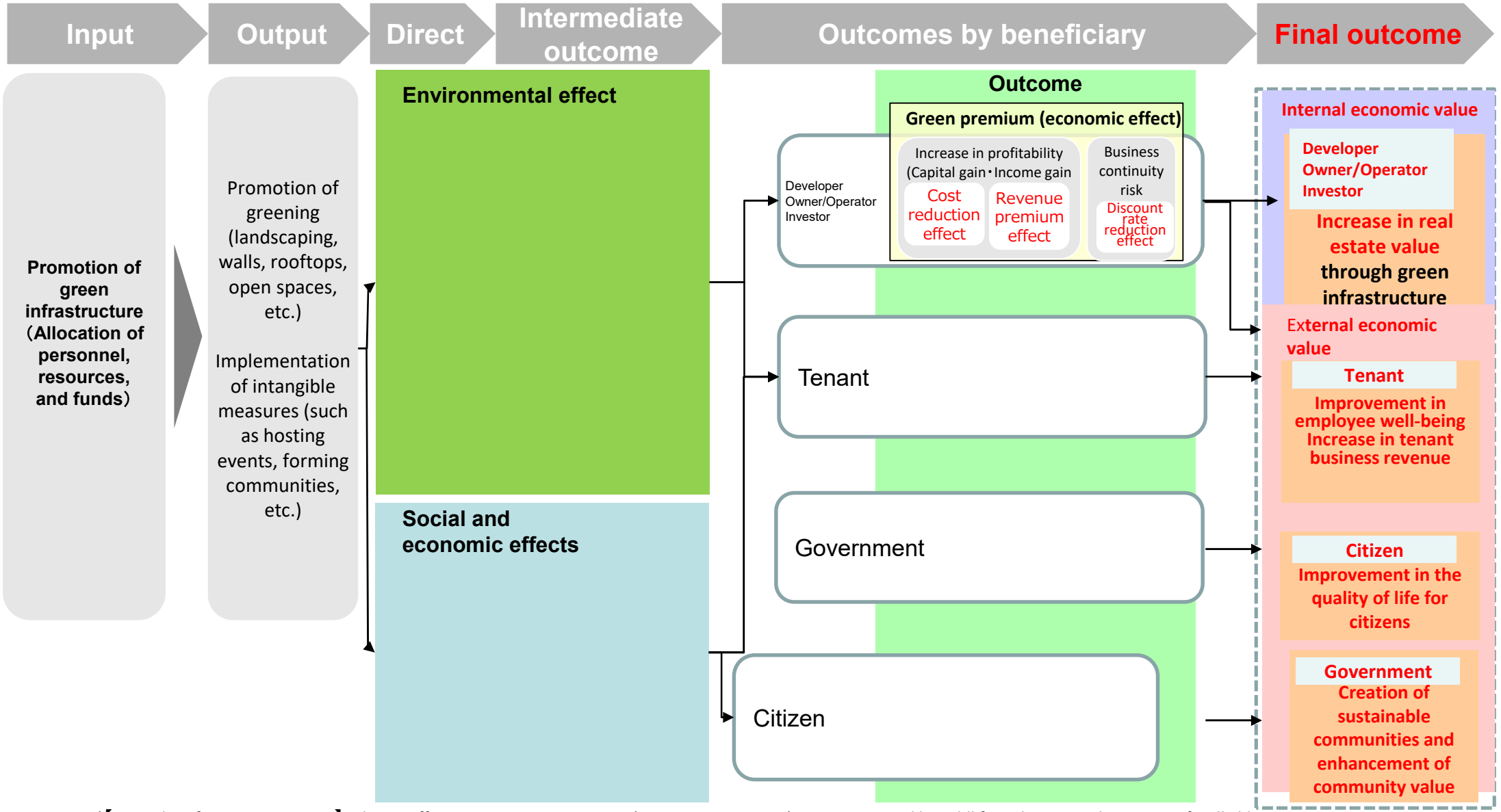
- If the liquidity of green buildings increases, it is expected that the discount rate will decrease through a reduction in perceived risk, leading to an increase in real estate value and returns.
- However, at this stage, **there is not yet sufficient empirical research** to support this.
- Related developments:
  - A movement toward **actively providing financing** for buildings with high environmental performance.
  - In response to the PRI, there is a growing movement to incorporate **ESG factors into investment practices**.

Chihiro Shimizu 『Environmentally Conscious Society and the Real Estate Market』(2021)

Approach to Organizing the Logic Model (Overview)

Logic Model of Economic Impacts through the Promotion of Green Infrastructure on the Site

Overview

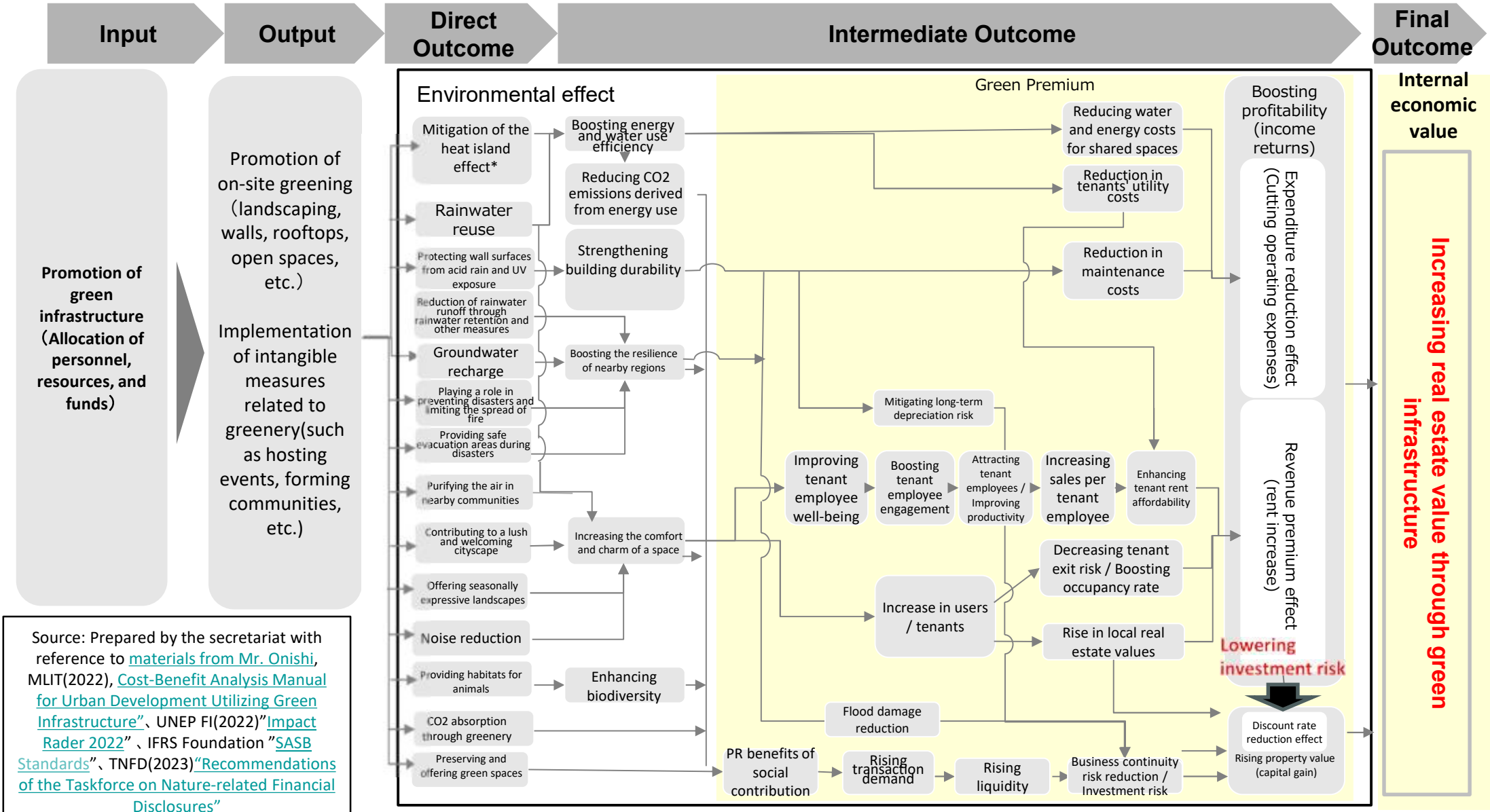


*【Examples of Negative Impacts 】Adverse effects on existing ecosystems (e.g., invasive species), Damage caused by wildlife and insects, Obstruction of walkable spaces, Negative effects on sunlight exposure to surrounding buildings

Outcomes and pathways of the effect of promoting green infrastructure (hypothesis)

Logic Model of Economic Effects through the Promotion of Green Infrastructure on the Site (1/4)

*Primarily organized with a focus on commercial facilities and offices. However, urban development centered around parks, logistics facilities, and residential areas can also be referenced to some extent.



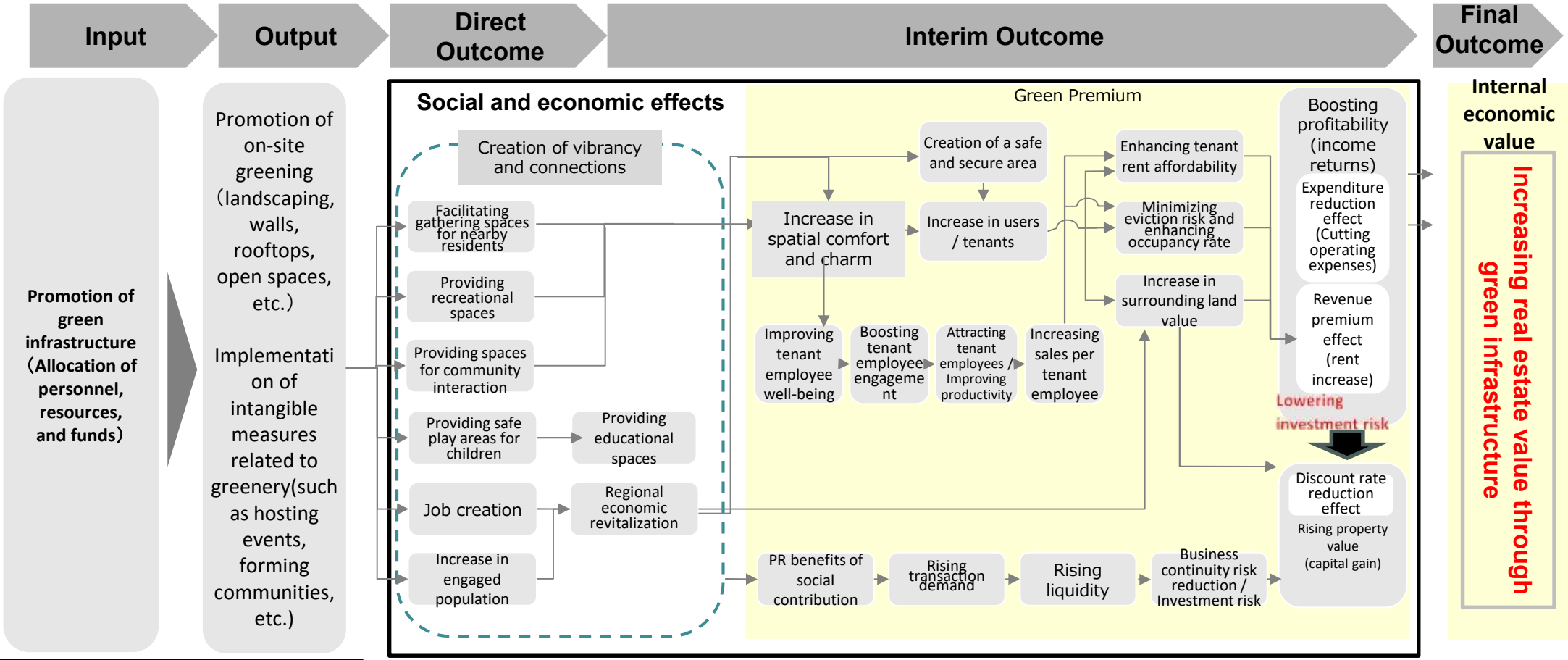
Source: Prepared by the secretariat with reference to materials from Mr. Onishi, MLIT(2022), Cost-Benefit Analysis Manual for Urban Development Utilizing Green Infrastructure"、UNEP FI(2022)"Impact Rader 2022" 、IFRS Foundation "SASB Standards"、TNFD(2023)"Recommendations of the Taskforce on Nature-related Financial Disclosures"

* The improvement in energy and water consumption efficiency through the mitigation of the heat island effect leads to a reduction in utility costs for common areas (but does not result in reduced utility costs for tenants)

Outcomes and pathways of the effect of promoting green infrastructure (hypothesis)

Logic Model of Economic Effects through the Promotion of Green Infrastructure on the Site (2/4)

*Primarily organized with a focus on commercial facilities and offices. However, urban development centered around parks, logistics facilities, and residential areas can also be referenced to some extent.

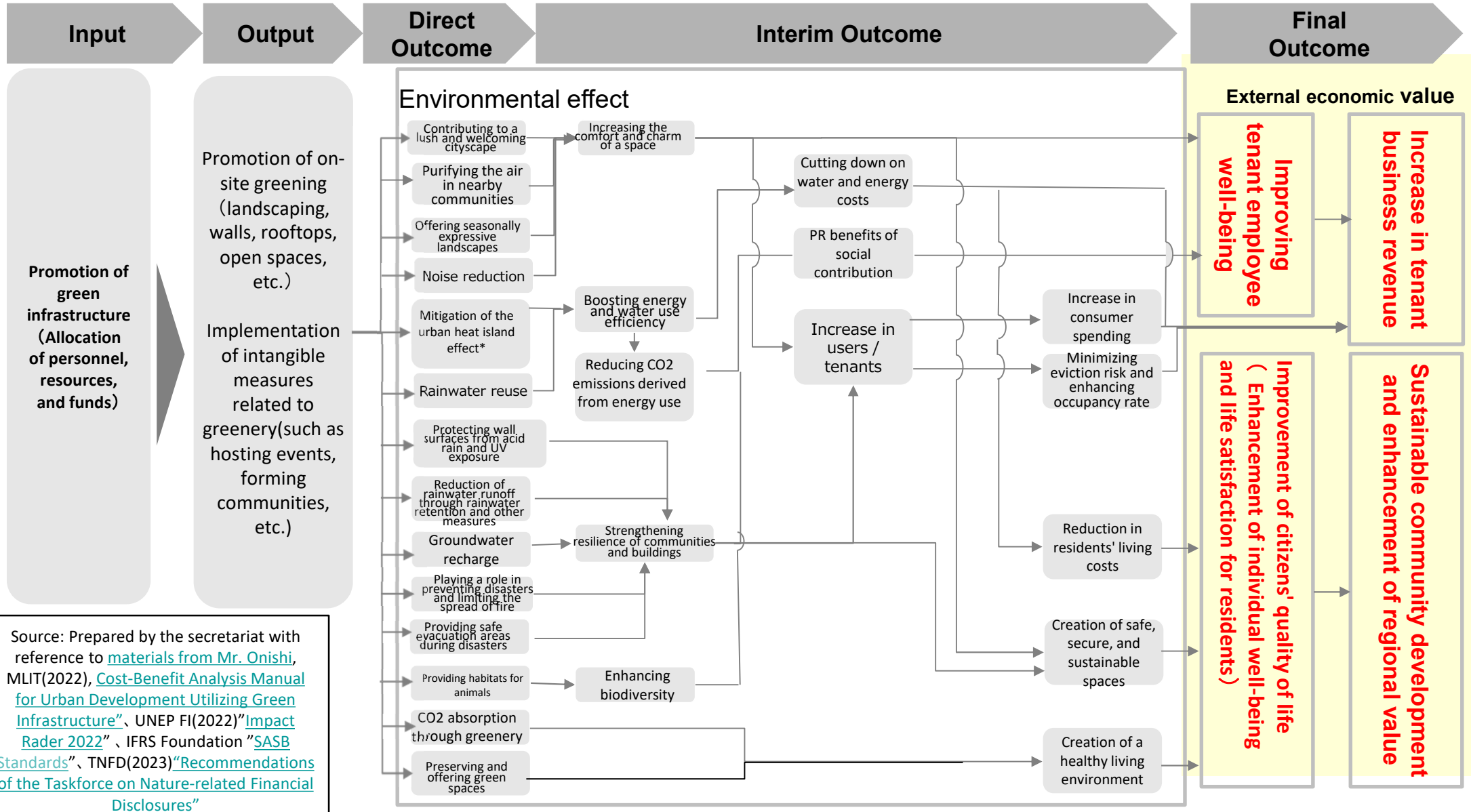


Source: Prepared by the secretariat with reference to materials from Mr. Onishi, MLIT(2022), Cost-Benefit Analysis Manual for Urban Development Utilizing Green Infrastructure"、UNEP FI(2022)"Impact Rader 2022" 、IFRS Foundation "SASB Standards"、TNFD(2023)"Recommendations of the Taskforce on Nature-related Financial Disclosures"

Outcomes and pathways of the effect of promoting green infrastructure (hypothesis)

Logic Model (3/4): Economic Effects through Promotion of On-Site Green Infrastructure

*This model is primarily organized with commercial facilities and office buildings in mind. However, it can also be partially applied to park-centered urban development, logistics facilities, and residential areas.



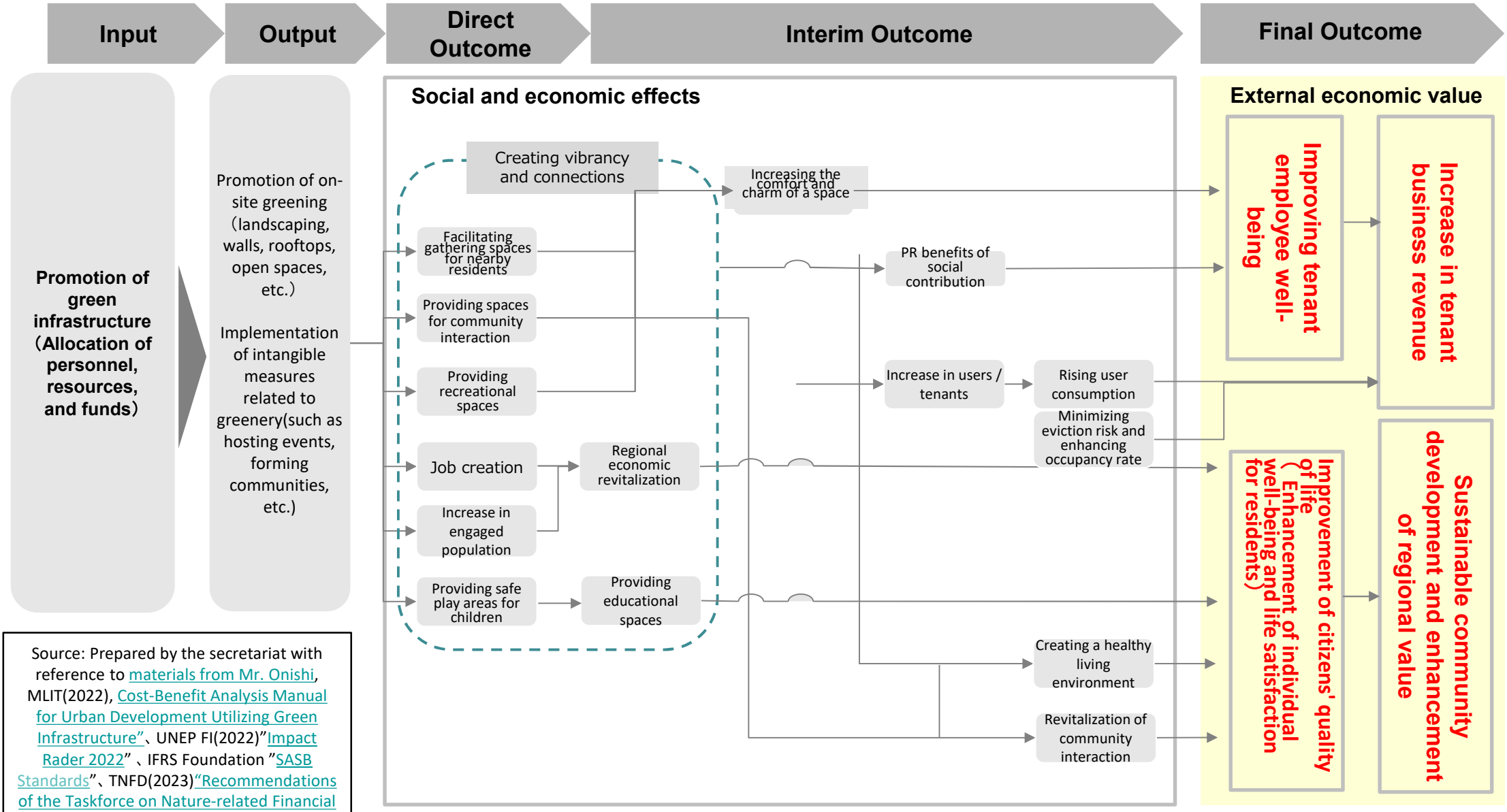
Source: Prepared by the secretariat with reference to materials from Mr. Onishi, MLIT(2022), Cost-Benefit Analysis Manual for Urban Development Utilizing Green Infrastructure"、UNEP FI(2022)"Impact Rader 2022" 、IFRS Foundation "SASB Standards"、TNFD(2023)"Recommendations of the Taskforce on Nature-related Financial Disclosures"

* The improvement in energy and water consumption efficiency through the mitigation of the urban heat island effect leads to a reduction in utility costs for common areas (but does not result in reduced utility costs for tenants)

Outcomes and Pathways of the Effect of Promoting Green Infrastructure (Hypothesis)

Logic Model of Economic Effects through the Promotion of Green Infrastructure on the Site (4/4)

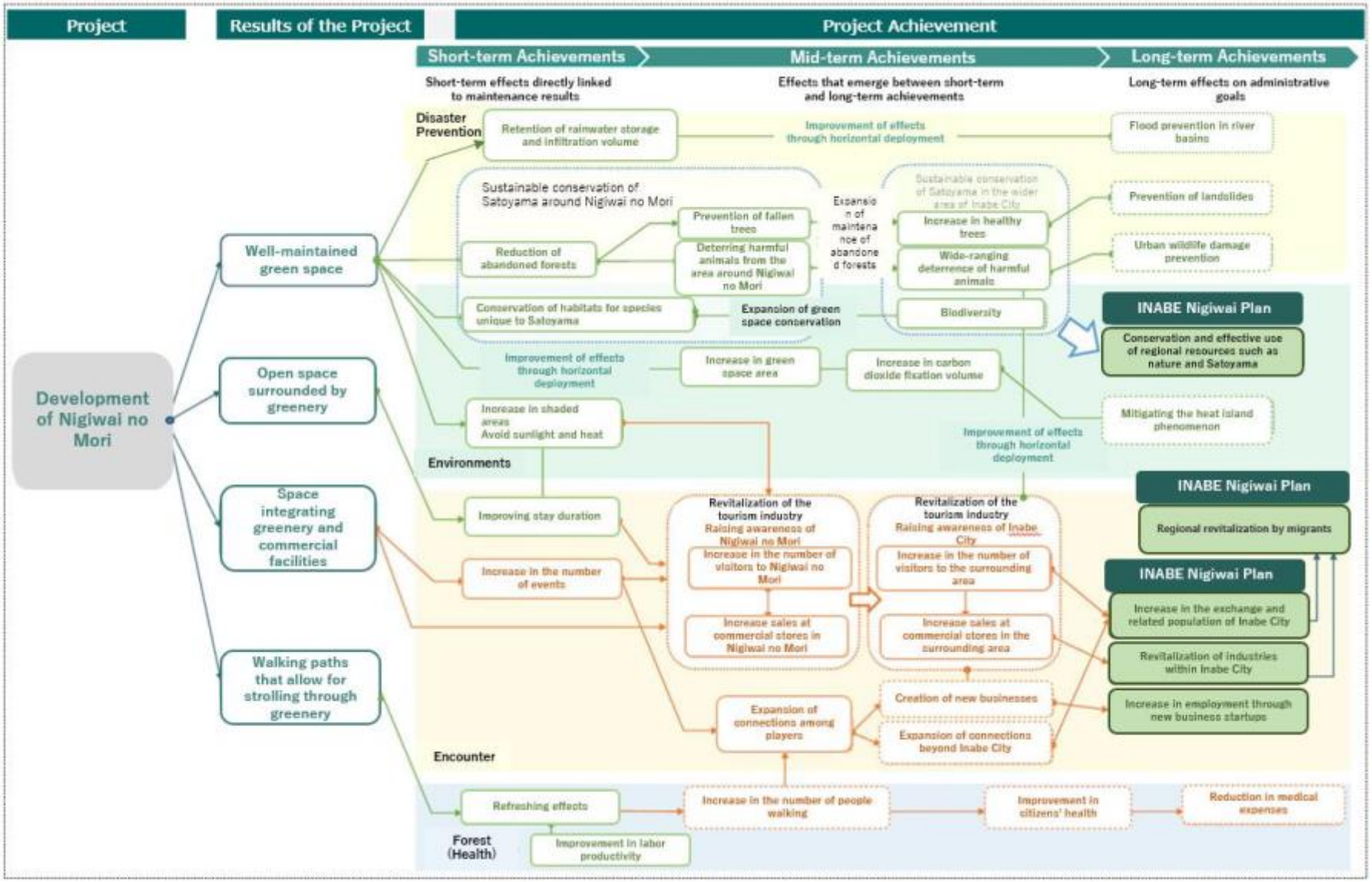
*Primarily organized with a focus on commercial facilities and offices. However, urban development centered around parks, logistics facilities, and residential areas can also be referenced to some extent.



Source: Prepared by the secretariat with reference to materials from Mr. Onishi, MLIT(2022), Cost-Benefit Analysis Manual for Urban Development Utilizing Green Infrastructure", UNEP FI(2022)"Impact Rader 2022" , IFRS Foundation "SASB Standards", TNFD(2023)"Recommendations of the Taskforce on Nature-related Financial Disclosures"

(Reference) Logic Model of the Green Infrastructure Effects of the “Nigiwai-no-Mori” Development

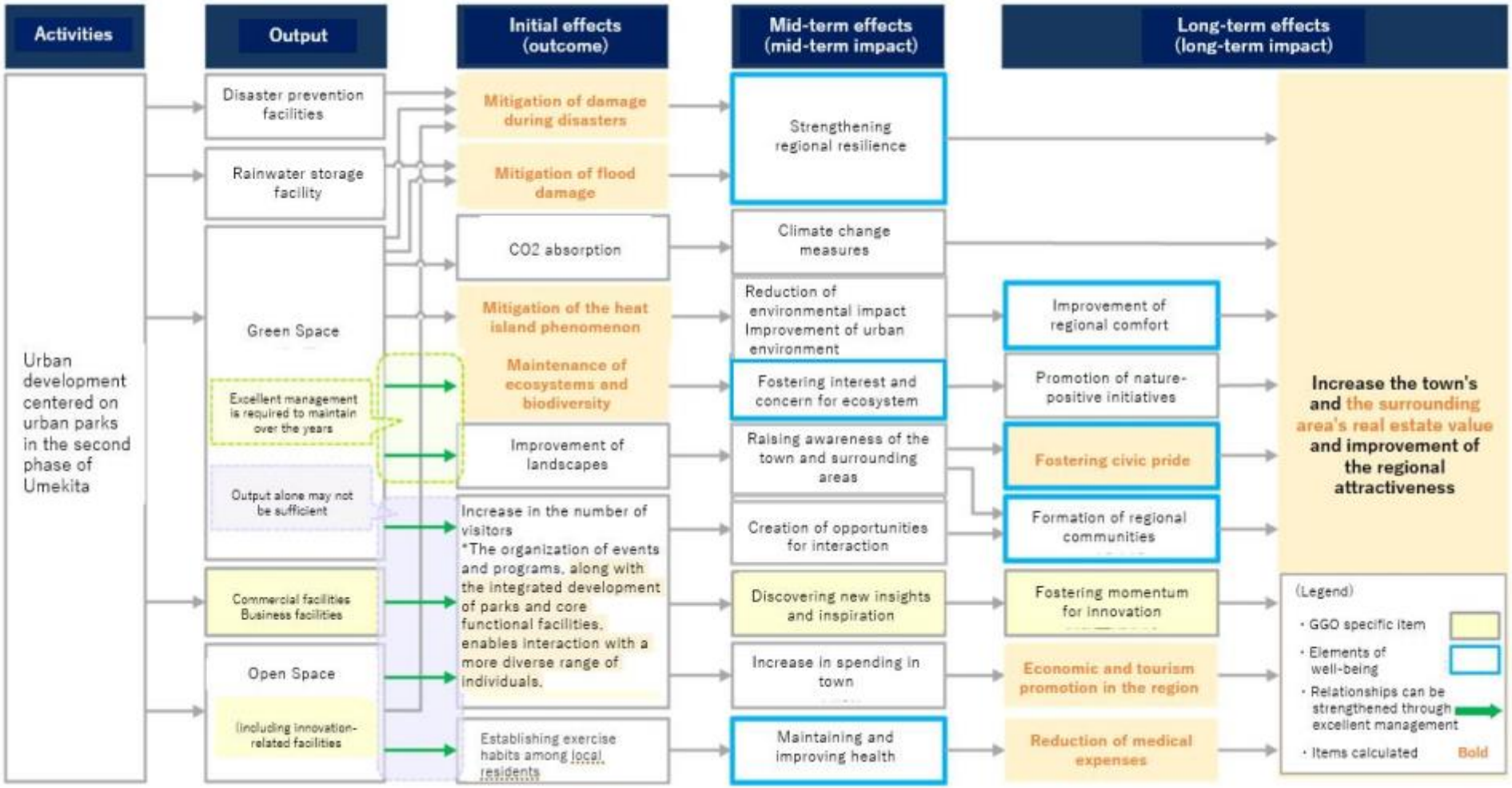
◯ " Nigiwai-no-Mori” (Inabe City, Mie Prefecture) organizes the outcomes of the project around four key axes: disaster prevention, environment, social interaction, and health (referred to as “Mori” or forest). It identifies outcomes that contribute to the realization of the envisioned future of the city, as outlined in the long-term plan *INABE Nigiwai Plan: The Road to 2024*.



Source: Inabe City, Mie Prefecture (2022). ″Project Report on the Leading Green Infrastructure Model Development Support Project.″

(Reference) Logic Model for the Second Phase of the Umekita Area Development

○ The Urban Renaissance Agency (UR) and the Development Bank of Japan Inc. (DBJ) have developed a logic model for “Grand Green Osaka,” located in the Umekita 2nd Phase Zone (Osaka City, Osaka Prefecture). The model organizes the initial and med-term effects of various on-site facilities and illustrates how these lead to the ultimate long-term outcome: an increase in real estate value and overall appeal of the district and surrounding areas.



Citation: Joint Study by the Urban Renaissance Agency (UR) and the Development Bank of Japan Inc. (DBJ),Visualizing the Social Impacts of Green-Centered Urban Development.

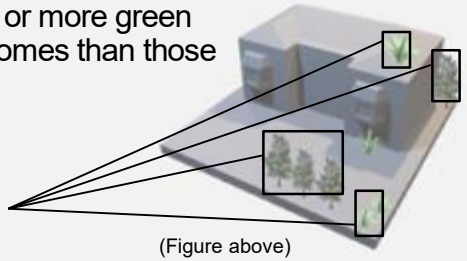
New Economic Value Analysis (On-site Green Infrastructure and Real Estate Value)

- While there has been a great deal of research on the relationship between the existence of green space around a property and the value of the property (transaction value, etc.), there have been few studies analyzing the relationship between the green space on the property and the value of the property; thus, this study group researched the relationship between the green infrastructure on the property and the value of the property.
- The analysis primarily focused on quantitatively evaluating corporate assets and profits in the real estate sector by examining the relationship between the end-of-term monthly rental income of properties and the percentage of green space on the property. A hedonic pricing approach was utilized to conduct a present state analysis of these factors (specifically targeting REIT properties located within the 23 wards of Tokyo).
- The analysis revealed that, while significant results were not obtained for the variables related to green infrastructure in the central 23 wards of Tokyo, a notable difference was observed in the central 5 wards (Chiyoda, Minato, Chuo, Shinjuku, and Shibuya). Properties with 10% or more green space within their premises demonstrated approx. 7.4% higher monthly rental income (per tsubo) than properties with less than 10% green space. Furthermore, office properties with 10% or more green space achieved 12.4% higher rental incomes than those with less than 10% green space.

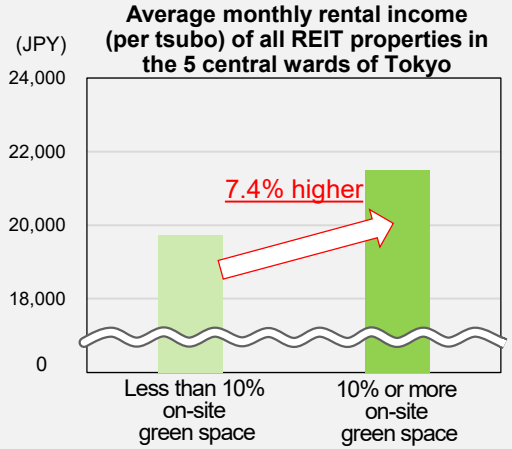
Analysis results

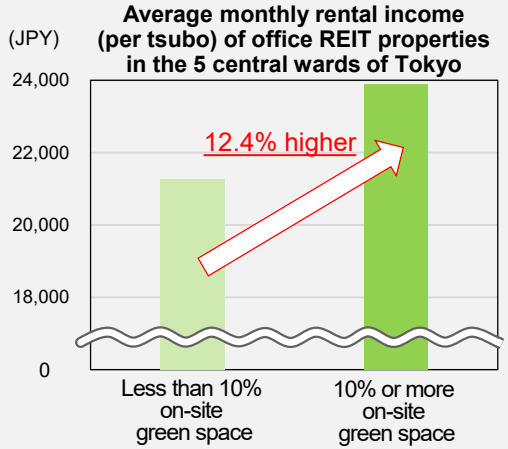
- The analysis indicated that the green infrastructure variable showed no significant effects across the 23 central wards of Tokyo.
- However, in the 5 central wards of Tokyo, properties with 10% or more on-site green space reported a 7.4% higher monthly rental income (per tsubo) than those with less than 10% green space.
- Furthermore, office properties with 10% or more green space achieved 12.4% higher rental incomes than those with less than 10% green space.

The green space visible in the aerial photograph is classified as "on-site green space."



(Figure above)
Image depicting 10% on-site green space





Note: Average values for each criterion are used for the graph data.

Analysis flow

- Collection of real estate data and data on on-site green space
- Setting variables for analysis (dummy variables, logarithmization of numerical values)
- Data cleaning, filtering, and processing of anomalies
- Combine each variable (total floor area, floor area ratio, age of building, etc.) and perform multiple regression analysis
- Discussion of analysis results

Limitations and challenges of this study

- Biased real estate information in REITDB data
  In J-REIT, the data primarily comprises small- and medium-scale properties, leading to the underrepresentation of large-scale property trends. This may result in biased outcomes.
- Discrepancy between greening area and visible greenery
  Aerial photographs used in the data do not capture all greenery, hence creating a gap between the actual green area ratio and the numbers shown in the data. Moreover, the volume of greenery was not considered in this analysis.
- Consideration of qualitative characteristics of green spaces
  The analysis has not considered the quality of plant management, wildlife habitats, or the creation of community spaces. Future analysis will need to incorporate these qualitative characteristics.

Evaluation and Certification Systems

Evaluation and Certification Systems

（Evaluation and Certification systems）

○ Up to this point, we have reviewed case studies, previous research, logic models, and economic value analyses related to visualizing the external and internal economic value brought by green infrastructure. One method of visualizing these values can be considered to be evaluation and certification systems. By obtaining evaluation and certification, it can lead to improved corporate social evaluation, such as IR effects and ESG ratings (e.g., GRESB), as well as enhanced fundraising ability from diverse investors.

○ Currently, various evaluation and certification systems are in place and being utilized in the fields of architecture and urban development, such as CASBEE, DBJ Green Building, LEED, SITES, SEGES, and JHEP. In this chapter, an attempt is made to organize the existing evaluation and certification systems in relation to GRESB, as well as property use and site scale (P52-54).

*The target properties were extracted from REIT DB, but it is important to note that not all certified properties may apply.

○ In May 2024, the ‘Act Partially Amending the Urban Green Space Act' was enacted to strongly promote solutions to issues such as climate change mitigation, biodiversity preservation, and improving well-being. It focuses on securing both the quality and quantity of green spaces in urban areas, introducing renewable energy, and promoting the efficient use of energy to realize a better urban environment. In order to attract private investment for the development of urban environments in harmony with greenery, the government plans to establish a system for evaluating and certifying efforts by private businesses to secure green spaces. This will facilitate the 'visualization' of the value of initiatives aimed at securing high-quality green spaces (P64).

Major Evaluation and Certification Systems Related to Green Infrastructure ①

○ Currently, various evaluation and certification systems are in place and being utilized in the fields of architecture and urban development for environmental assessment and certification.

		Certification System	Overview	Relationship with GRESB (Real Estate)*
Abroad	–	**GRESB**	• An evaluation system to measure ESG considerations at the corporate and fund level in the real estate sector. It is scored on two axes: 'Management Component' and 'Performance Component,' with rankings ranging from one star to five stars. • Sector：Real Estate/Infrastructure Fund/Infrastructure Asset/Infrastructure Development Asset/Public Disclosure	–
	Building	**Fitwel**	• It is a system developed and operated in the United States that evaluates and certifies buildings from the perspective of occupant health. Certification results are ranked using a three-star rating system. Evaluation criteria include location and access to the building, indoor and outdoor environments, and preparedness for emergencies. • Sector：New construction(Design/Built)/Existing Building(Built only)	○
		WELL Building Standard	• A spatial certification system focused on occupant well-being. It integrates design, construction, and operations with medical and scientific research, and evaluates based on ten concepts: Air, Water, Nourishment, Light, Movement, Thermal Comfort, Sound, Materials, Mind, and Community.	○
	Site/Urban space	**Eco Districts**	• This tool, developed by the nonprofit organization EcoDistricts, supports the formulation of a shared sustainability vision and actionable strategy through the collaborative engagement of diverse stakeholders such as residents, landowners, employees, businesses, nonprofits, and public authorities. The framework is structured around three core requirements—Equity, Resilience, and Climate; six priority areas—Place, Prosperity, Connectivity, Health & Well-being, Living Infrastructure, and Resource Regeneration; and three stages of implementation—Organize, Roadmap, and Performance.	–
		SITES	• An environmental certification system specialized in landscapes. Calculate the benefits of the landscape as a whole, including soil, plants, water, and hardscape. Projects without buildings are also subject to evaluation.	–
	Both categories exist	**BREEAM**	• A green building certification system originating from the UK. While the assessment criteria are similar to those of LEED, it is aligned with UK regulations and systems. Applicable to both existing and new buildings, it is evaluated across 11 categories: Management, Water, Energy, Transport, Health & Wellbeing, Pollution, Resources, Resilience, Land Use & Ecology, Materials, Waste, and Innovation. • Sector：In-use/Refurbishment and fit-out/New construction/Infrastructure/Home Quality Mark/Communities	△ *In-Use、Refurbishment and fit-out、New construction、Home Quality Mark only
		LEED	• A green building certification system originating from the US. The system assesses a building's environmental performance based on its ability to minimize environmental impact and improve user comfort. The system includes distinct evaluation criteria for new and existing buildings, as well as for different targets (such as buildings, tenants, or districts), and is globally recognized and widely used. • Sector：Building Design + Construction(BD+C)/Interior Design + Construction(ID+C)/ Operations + Maintenance(O+M)/Neighborhood Development(ND)/Homes/Cities and Communities	△ *BD+C、ID+C、O+M、ND、Homes only

*Starting from 2024, GRESB has incorporated the duration of holding a green building certification as a factor in its evaluation, affecting the overall score. Moreover, preparations are being made for upcoming changes after 2025, including the review of standards for related certification systems relevant to GRESB's assessment.

Major Evaluation and Certification Systems Related to Green Infrastructure ②

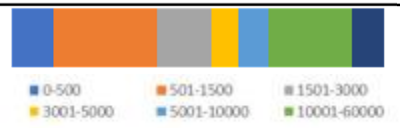
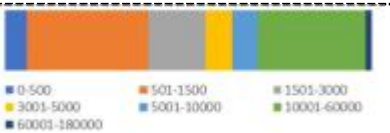
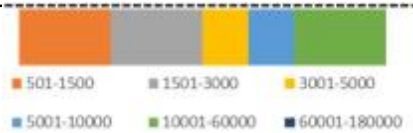
○ Currently, various evaluation and certification systems are in place and being utilized in the fields of architecture and urban development for environmental assessment and certification.

		Certification System	Overview	Relationship with GRESB (Real Estate)*
Domestic	Building	**DBJ Green Building**	• A green building certification system originating from Japan. In contrast to CASBEE, it offers a holistic assessment of the physical (hard) and operational or management (soft) performance of real estate, with a focus on ESG considerations. Beyond environmental performance, the system also considers user comfort, disaster resilience and safety, integration with the surrounding environment and community, and cooperation with stakeholders. • Sector：Office buildings/Retail/Logistics facilities /Residences/Hotels	○
	Site/Urban space	**ABINC** (Certification for Businesses in Harmony with Nature)	• A certification system designed to promote harmony with nature in corporate activities by recognizing business sites—such as factories, urban developments, and residential areas—that are considerate of biodiversity. • Sector：Factory/Urban area・SC（Shopping center）/Residential complex/Detached housing complex/Logistics facility/Golf club/ABINC ADVANCE (District-level large-scale facility)	△ *Urban area・SC only
		JHEP (Japan Habitat Evaluation and Certification Program)	• A certification system that focuses on the increase or decrease in biodiversity value before and after a project. A system that calculates the biodiversity value based on three axes: quality, area, and time of the habitat, for all projects aimed at the conservation, restoration, and transformation of habitats (wildlife living environments).	–
		SEGES (Social and Environmental Green Evaluation System)	• The system that evaluates well-maintained green spaces created by companies and other entities based on their daily activities and initiatives, and certifies them as green spaces that contribute to society and the environment. It takes into consideration the functionality of green spaces, the sustainability of land use, and the respect for the potential value of the local community. • Sector：SEGES OMA (Operation, Management and Active use)/SEGES ESW (Environmental friendliness, Safety and Well-being)/SEGES PDC (Planning, Designing and Construction)	○
	Both categories exist	**CASBEE**	• A green building certification system originating from Japan. It is evaluated using an index that divides "environmental quality" by "environmental impact." This comprehensive assessment of the building's quality includes environmental considerations such as the use of energy-efficient and low-impact materials, as well as attention to indoor comfort and aesthetics. It is characterized by the fact that it is linked with the initiatives of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), offering benefits such as grant systems and relaxation of floor area ratios. • Sector：Detached Houses (New / Existing) /Architecture (New Construction / Existing / Renovation)/Real estate/Block/Wellness Office	△ *Architecture, Real Estate, and Wellness Offices only.

*Starting from 2024, GRESB has incorporated the duration of holding a green building certification as a factor in its evaluation, affecting the overall score. Moreover, preparations are being made for upcoming changes after 2025, including the review of standards for related certification systems relevant to GRESB's assessment.

The Characteristics of Properties That Have Obtained Certification under Various Evaluation and Certification Systems

○ Analysis and organization of the main usage types and site area sizes of properties under REITs that have obtained major evaluation and certification systems.

Certification System Name（Number of REIT Properties）	Characteristics of Certifications	Certification-acquired Property Information REIT Database	
		Primary Use	Site Area / Scale of Land
DBJ Green Building 477 properties	Based on a comprehensive evaluation that includes not only the environmental performance of the target property but also the response to various stakeholders, the property is evaluated and certified.		
ABINC 8 properties	Properties, including buildings, that are engaged in creating green spaces and other efforts that consider biodiversity, are evaluated based on the JBIB's "Ikimono Kyosei Jigyosho® Suishin Guidelines".		
SEGES OMA (Operation, Management and Active use) 1 property	The evaluation and certification of social and environmental contribution activities related to the preservation and creation of green spaces of 300㎡ or more owned by the business operator.		
SEGES ESW (Environmental friendliness, Safety and Well-being) 13 properties	The evaluation and certification of urban green spaces created by companies and other entities, based on their efforts toward public accessibility, safety, and environmental consideration.		
SEGES PDC (Planning, Designing and Construction) 2 properties	The evaluation and certification of green plans that create high-quality green spaces in urban development and architectural planning, contributing to society and the environment.		
CASBEE Real estate 797 properties	The development of evaluation criteria strongly related to real estate assessment, limited to office buildings, retail stores, and logistics facilities that have been completed for over one year.		
CASBEE Architecture 52 properties	Applicable to all uses except for detached houses. It can be used for purposes such as setting environmental performance standards for buildings, establishing design goals, conducting detailed evaluations of environmental design implementation, and obtaining third-party certifications.		
CASBEE Wellness Office 8 properties	The primary target use is office buildings. It evaluates the specifications, performance, and initiatives of the building that support the maintenance and enhancement of the health and comfort of its occupants.		

Source: REITDB and the official websites of each certification system and IBECs (Information as of May 30, 2023), compiled by the secretariat, covering REIT properties nationwide.

Green Infrastructure × Environmental Certification Case Study ① (Building)

CASBEE Architecture

AEON Mall Toki

Category Top-tier S Rank

- Opened in 2022 in Toki City, Gifu Prefecture, AEON Mall Toki is a commercial complex built amidst lush greenery. It features a lawn area with terrace seating where visitors can relax and spend the whole day comfortably. On its rooftop, the mall is equipped with one of the largest mega solar panel installations among commercial facilities in Japan, generating electricity and embodying a mall that is friendly to both people and the environment.

Features

■ A freely accessible garden for relaxation
The mall features "TOKINIWA," a relaxing open garden area that includes an approximately 800 -square-meter natural grass lawn and a 600-square -meter event space with artificial turf.

■ Open-air garden terrace
Under a lush, green open-terrace environment, the space is designed to allow visitors to feel the natural breeze flowing from the first to the second floor, creating a rich and relaxing atmosphere. A lawn area has been incorporated to connect the local community with its people, making the open terrace a hub for interaction and connection among a diverse range of individuals.

■ Dining area
In addition to terrace seating where you can enjoy your meal while taking in the changing seasonal views, various trees are also placed along the indoor pathways, offering a dining space that allows you to experience the soothing embrace of nature.

Evaluation points

- In the environmental performance evaluation of the building, high evaluation scores were achieved in energy-related categories, with efforts made to reduce the building's thermal load and improve the efficiency of its systems.
- In the environmental quality evaluation of the building, high scores were achieved in indoor environmental categories, with good lighting and visual conditions, and in the site outdoor environmental categories, with **a well-maintained streetscape and landscape.**

Source: AEON Mall Toki official website, AEON Mall press release "Grand Opening of AEON Mall Toki", CASBEE evaluation results.

CASBEE Real Estate

Isetan Shinjuku The roof/I-GARDEN

Category Top-tier S Rank

- The rooftop garden "I-Garden" at Isetan Shinjuku Main Store was created as part of the rooftop renovation plan, which included facility upgrades and seismic reinforcement work. Along with enhancing safety and increasing the building's value, the goal was to create a space where visitors can relax and unwind in the heart of the city.
- **It is a spacious lawn area and a tranquil garden interwoven with a grove of trees, including cherry blossoms and autumn foliage.** Drawing on the simple, natural plants commonly found in satoyama, visitors can experience the beauty of the changing seasons.

Features

■ Green space management
The approach is based on preventive measures and early detection and response. To minimize nutrient runoff, coated fertilizers are used for the trees, and **to maintain a natural landscape**, shrubs are selectively pruned rather than being sheared. Also, improving air circulation helps prevent the occurrence of pests and diseases. When pests or diseases occur, we make efforts to minimize the use of chemical pesticides by manually removing pests and using alternative treatments such as oleic acid and Bacillus subtilis (natto bacteria), both of which are also used in food products. Thanks to reduced pesticide management, a relatively high diversity of insect species is maintained within the garden. Numerous flying insects, such as butterflies and bees, are drawn to nectar sources and host plants **fostering the development of a key site that supports the urban biotope network.**

Evaluation points

- In the highest-rated category of biodiversity and site management, the initiatives for biodiversity conservation, as well as the site's direct connection to a subway station, which ensures excellent accessibility via public transportation, were highly evaluated.

Source: MLIT website "Corporate Initiatives for Green Space Conservation and Creation"; Isetan website, "The roof/I-GARDEN"

Green Infrastructure × Environmental Certification Case Study ② (Building)

CASBEE Wellness Office

GRAND GREEN OSAKA

Category	Top-tier S Rank

- Centered around expansive greenery, GRAND GREEN OSAKA—a complex integrating diverse functions such as offices and commercial facilities—was completed in November 2024. **A 45,000 m² urban park directly connected to JR Osaka Station is being developed through a public-private partnership**.
- The offices feature a variety of workspaces designed to accommodate diverse companies and work styles, with the aim of fostering innovation.

Features

■ Offices with views of greenery and the cityscape

from the lower floors, tenants can enjoy views of the park's greenery, while the upper floors offer sweeping vistas of Osaka City and the Yodogawa River. The office lobby takes full advantage of the expansive park view, **providing a lush, open atrium space that seamlessly integrates with the surrounding greenery**.

■ Office lounge exclusively for employees

A terrace seamlessly integrated with a lawn plaza and deck, a cafeteria facing the terrace where you can enjoy breathtaking natural views, dining spaces where you can enjoy time alongside the view of the sky through the windows, and workspaces—all of these elements together create an environment where you can feel closely connected to the park and the sky. This space allows for a comfortable connection between the city and nature, fostering new ideas, interactions, and ways to spend time. **It is designed to encourage new encounters, stimulate intellectual curiosity, spark inspiration, and enhance well-being** through healthy meals.

Evaluation point

- In the highest-rated category for safety and security, measures have been implemented for disaster response, hazardous substance management, water quality safety, and security measures.
- In the next highest-rated category for convenience improvement, infrastructure has been developed for **mobility spaces, communication**, and advanced information and communication technologies.

Source: Mitsubishi Estate website, GRAND GREEN OSAKA, CASBEE Evaluation Results

LEED Building Design & Construction

Chugai Life Science Park Yokohama

Category	LEED v4 BD+C: New Construction category — certified LEED GOLD®

- Launched in April 2023, Chugai Pharmaceutical's research facility is based on the concept of a cutting-edge innovation lab spread across lush greenery. As the surrounding area is a residential neighborhood, **coexistence with the local community** was a key concept and one of the most important challenges in the planning process. To promote harmony with the community, **the site incorporates abundant greenery and features a design that blends seamlessly into the local environment.**
- The facility is designed with innovative equipment to promote energy efficiency and the generation of energy using natural energy sources. It also takes into account environmental considerations, such as CO2 reduction, aiming for a sustainable design that coexists harmoniously with the environment.

Features

■ Use of circular resources

As part of rainwater storage and reuse, the residential building is equipped with rainwater storage tanks and rainwater filtration systems. The filtered rainwater is reused for flushing toilets and **irrigating outdoor green spaces,** aiming to reduce water consumption.

■ Greening measures

➢ Harmonization with the local landscape

The area is developed as a large green belt, reducing the sense of pressure on pedestrians on the front road and nearby buildings, while also creating a lush and vibrant landscape.

➢ Succession of cherry blossom tree-lined avenues

To give depth to the cherry blossom landscape, cherry trees have been planted in a linear arrangement along the site's boundaries. Additionally, cherry trees are widely planted in the green belt on the west side of the site, **ensuring that the historic cherry blossom scenery is preserved and expands across the area.**

Evaluation point

- The design focuses on high energy efficiency, **reduction of water usage, selection of sustainable sites for development**, responsible material choices and waste management, as well as improving indoor environmental quality.

Source: Chugai Pharmaceutical website, "Environmental Initiatives at Chugai Life Science Park Yokohama"; GBIG website "216 Totsukacho"

Green Infrastructure × Environmental Certification Case Study ③ (Building)

DBJ Green Building
SHINAGAWA SEASON TERRACE

Category	Highest rank "Platinum" plan certification

- Shinagawa Season Terrace, a mixed-use building primarily consisting of office spaces, **has created a vast 3.5-hectare green open space** by constructing an artificial ground on the existing sewerage facilities on the north side of the building, in conjunction with the redevelopment of the Shibaura Water Reclamation Center.
- By incorporating tree-shaded areas, water features, and green walls, the site also serves as a "cool oasis" in the city. It helps **secure a wind corridor** from Tokyo Bay to the city center, contributing to the mitigation of the urban heat island effect.

Features

■ Latest environmental performance
Equipped with the latest environmental performance, including air conditioning heat source systems utilizing sewer heat, highly sensitive human presence and daylight sensors, as well as the adoption of solar power generation and solar lighting systems.

■ Enhancing local disaster resilience
Equipped with the highest level of seismic performance through seismic isolation structures, emergency power supplies capable of supporting 72 hours, as well as measures to assist stranded commuters, the building demonstrates exceptional consideration for disaster prevention, tenant business continuity, and enhancing regional disaster resilience.

■ Creation of an ecosystem network
By developing a vast 3.5-hectare green space to **create an ecosystem network** and installing water-retentive pavement such as cool walls and cool roads, exceptional efforts are planned in consideration of biodiversity and countermeasures against the urban heat island effect, ensuring these initiatives are preserved.

Evaluation points

- Equipped with the latest environmental performance, including 'water flow windows' that create a film of water on the glass surface for cooling through evaporative heat, air conditioning heat source systems utilizing sewer heat, highly sensitive human presence and daylight sensors, as well as the adoption of solar power generation and solar lighting systems.
- Equipped with the highest level of seismic performance through seismic isolation structures, emergency power supplies capable of supporting 72 hours, as well as measures to assist stranded commuters, the building demonstrates exceptional consideration for disaster prevention, tenant business continuity, and enhancing regional disaster resilience.
- By developing a vast 3.5-hectare green space to create an ecosystem network and **installing water-retentive pavement systems such as cool walls and cool roads**, exceptional initiatives are planned **in consideration of biodiversity** and **measures to combat the urban heat island effect.**

Sources: MLIT press release, "The Third Green Infrastructure Grand Prize-'Minister of Land, Infrastructure, Transport and Tourism Award' decided.", NTT Urban Development press release,"Shinagawa Season Terrace, the Landmark for International Business Hub, Achieves the Highest 'Platinum' Rank in the DBJ Green Building Certification System." Shinagawa Season Terrace website, "About Shinagawa Season Terrace." Development Bank of Japan (DBJ) website, "DBJ Green Building Certification for NTT Urban Development Co., Ltd. and Hulic Co., Ltd. regarding 'Shinagawa Season Terrace.'" Nikkei BP (2023),"Learning from the Green Infrastructure Grand Prize: Space and Its Management."

Green Infrastructure × Environmental Certification Case Study ④ (Building)

WELL Building Standard

Azabudai Hills Mori JP Tower

Category Achieved the highest 'Platinum' rank in 'WELL Core'

- Azabudai Hills is based on the concept of 'GREEN & WELLNESS' and 'A city like a plaza that connects people, surrounded by greenery.' It aims to create a completely new type of urban development, where diverse people gather in an environment harmonized with nature, surrounded by overwhelming greenery, **fostering a new community where people can live in a more human-centered way.**
- The certified WELL Core applies to the common areas of the office and commercial sections. The highest rank, Platinum certification, is the first of its kind in Japan for this property. Moreover, this property has the largest registered area among all WELL-certified properties, including all ranks, in Japan.

Features

■ Surrounded by overwhelming greenery, an environment where the city and nature are in harmony.

By considering the flow of people and gathering spaces, a plaza is placed at the center of the city, with a **seamless landscape** planned. **By utilizing the terrain's elevation changes** and greening the entire site, including the rooftop of the low-rise section, approximately 24,000m² of green space is secured, including a central plaza of about 6,000m², even within the existing urban area of the city center. A landscape where greenery and water are connected has been developed, creating a natural, relaxing space.

■ Creating a green space where the changing seasons can be experienced

➢ Aiming for greenery that people can interact with, approximately 320 types of plants, which change their appearance with each season, spread throughout the city. An orchard and vegetable garden are located on the sloped green area visible from the central plaza. Utilizing the terrain's elevation changes, **water flowing throughout the site** connects to the central plaza, **forming an ecotone with aquatic plants, grasslands, and low shrub plantings.** The goal is **to create planting that serves as a habitat for living creatures while maintaining a hierarchical structure.**

Evaluation points

- Exercise: **Good access** to the central square.
- Mind: The design should incorporate elements of nature and art.
- Food: **The maintenance of an orchard** and the provision of healthy meals at "Hills House Azabudai."
- Air: The implementation of high-performance air conditioning filters to prevent the intrusion of harmful substances into the building, maintaining air quality at a high standard within the building.
- Exercise:・Community: Promoting physical activity through **wellness-related events, such as those held in the central square.**

＜Other wellness-related initiatives＞

- Water: Promoting water consumption by installing water purifiers in shared office areas and providing drinking water stations in the central square.
- Air: Providing air quality visualization services in the office

Source: Azabudai Hills website "Green & Wellness," Mori Building press release「WELL Core"Achieved the highest Platinum certification in WELL Core."

Green Infrastructure × Environmental Certification Case Study ⑤ (Building)

BREEAM

Shonan Health Innovation Park (Shonan iPark)

Category The fourth level from the top, "Good," on a 6-point scale

- Opened in April 2018 by Takeda Pharmaceutical Company, this is Japan's first science park established by a pharmaceutical company. It aims to accelerate health innovation by bringing together a wide range of industries, government, and academia of various sizes and sectors. Not only pharmaceutical companies, but also around 150 companies and organizations from next-generation medicine, cellular agriculture, AI, and government sectors, with over 2,000 people (as of April 2023), have gathered to form an ecosystem.
- The operation is led by personnel with expertise in life science business, aiming to create a platform where "the social implementation of innovative ideas" becomes a reality, accelerating research and enabling its societal application.

Features

■ Formation of a community
While organizing platforms to promote research collaboration, efforts are focused on **fostering a culture where communities naturally emerge** from individual interactions between residents. As a result, many communities have formed and continue to thrive, such as the "Shonan iPark Science Café" for science discussions through paper presentations and club activities centered around shared hobbies. Additionally, systems are in place to provide free consultations on science and business, such as "Science Mentors" and "Pharmaceutical Study Groups," contributing to a culture of mutual support and community-building that leverages each resident's area of expertise.

■ It is estimated that there are over 350 plant species inhabiting the site.

■ The purchase of 100% renewable energy electricity has commenced.
Since 2021, all electricity purchased for the facilities at Shonan iPark from TEPCO Energy Partner, Inc. has been switched to 100% renewable energy sourced electricity with non-FIT (Feed-in Tariff) non-fossil certificates.

Source: Shonan Health Innovation Park website "About Shonan iPark," and the press release "Commencement of Purchasing 100% Renewable Energy at Facilities of Shonan iPark."

Fitwel

RESISTAY HOTEL SUN CHLORELLA

Category The highest rating of a three-star certification

- RESISTAY HOTEL SUN CHLORELLA, a lodging facility that opened in July 2020, is designed with the concept of health and a comfortable living space.
- In January 2021, this hotel became the first in Japan to be awarded a three-star "Fitwel" certification for building wellness.

Features

■ It features a Taiwanese restaurant, and a healthy cold-pressed juice stand that use chlorella, seasonal fruits, and vegetables, making them accessible not only to guests but also to both domestic and international tourists visiting Kyoto, as well as local residents.

Evaluation point

- It is a hotel **that takes environmental sustainability and the well-being of its staff into consideration.**

Source: Sun Chlorella website "'RESI STAY HOTEL SUN CHLORELLA' Becomes the First in Japan to Earn the 'Fitwel Certification' Three Stars."

Green Infrastructure × Environmental Certification Case Study ⑥（Site/Urban Space）

CASBEE District

Kobe Suma Seaworld and Seaside Park Redevelopment Project

Category	Top-tier S Rank

- The seaside park where Kobe Suma Seaworld is located has remained unchanged for many years, and there has been a demand for how to make better use of urban parks. Therefore, a redevelopment was carried out to utilize the potential of the aquarium and seaside park, resulting in the birth of a new facility in 2024.
- This redevelopment project has achieved an S rank under the 2023 edition of the new CASBEE district certification standards, making it the first in Japan to obtain this rank for the targeted facilities in the district (aquarium, hotel, parking, entertainment facilities, and park).

Features

■ Sustainable Initiatives

Drawing lessons from the Great Hanshin-Awaji Earthquake, the facilities and park itself focus on themes such as heat, water, and disaster prevention. Sustainable initiatives have been implemented, including energy self-sufficiency during major disasters and eco-friendly facility development during normal times.

➢ Heat Source Water Network

By using a heat source water network and a water-cooled heat source system, the goal is to reduce energy consumption. These energy-efficient methods, suited to the characteristics of the aquarium, aim to lower environmental impact.

➢ Zero Water Aquarium

By reducing seawater usage with an ultra-water-saving filtration system and making advanced use of well water treatment equipment for general air conditioning and heat prevention measures, the overall water usage is reduced.

➢ Reliable infrastructure and energy independence in emergencies

Based on the lessons learned from the Great Hanshin-Awaji Earthquake, it was recognized that self-sufficiency in water, electricity, and heat is essential. To strengthen the business continuity plan, a seawater intake system has been implemented that allows for water intake without power requirements during both normal and emergency situations.

Evaluation point

- In the environmental impact reduction performance evaluation of the building, high ratings were achieved in the energy category by utilizing unused energy and improving energy efficiency.

Source: Kobe Suma Parks+Resorts Joint Venture Press Release "Suma Seaside Park Partial Area Opens Early, and Entertainment Facility Tenants Open in the Park, "Various Environmental Certifications, Including the 'CASBEE District 2023 Edition S Rank' as the First in Japan, Have Been Obtained,"CASBEE District Evaluation Results.

LEED ND（Neighborhood Development Category）

Minami Machida Grandberry Park

Category	LEED v4 BD+C: New Construction category — certified LEED GOLD®

- Minami Machida Grandberry Park is located in an area of about 22 hectares, centered around the site of the Grandberry Mall, which closed in 2017, and the surrounding Tsuruma Park to the south of Minami Machida Grandberry Park Station. The project, which involves **collaboration between the public and private sectors, is focused on the integrated redevelopment and reconstruction of urban infrastructure, commercial facilities, urban parks, and the station.** The goal is to create a 'new hub for living' where nature and vibrancy come together, allowing people to enjoy a park life.
- Minami Machida Grandberry Park, which celebrated its opening in November 2019, obtained LEED ND (Neighborhood Development) Gold certification for approximately 15 hectares of the area in July 2022. Additionally, the station building also received LEED NC (New Construction) Gold certification in June 2022.

Features

■ Creating a walkable city through the development of pedestrian networks

By constructing new roadways and establishing pedestrian spaces between commercial facilities and parks, the area has been reorganized into a walkable city with separated pedestrian and vehicle zones, seamlessly connecting the commercial facilities and parks.

■ Landscape design that leverages green infrastructure

Additionally, conventional measures for controlling rainwater runoff, such as retention basins and rainwater storage tanks, green infrastructure that utilizes the natural environment's inherent functions is being adopted. The landscape design incorporates a permeable, stone-lined ditch known as **"Rain Path: Bioswale,"** which surrounds the site, along with a recessed planting area referred to as **"Rain Garden,"** utilizing these features to enhance environmental functionality.

Evaluation point

- By developing pedestrian networks, the area is being transformed into a **walkable city** where people can freely wander while enjoying both nature and the lively atmosphere.
- **The design incorporates green infrastructure into the landscape, emphasizing the use of natural environmental functions to create sustainable and eco-friendly spaces.**

The source: Machida City Press Release "Minami-Machida Granberry Park obtains Gold Certification for 'LEED NC (New Construction)' and 'LEED ND (Neighborhood Development)' – The first domestic Gold certification for a development including station facilities."

Green Infrastructure × Environmental Certification Case Study ⑦（Site/Urban Space）

SITES

Daiwa House Group MIRAI KACHI KYOSO Center “Kotokurie” (Nara Pref.)

- Daiwa House has opened the Future Creation Co-Creation Center with the aim of providing a space where people of all generations, from children to adults, can learn, think, grow, and co-create future values, while nurturing human resources alongside society. The outdoor space is **always open, allowing anyone to freely stroll and experience the changing seasons.**
- The planned site is located at the boundary of ancient residential ruins, streets, and a water feature resembling a Nara-period garden, which were discovered during archaeological excavations of buried cultural assets. Furthermore, the exterior walls are made using soil from the site, dating back to the Nara period, creating a design that evokes a sense of 1,300 years of history.

Features･Evaluation Points

■ Planting plans and efforts towards biodiversity
The planting plan incorporates historical elements, selecting nearly 60 plant species mentioned in Japan's oldest anthology of poems, the **"Manyoshu**," compiled during the Nara period. **Moreover, educational programs** centered on the Manyoshu and Manyo plants are conducted. Furthermore, by incorporating native plants and local materials, efforts to restore the regional ecosystem have begun yielding results. Notably, a rare bird of prey in Nara Prefecture, the peregrine falcon, has started to visit the area, **indicating the positive impact of biodiversity conservation initiatives.**

■ The green infrastructure spreading across the entire site
By transitioning from traditional gray infrastructure, such as concrete and metal-covered stormwater management facilities, to green infrastructure, rainwater is absorbed and stored on-site without flowing off the property. This helps reduce the burden on public sewage systems and the potential for flooding, while also alleviating the urban heat island effect. Rainwater that falls on the building's roof is collected in an underground storage tank and is used for irrigation, water features, and toilet flushing.



Source: Daiwa House Group website, “Architecture Creating the Future” SITES website” Daiwa House Group MIRAI KACHI KYOSO Center”

SEGES

Yokohama Nomura Building

Category	SEGES PDC (Planning, Designing and Construction)

- The Yokohama Nomura Building is a high-rise office building **featuring a lush outdoor plaza that offers the comfort of nature and creates a lively and relaxing space integrated with the retail establishments on the lower floors.**
- As the final development within the Minato Mirai 21 city planning area, the project was designed with a strong emphasis on harmony with the already developed adjacent sites. It also aims to create a green plaza that serves as a connecting hub for three major developments, providing a vibrant and relaxing space for the local community.

Features

■ Smart urban development suitable for an environmentally sustainable future city
By incorporating plant materials suited to the local environment and implementing a greening plan that takes biodiversity into account, we will also introduce **unique and advanced urban greening technologies such as green louvers and cool furniture**, sharing new approaches to urban greenery with the public.

■ Consideration for the surrounding environment and local community
Environmental considerations are made from three perspectives—nature, the city, and people—**by forming ecological networks with the surrounding natural environment** and integrating with the urban axis. The greening plan is designed to **create a sense of greenery and vibrancy** for building users, especially office workers, as well as for visitors to the area.

Evaluation point

- By leveraging the benefits and functions of greenery, **the project enhances environmental performance** while also strengthening the role of green spaces as areas for social interaction and relaxation.
- The project **undertakes initiatives** to explore new greening technologies and actively share related information.



Source: SEGES website, “Green Projects List – Yokohama Nomura Building Plan”, Nomura Real Estate Press Release: “Completion of Yokohama Nomura Building – One of Japan’s Largest Standard Floor Area Office Buildings”, Urban Greening Organization website :“ The 17th Rooftop and Green Wall Greening Technology Contest"

Green Infrastructure × Environmental Certification Case Study ⑧（Site・Urban Space）

ABINC

MORIOKA SEIKO INSTRUMENTS INC.

- Seiko Group's watch manufacturing plant, Morioka Seiko Industry, recognizes that its business activities benefit from ecosystem services and simultaneously impact them. **The company prioritizes the coexistence of manufacturing and the natural environment and is committed to creating green spaces for biodiversity conservation** (this is the first factory initiative of its kind).

Features

■ Waterside Biotope “Waku-Waku Tope”
Utilizing natural purification processes, **the system maintains water quality by circulating water resources such as rainwater from the factory.** It also supports biodiversity by enabling the monitoring of aquatic organisms and plants, contributing to the conservation and enhancement of waterside biodiversity. In the future, the goal is to establish a habitat for regionally rare species such as tanago (bitterling fish) and fireflies.

■ Implementation of monitoring
Monitoring of birds and animals inhabiting the green spaces is conducted using outdoor sensor cameras. In addition, surveys of native forest trees and environmental maintenance activities are carried out to ensure the sustainable management of the green areas.

■ Environmental education program
Environmental education classes are held for children to learn about conservation and biodiversity. Activities include building insect hotels to support habitats for microorganisms and insects and managing green spaces through thoughtful mowing practices to create insect-friendly environments. These efforts aim to **foster environmental awareness** among children and the wider community.

Evaluation Points

- With the goal of creating a green space that considers biodiversity **and improving communication with stakeholders** through the green space, the company, with the advice of experts, engaged employees and their families in biodiversity conservation activities. Also, efforts were made to introduce these activities to local residents and enhance communication through on-site visits.



Source: Morioka Seiko Industry website, “History of Activities”, Seiko website,“Learn about Biodiversity: The ‘Insect Hotel’ Created by Parents and Children is Completed. Seiko Waku-Waku Environmental Classroom Fall 2021”, and “Morioka Seiko Industry Receives ABINC Special Award”

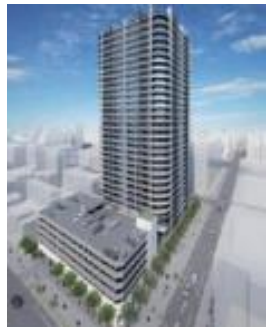
Eco-District

Nishiki 2-chome District, Nagoya

- An Eco-District is a framework that originated in Portland, Oregon, USA, focusing on the revitalization of established urban areas at the district scale, led by community-driven initiatives.
- In the Nishiki 2-chome District of Nagoya, a Low Carbon City Development project applying the Eco-District framework is underway.
- In February 2015, the Nishiki 2-chome District in Nagoya was recognized as the first 'Low-Carbon Model District' through a public call by the city. The project involves collaboration among various stakeholders, including businesses, residents, and government agencies, aiming for a 31% reduction in CO2 emissions compared to 2005 levels, with a 15-year timeline for low-carbon urban development.

Features

■ **Project promotion system by the collaboration between the public and private sectors**
- ➢ In the implementation of the project, the 'Nishiki 2-chome City Planning Council,' an organization composed of local landowners and businesses, plays a central role, working in collaboration with architectural and urban planning experts, as well as the government, to drive the project forward.
- ➢ Through a platform for collaboration with various companies both inside and outside the district, the project actively incorporates new technologies and ideas to drive its development.



■ Promotion of Green Buildings
Promoting architecture that is friendly to both people and the environment

■ Urban energy utilization
Establishing an energy system that incorporates natural energies such as solar power

■ Wooden urbanization
Aiming to create a low-carbon and attractive city, the project promotes the installation of wooden benches and the use of wood in the interior design of buildings.

■ Public Space Design
Promoting low-carbon transportation through the use of plantings in road spaces, the utilization of bicycle parking, and car-sharing initiatives.

Source: Nagoya City website, “Low-Carbon Model District”, Nishiki 2-chome District website

Green Infrastructure × Environmental Certification Case Study ⑨（Site/Urban Space）

JHEP

Oak Omotesando

Category	Rating: A

- Oak Omotesando, a mixed-use building, was **designed to create a new landscape that harmonizes with the zelkova-lined streets of Omotesando and the surrounding architecture**. The rooftop greening **features primarily native Japanese plant species, with the aim of contributing to biodiversity**.
- The building's efforts to conserve biodiversity were recognized, earning the first-ever certification for a rooftop garden.
- Although surrounded by commercial and office buildings, the site faces the zelkova-lined Omotesando avenue that stretches toward Meiji Shrine, making it a key location within the **biodiversity network** of central Tokyo. By planting primarily native species, the project is expected to contribute to maintaining and enhancing ecological connectivity.

Features

■ Biodiversity conservation

The rooftop garden **recreates the area's native vegetation by referencing local plant species and incorporating shrubs and other greenery to attract birds and insects.** Flowering and fruit-bearing plants have been selected to create a lush and nature-friendly urban environment that offers seasonal fragrance and beauty. Moreover, the green space on the southern side of the passage that runs through the center features the planting of oak trees, which are the origin of the building's name. This creates a green eco-space that **extends from the zelkova trees of Omotesando.**

Evaluation Points

- **The planting, primarily consisting of native Japanese plant species, is maintained with the aim of contributing to biodiversity conservation.**
- As a key hub in the local ecosystem network, its importance continues to grow, making it a **leading example of urban development that coexists with nature**.

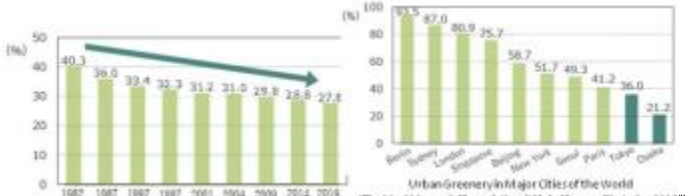
Source: Obayashi Corporation website, "Introduction of Rooftop Greening at Oak Omotesando at the Minato Ward Biodiversity Forum", Tokyo Art Beat website Art and Environment Merge: New Landmark 'oak omotesando' Opens in Omotesando", Nikkei Newspaper Green Technologies that Protect Our Lives"

Act Partly Amending the Urban Green Space Act

Promulgated on May 29, 2024
Enforcement within six months from the date of promulgation

Background and Necessity

- ◯ Compared to the rest of the world, **the amount of greenspace in Japan's urban areas is low and declining.**
- ◯ **Rising expectations for the functions of green spaces** aiming at solving the issues, such as **addressing climate change, ensuring biodiversity, and improving well-being**.
- ◯ Tendency towards increasing **private investment in the environmental sector**, such as ESG investment.
- ◯ For taking necessary measures to **secure urban greenspaces in both quality and quantity**, including enhancing of green space networks.
  - **Local governments face financial constraints and a lack of expertise in the development and management of green spaces;** and
  - **Private sectors,** recognizing green spaces rarely generate profit, **also make limited efforts** to secure green spaces.
- ◯ It is also important to **promote efforts for efficient energy use**, etc. in order to promote decarbonization in urban areas.



Trends in the percentage of Green Coverage in Yokohama City (Results of the survey on the green coverage rate in FY2019 (Yokohama City))

Outlines of the Act

1. Strategic securing of urban green space led by national government

① **Formulation of the national basic policies and prefectural plans** [Urban Green Spaces Act]
- **The Minister of Land, Infrastructure, Transport and Tourism formulates the basic policy** on urban green space conservation, etc.
- **Prefectural governments formulate regional plans** for the conservation of urban green space.

② **Improvement of positioning of green spaces in urban planning** [City Planning Act]
- The "importance of the improvement in preservation of the natural environment" is positioned as a criterion for stipulating city plans..

2. Active conservation and renewal of urban green spaces

① **Positioning of maintenance and promotion of green space functions** [Urban Green Space Act]
- The renewal and improvement of green spaces to maintain and promote their functions is positioned as a "**Function Maintenance and Promotion Project".**
- Special provisions were established to **simplify the procedures for implementation of Function Maintenance and Promotion Projects** in special green space conservation districts*. ＜Budget＞ (City Planning Tax can be allocated for implementation.)

*Districts where building activities, etc. are regulated in order to conserve green space

② **Establishment of the Urban Greenery Support Organization system to purchase green spaces on behalf of local governments**
[Urban Green Space Act, Ancient Capital Preservation Act, Act on Loans of Funds for Urban Development]
- Establishment of **a designation system for the Urban Greenery Support Organization, which purchase green spaces** in special green space conservation districts, etc. and conducts Function Maintenance and Promotion Projects, based on requests from prefectures, etc.

<Taxation system>
- Support for the work conducted by the Organization through the provision of loans from the Urban Development Fund. <Budget>

Image of maintaining and promoting of green space functions (Kobe City)

Fear of disaster due to large diameter trees in slope forests
Selective cutting of trees (functional enhancement)
Safely renewed woods

3. Promoting private investment in urban environment development in harmony with greenery

① **Establishment of a certification system for projects to secure green spaces by private business operators**, etc. [Urban Green Space Act and Act on Loans of Funds for Urban Development]
- The national government establishes guidelines for projects to secure green spaces by private business operators, etc.
- Establishment of a system whereby **the Minister certifies the projects of business operators, etc. to secure green space.**
  Establishment of a registration system for agencies that conduct the examination for the certification screening on behalf of the Minister.
- Support for the projects that have received the above certification through the provision of loans from the Urban Development Fund. ＜Budget＞


Example of green space creation by a private business operator (Chiyoda Ward)

②**Establishment of a certification system for urban development projects that contributes to urban decarbonization**[Act on Special Measures concerning Urban Renaissance].
- Establishing a system **to certify urban development projects that contributes to urban decarbonization** by creating green spaces, introducing renewable energy, and making efficient use of energy, etc.
- The Organization for Promoting Private Sector Urban Development provides financial support for the above-mentioned certified projects. <Budget＞

Promoting "Urban Green Transformation" in conjunction with budget and tax measures

Overview of the Certification

○ Based on the Urban Green Space Act, the Minister of MLIT evaluates and certifies the efforts of private companies to **secure quality urban green spaces** from the viewpoints of **quantity and quality of green spaces**: including **climate change** countermeasures, securing **biodiversity**, and improving **Well-being,** etc.

○ The certification is based on conformity with the "Standards for Securing Quantity and Quality of Green Space"※ established by MLIT.

※The standards stipulate measures to be taken by private companies in the development and management of green spaces.

Certification Framework

Urban Green Space Act

Minister of Land, Infrastructure, Transport and Tourism
- Formulates the "Standards for Securing Quantity and Quality of Green Space"
- Evaluates and certifies conformity with the Standards

(i) Application

(ii) Certification

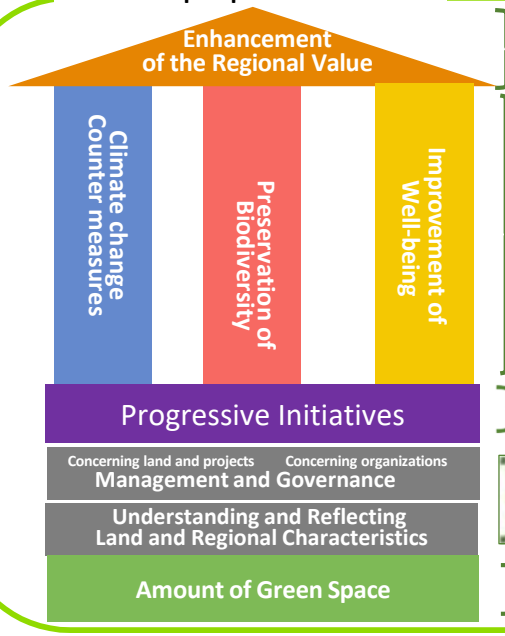
Private business operators, etc. carrying out initiatives for green space preservation

Create a Green Space Securing Plan and apply for certification.

[Eligible projects]
(i) Projects creating new green spaces
(ii) Projects contributing to the preservation or enhancement of the quality of existing green spaces

[Eligible areas]
Sites, etc. containing green spaces within city planning areas

Evaluation perspectives and Items



(Enhancement of Regional Value)
- ○ Formation of regional communities, ecosystem networks and wind paths, etc.

(Climate Change Countermeasures)
- ○ Absorption and reduce emission of GHG, heatstroke countermeasures, flood control, resource recycling etc.

(Preservation of Biodiversity)
- ○ Ensuring habitat and growth diversity environment, harmony with surrounding environment, environmental education, etc.

(Improvement of Well-being)
- ○ Improvement of health, pleasant landscape, safe and secure spaces, creation of lively atmosphere, etc.

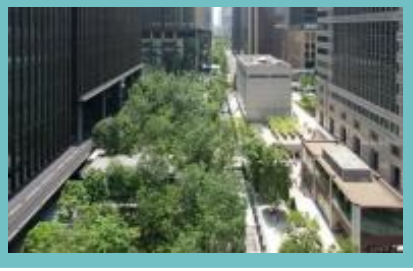
(Progressive Initiatives)
- ○ Progressive Initiatives Plan

(Management and Governance)
- ○ Project management, transparency, communication etc.

(Understanding and Reflecting Land and Regional Characteristics)
- ○ Land and Regional Characteristics, consistency with administrative plans, etc.

(Amount of Green Space)
- ○ Green space ratio, green space area, etc.

<Images of initiatives for good-quality green space preservation>



Main support measures

* Excluding the amount allocated from comprehensive social capital improvement grants and subsidies for the development of green areas

◆ **Interest-free loans** through the Fund for Supporting Projects to Secure Green Spaces (Urban Development Funds): Within 1/2 of the amount of the loan (expenses required for projects such as the development of green spaces based on an approved plan*)

◆ **Subsidies** through the **Green Infrastructure Utilization Urban Development Support Project**: Within 1/2 of the subsidy eligible expenses (expenses required for projects such as the development of green spaces based on the approved plan)

Establishing Certification System for Urban Decarbonization and Regeneration Projects and Strengthening Financial Support

○ Promote private urban development that involves creating excellent urban greenery, utilizing renewable energy, and implementing energy-saving measures through efficient energy use, and to achieve urban decarbonization, establish a new certification system and strengthen financial support for the certified projects (i.e., increase in the financial support limit by the Organization for Promoting Urban Development.)

<Current Certification System>

Certification of Private Urban Regeneration Development Projects by the Minister of Land, Infrastructure, Transport and Tourism
(Article 63 of Act on Special Measures concerning Urban Reconstruction)

Certification Criteria

- **The project must contribute significantly to urban reconstruction (a certain size requirement).**
- **The timing of the start of construction, the project implementation period, and the land acquisition plan must be appropriate.**
- **The company must have the necessary economic foundations and the ability to carry out the project appropriately.**

→

Financial Support

Loans (Mezzanine)
investment

<Targets of Support>
Public facility development costs
① Public facilities
② Convenience facilities in buildings
③ Urban convenience facilities

<New Certification System>

Certification of Private Urban Regeneration Development Projects by the Minister of Land, Infrastructure, Transport and Tourism

Certification criteria of
the current certification system
+

① Initiatives to create greenery
② Renewable energy use and energy-saving initiatives

→

Financial Support

Loans (Mezzanine)
Investment

<Targets of Support>
Public facility development costs
①Public facilities
②Convenience facilities
③Urban convenience facilities
+

Costs for introducing facilities for efficient management of green spaces, renewable energy power generation facilities, and others.

Finance / Credit

Finance / Credit

(Sustainable Finance)

- Possible approaches to the financing essential for green infrastructure initiatives include utilizing blended finance, which combines public and private funds to expand the scale of investment, and sustainable finance mechanisms that support the development of the economy, industry, and society towards an ideal state. The expected effects of sustainable finance initiatives are: 1) Advance sustainability management, 2) Obtain social support, 3) Strengthen the financing base by a relationship-building with finance providers, and 4) Enable financing with reasonable terms (**P69**).
- Various financing schemes are found, such as DC Water in the US and the River Wyre in the UK. Finance will hopefully be utilized widely in diverse green infrastructure projects.

(Credits)

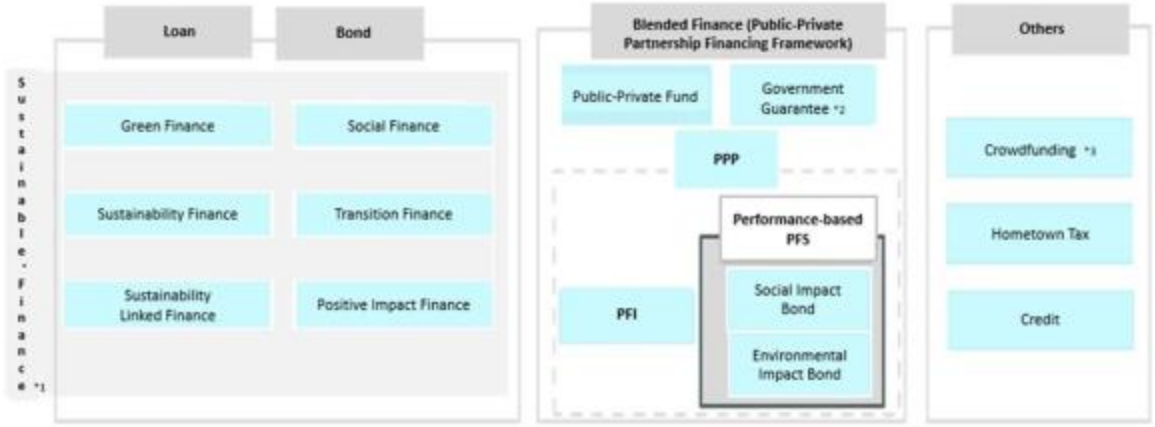
- Globally, there is a growing movement to create a market for Nature Credits, in addition to Carbon Credits. In Japan, formulating the Transition Strategies toward Nature Positive Economy and other policies are expected to drive the creation and development of a market for Nature Credits (**P71**).
  * For example, Nature Credits are supposed to be utilized: (1) in combination with Carbon Credits, (2) to provide finance for improving ecosystem services in the value chain, (3) to contribute to restoring natural capital outside the company's influence, (4) to provide products that incorporate the restoration of natural capital, and (5) to offset the company's impact on natural capital unable to be mitigated.

(Value of Green Infrastructure and Corresponding Investor/Lender Base)

- Improving the evidentiary value (quantification and monetary conversion) of the effects created through the promotion of green infrastructure may have them evaluated as economic and social value, broadening the scope of financing (e.g., investor/lender base) (**P74**).
- In the future, the value of green infrastructure needs to be visualized from these financing perspectives, too.

Financing Methods for Green Infrastructure Projects

Overview of Financing Methods for Green Infrastructure Projects



The main financing methods for green infrastructure projects are shown in the left diagram.

*1 While loans and bonds are the mainstream of sustainable finance, other financing through alternative methods, such as green equity, are available.

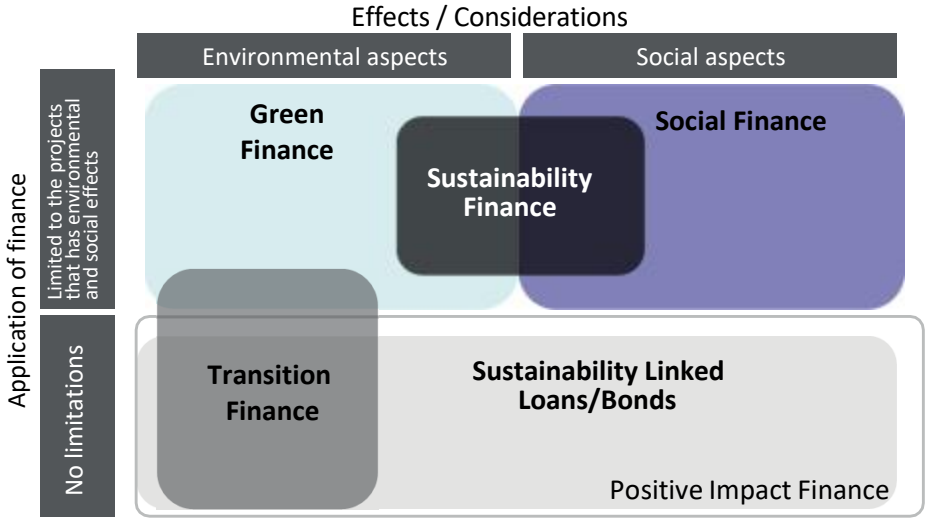
*2 Public-private fund and government guarantees include financing and guarantees provided by government-funded international organizations.

*3 Crowdfunding is often utilized in combination with other financing, such as green bonds.

Sustainable Finance

European Commission's Definition of Sustainable Finance

Sustainable finance refers to the financial sector taking environmental, social and governance (ESG) factors into account in its investment decisions and making longer-term investments in sustainable economic activities and projects.



*Transition finance is a financing method that focuses on the credibility of the finance provider's transition strategies and practices and can be utilized for both specified and unspecified application of finance.

Source: CMA Principles and Various Guidelines Provided by the Ministry of Environment

	Green Finance	Social Finance	Sustainability Finance	Transition Finance	Sustainability Linked Bonds/Loans	Positive Impact Finance
Main features	The application of finance is **limited** to green projects with a positive **environmental** impact.	The application of finance is limited to projects with a positive **social** impact.	The application of finance is **limited** to green projects or other projects with **environmental** or **social** positive impacts.	Support the companies that consider measures to address climate change and undertake long-term strategies to **reduce GHG emissions** towards **a decarbonized society**.	Encourage the issuers/borrowers to achieve the **Sustainability Performance Targets (SPTs)**.	**Analyze and identify the environmental, social, and economic impacts** of the borrower's corporate activities, and identify activities that are expected to have positive impacts and reduce negative impacts.
Application of finance	The application of finance is **limited** to the projects with environmental or social positive impact.			There are **no limitation** on the application of the finance.		
Key evaluation points	1. **Determine whether the application of finance is for projects that provide environmental and social benefits.** 2. Ensure that the finance are appropriated to the projects mentioned in the evaluation point 1 above. 3. Apply a method of reporting on the benefits of the projects and the appropriation of finance.			**Determine whether the finance provider has established an appropriate sustainability strategy that includes setting KPIs with consideration for environmental and social aspects.**		

○ Sustainable finance initiatives may have the following four major benefits:
1. Advance sustainability management, 2. Obtain social support, 3. Strengthen the financing base by building relationships with finance providers; and 4. Enable financing with reasonable terms.

Source: Ministry of the Environment (2022), *Green Bond and Sustainability Linked Bond Guidelines" and "Green Loan and Sustainability Linked Loan Guidelines*.

Case Studies on Financing Green Infrastructure Projects

<Case 1: DC Water, US>

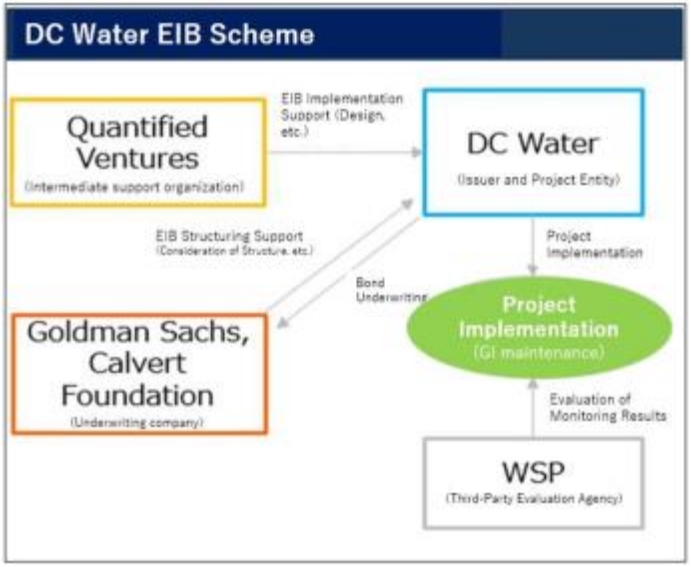
<Overview>

- To solve the deterioration of river water quality caused by CSOs during heavy rains, DC Water launched the DC Clean River Project and is taking measures to prevent stormwater runoff into rivers by developing green infrastructure.
- DC Water utilizes EIB for financing diversification and first green infrastructure project.
- The outcome indicator is **the amount of stormwater runoff reduction**. If the evaluation benchmarks are met, DC Water will make an **outcome payment** to the investor; if they are not met, the investor will make a **risk share payment** to DC Water.
- The storm water runoff reduction calculated as the evaluation result in 2021 was 19.56%, and no risk share or additional compensation was paid.

DC Water EIB Summary

Issuance Amount	USD 25 million (private placement)
Issuance Date	September 29, 2016
Initial Interest Rate	Annual interest rate of 3.43% (flexible rate)
Redemption Date	October 1, 2046 (30 years)
Use of Funds	Development of green infrastructure equivalent to 20 acres in the Rock Creek Area (RCA) to address environmental pollution caused by combined sewer systems
Repayment Source	Sewer charges
Performance Indicator	Stormwater runoff reduction rate
Performance-linked Structure	Performance Payment If the performance is not achieved, a Risk Share Payment will be made, and if the performance exceeds expectations, an Outcome Payment will be made. USD 3.3 million will be executed on April 1, 2021. If the performance is within expectations, no payment will be made

DC Water EIB Scheme



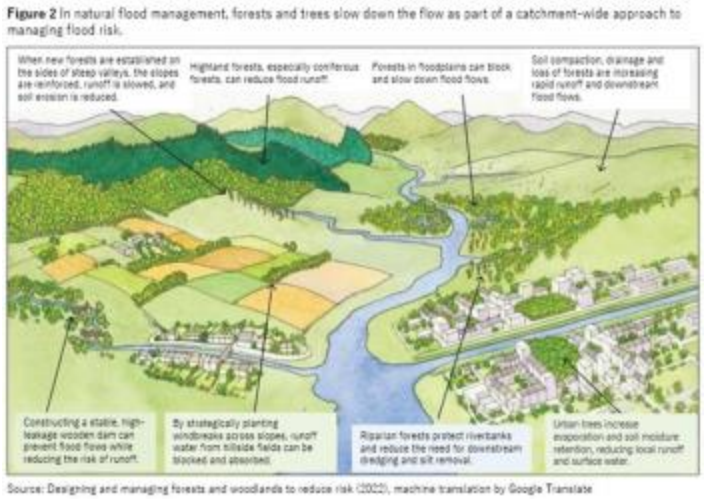
Source: *Materials provided by Yoshikazu Kitae, Development Bank of Japan Inc.*, in the 2nd Workshop of this Research Group

<Case 2: River Wyre, UK>

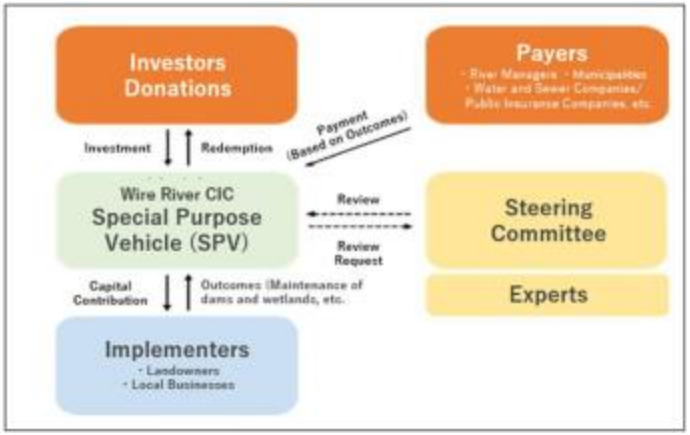
<Overview>

- Natural flood management started in the UK around 2010.
- The project delivered more than 1,000 measures in the upper reaches of the River Wyre to store flood water in an area of around 70 hectares and prevent peak flow.
- This financing is a public-private blended financing, with contributions from river management, local governments, insurance companies and water and sewerage companies. This is a national pilot project on green finance.
- Private loan: Limited to wealthy individual investors (* because too risky for ordinary individuals). There are tax breaks for the wealthy.
- Since Investment financing was also difficult with regular funds (because the investment size is too small), Triodos Bank UK and other investors participated in the financing with the so-called impact investment funds.

Natural Flood Management



Adaption Finance Scheme through Public-Private Blended Finance



Source: Materials provided by Keigo Nakamura, Public Works Research Institute, National Research and Development Agency in the 4th Workshop of this Research Group.

Carbon Nature Credits

○ Globally, there is a growing movement to create a market for Nature Credits in addition to Carbon Credits.

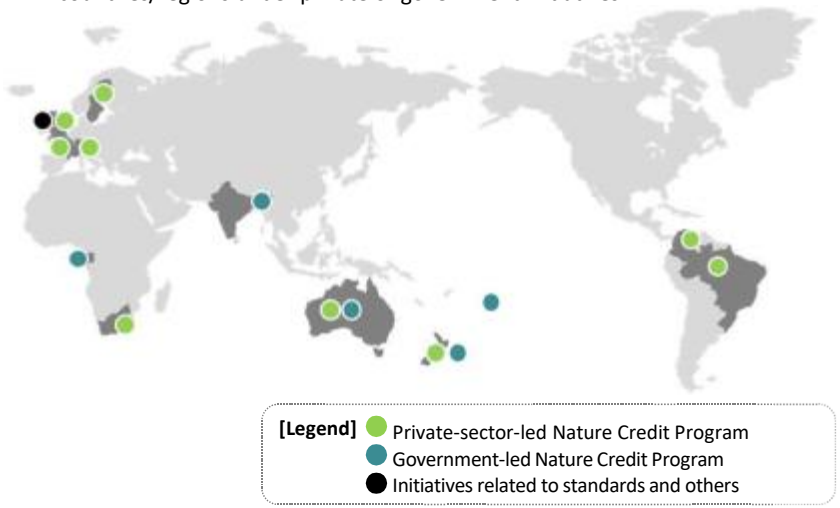
<Type of Credit>

Classification	Name	Authorization Body	Domain	Natural Capital-related Targets	Applicable Area	Operational Status
NbS series Carbon Credits	J-Credit	METI, MOE, MAFF	Public	• Forestry (forest management, afforestation, reforestation) • Agriculture (biochar, mid-drying of rice cultivation)	• Japan	• In operation
	J Blue Credit	JBE	Voluntary	• Creation, restoration, maintenance and deterioration prevention of ecosystems in natural coasts and marine areas • Climate change countermeasures for artificial infrastructure such as aquaculture facilities	• Japan	• In operation
	VCS	Verra	Voluntary	• Forestry (e.g., forest conservation and management, reforestation) • Agriculture (biochar, livestock methane, farmland management)	• Global	• In operation
	Puro Standard	Puro.earth	Voluntary	• Biochar and others	• Global	• In operation
	Other regional credits available					
Nature and Biodiversity Credits	SD VISta Nature Framework	Verra	Voluntary	• Conservation and restoration of biodiversity	• Global	• Under consideration (Public comments closed)
	PV Nature	Plan Vivo	Voluntary	• Conservation and restoration of biodiversity	• Global	• In operation

Source: Materials provided by Hokuto Nakata, Nomura Research Institute Ltd., in the 4th Workshop of this Research Group

<Trends in the Nature Credit Market Formation>

○ Nature credit markets have begun to be launched in some countries/regions under private or government initiatives.



Private-sector-led

- Australia
- New Zealand
- Colombia
- UK
- South Africa
- France
- Switzerland
- Sweden
- Brazil
- Wallacea Trust Biodiversity Credits (International)
- Verified Impact Standards (International)

Government-led

- Australia
- Niue
- Gabon
- India
- New Zealand

Initiatives

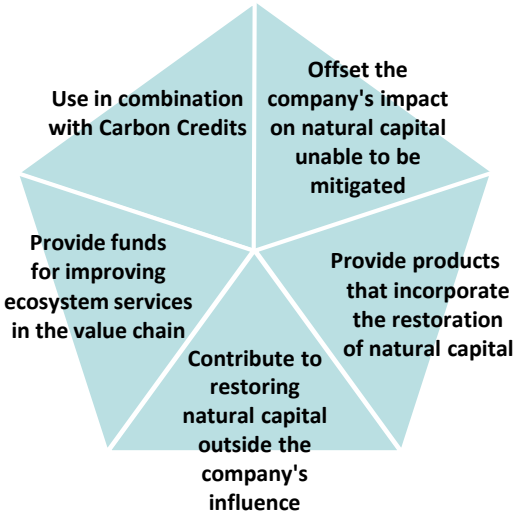
➢ Governance/ Integrity- related Initiatives

- WEF Biodiversity Credits Working Group(International)
- Biodiversity Credits Alliance (International)
- Taskforce for Nature Markets (international)
- IUCN Global Standard for Nature Based Solutions (International)

➢ Standardization Initiatives

- VERRA (International)
- Plan Vivo Foundation (UK)

<Intended Use of Nature Credits>



Source: Based on Pollination (2023), *State of Voluntary Biodiversity Credit Markets.*

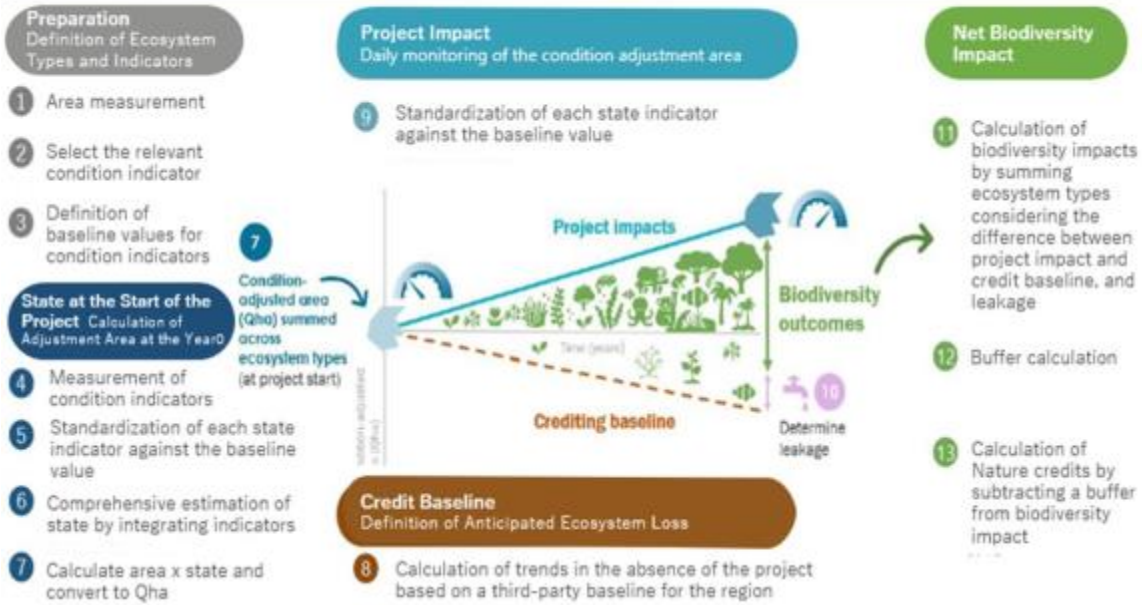
Nature Credit Scheme Case Studies

<Case 1: Verra>

<Overview>

- Verra, a leading international voluntary credit operator, is considering to establish Nature Credits for the conservation and restoration of nature and biodiversity and published a first draft the framework.
- Demonstration experiments got started since the summer of 2023.

Framework for Nature Credits promoted by Verra



<Case Study 2: Plan Vivo>

<Overview>

- The Plan Vivo started operating the PV Nature Certification System for Biodiversity from December 2023.

PV Nature Certification of Plan Vivo

Subject of Certification	
Restoration	A project to improve and enhance regional biodiversity. It aims to demonstrate measurable benefits to biodiversity by restoring the native ecosystem to its baseline
Conservation	A project to maintain and protect regional biodiversity. It aims to demonstrate that there are no changes in biodiversity. To qualify as a conservation project, it must meet at least one Key Biodiversity Area (KBA) criterion or at least two Important Plant Area (IPA) criteria

Development Status of PV Nature

Items	Contents	Status
Project Requirement	Criteria that the project needs to prove compliance with	Version1.0 Published
Project Certification Process	Used based on the Calculation Method for Plan Vivo Biodiversity Certificates and PV Nature Methodology to collect the Biodiversity Data related to Data Protocols	Version1.0 Published
Project Review Requirement	Criteria that auditing bodies and experts must follow for project verification	Version1.0 Published

Source: *Materials provided by Hokuto Nakata, Nomura Research Institute, Ltd.,* in the 4th study session.

Crowdfunding/ Hometown Tax Donation Program

<Case 1: Financing through Crowdfunding (The Hiigawa Terrace)

- Crowdfunding was utilized to finance **JPY 553,000 (achievement rate: 111%)** for creating a terrace with rain garden function.
- Estimated runoff control on the target site combined with other implementations will be reduced to approx. 50% of the pre-development level.

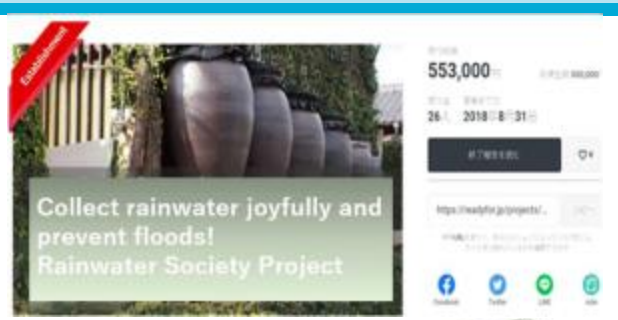
Purpose

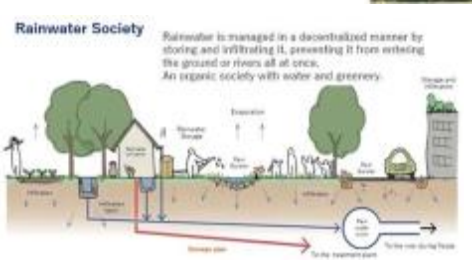
The rain garden was developed to realize a “Rainwater Society" through decentralized water management by utilizing its rainwater storage and infiltration functions.

- Prevent and reduce urban flood damage caused by storm water runoff
- Improve urban landscape
- Preserve biodiversity
- Improve river water quality
- Create a community from rainwater (*Amamizu*) as a starting point.

Use of Donation

- Parking space improvement
- : JPY 228,744
- Deck material cost: JPY 98,496
- Work materials cost: JPY 7,668
- The remaining JPY 100,856 will be used for planting trees and maintenance.





Source: Readyfor website "Let's prevent flooding! Creating a rain garden terrace that brings people closer to rainwater"

<Case 2: Financing through Hometown Tax Donation Program (Kumamoto City)>

- Kumamoto City is implementing the "City Tram Green Carpet" project to green the tram tracks to reduce train noise and mitigate the heat island effect. Financial resources of **JPY 65 million** were explored through the Hometown Tax Donation Program to realize the development.
- The donations were used for maintenance and management of the green carpet (lawn), purchase of water sprinkler trucks, and others. The project started in September 2010, and the total length of the green carpet now reaches 935m.

- Amount of donations (cumulative)
  JPY 65,296,595
- Total number (cumulative)
  1,938 donations
  (Donors)
  Citizen Supporters: 1,590
  Official Supporters: 348
  (As of December 31, 2020)

Example of Green Carpet Installation

City Tram Green Carpet Project (Kumamoto City)

Category	Target	Donation Amount
Official Supporters	Business Owners and Organizations	Over JPY 10,000 ※ Annual Maintenance Cost Equivalent per Tsubo (approx. 3.3 Square meter) of Green Carpet
Civil Supporters	Individuals	Over JPY 3,000 ※ Annual Maintenance Cost Equivalent per Square Meter of Green Carpet

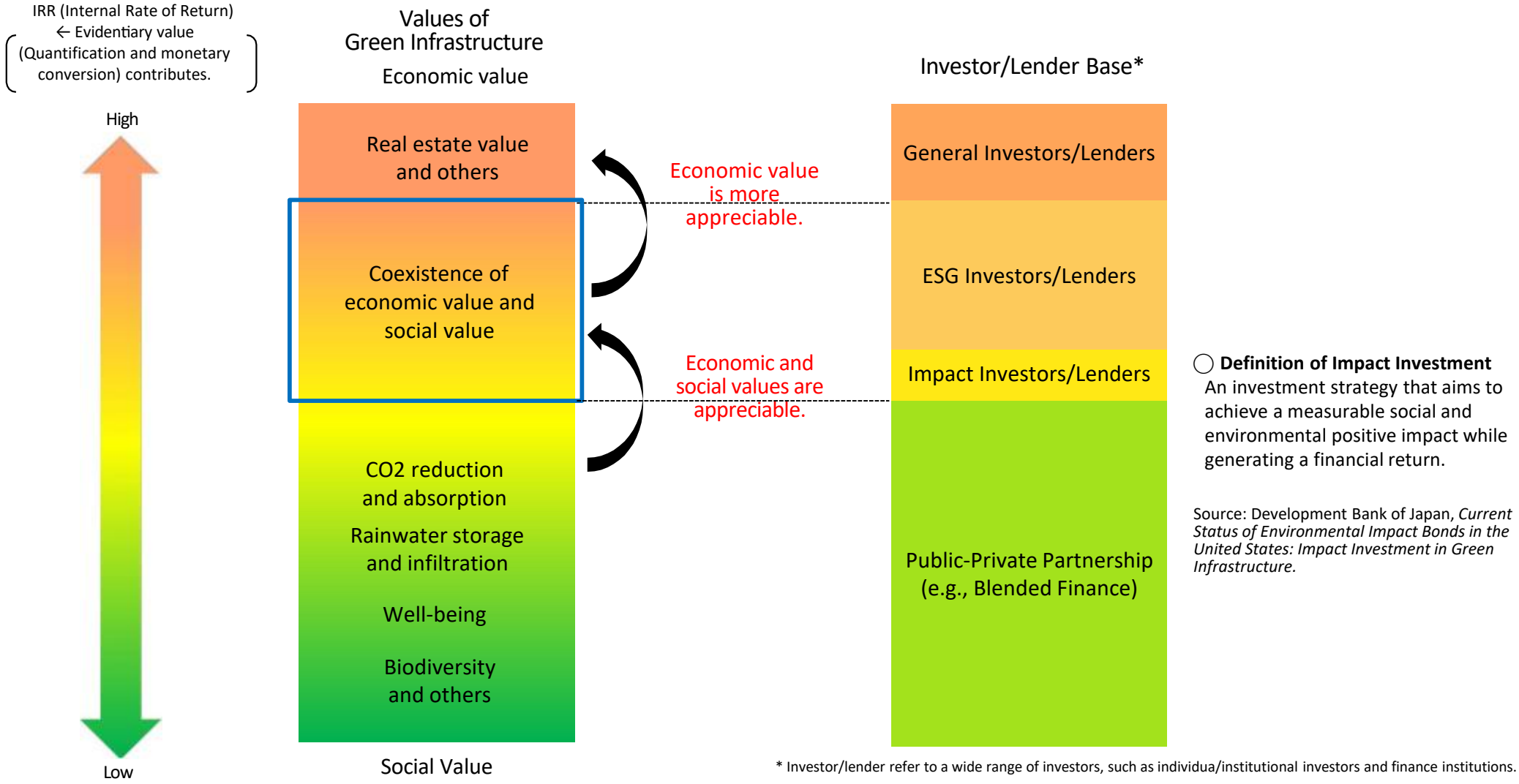
<Supporter Benefits>

- ◯ Individuals who donate JPY 3,000 or more (Citizen Supporters) and groups who donate JPY 10,000 or more (Official Supporters) will receive supporter certificates that allow them to receive discounts at Kumamoto City's tourist facilities and have their names posted on the Kumamoto City website upon request.
- ◯ Individuals (Citizen Supporters) and groups (Official Supporters) who donate JPY 10,000 or more will receive supporter certificates and have their names displayed on the donor list nameplate installed at the tram stops upon request.
- ◯ Individuals and groups who donate JPY 100,000 or more will receive a letter of appreciation from the Mayor of Kumamoto City.

Source: Kumamoto City’s Website, “*What is the City Tram Green Carpet Project?*"

Value of Green Infrastructure and Corresponding Investor/Lender Base

- ◯ While general investors allocate funds in economic value such as real estate value, impact investors invest in projects where economic value and social value coexist.
- ◯ Projects with a high proportion of social value are likely to have a high affinity for public-private investment such as blended finance.
- ◯ Improving the evidentiary value (quantification and monetary conversion) of the effects created through the promotion of green infrastructure may have them evaluated as economic and social value, broadening the scope of financing (e.g., investor/lender base).



◯ **Definition of Impact Investment**
An investment strategy that aims to achieve a measurable social and environmental positive impact while generating a financial return.

Source: Development Bank of Japan, *Current Status of Environmental Impact Bonds in the United States: Impact Investment in Green Infrastructure.*

* Investor/lender refer to a wide range of investors, such as individua/institutional investors and finance institutions.

Conclusion ①

- The term “Green Infrastructure” becomes established, but on the other hand, even if it is beneficial to society, no small number of business operators may hesitate to take the first step, wondering what benefits it will bring to their companies and whether it will only increase costs and burdens except for the element of social contribution.
- With this awareness of the issue in mind, this Research Group conducted a total of five workshops, including interviews and discussions with plenty of experts, to determine whether local business operators and other stakeholders can take the first step in promoting investment in green infrastructure, as well as the city planning companies and investors pioneering green infrastructure projects. The results of studies are now compiled in this guideline.
- First, based on the global trends of Nature Positive, TNFD trends, domestic trends, and others, this guideline introduces the fact that, like climate change, we are entering an era in which efforts to protect natural capital and biodiversity are essential, and the business sector actions are being accelerated. Also, with various examples from Japan and overseas, this guideline introduces the cases that demonstrate diverse effects of green infrastructure (e.g., increasing the number of visitors, land price rises, boosting store sales.)
- Additionally, this guideline shows logical thinking in the context of urban development and city planning, where the economic impact on the market is relatively strong, that the utilization of green infrastructure can increase corporate value through the enhancement of brand image, as well as an increase in rental prices and a decrease in yields, thereby improving the asset value of companies. Also, the external economic value can increase, such as improving the well-being of citizens, which turns out to be a contribution to the increase in corporate value. Various studies on the green premium (positive effects on prices, rents, and yields) and previous research findings, such as the positive effects of green spaces surrounding real estate value on its value, supported this logic.
- Furthermore, this guideline describes the relationship between green infrastructure initiatives within premises and real estate value and attempted a new analysis to show how the effects of green infrastructure may increase real estate value through various pathways for different stakeholders, which were not accumulated in previous studies.
- These elements did not all yield positive results. For example, while this guideline presents many case studies on effects, they did not necessarily analyze causal relationships (practically, such analysis involves significant data difficulties). Also, in interviews, some voices said there are no such factors affecting real estate price determination." Furthermore, the new analysis was significant in the central five wards but not at the same level across all 23 special wards of Tokyo.
- Although causal relationships are unclear, various practical effects are observed. Based on previous studies and logic models, engaging in green infrastructure could have sufficient potential to enhance the company’s economic value. Based on global and domestic trends, it is meaningful for all business operators, investors, and financial institutions to consider using green infrastructure in their business implementation and investment decisions to enhance corporate value.

Conclusion ②

- Of course, it is essential to enhance the accumulation and economic analysis of cases demonstrating the effectiveness of green infrastructure across various sectors and regions, in terms of quality and quantity, including improvements in well-being, Making these effects more visible is crucial. If the evidence strength (quantification and monetary conversion) of those effects created through the promotion of green infrastructure improves and can be evaluated as economic and social value, the range of financing (e.g., investor base) may expand.
  Furthermore, environmental improvements, including various forms of support, are indispensable. The Ministry of Land, Infrastructure, Transport and Tourism, and the public-private partnership platform that serves as the core of green infrastructure promotion, are expected to deepen their collaboration.
- This guideline systematically introduces the certification systems and finance credits as evaluation tools available, including global and domestic trends. In any case, this guideline will hopefully help not only urban development companies and investors pioneering the initiatives, but also local city planning companies, investors, and financial institutions understand and consider green infrastructure initiatives, leading to investment expansion.
- Various issues were identified during the discussions in the study group. Needless to say, in addition to the accumulation and analysis of the cases mentioned above, it is important to improve the evaluation items related to green infrastructure in each evaluation system, create an environment for the formation of the Nature Credit Market, improve the environment for promoting green infrastructure finance, and promote the use of green infrastructure on underutilized land. It is expected that a broad range of studies will be conducted on fields and regions other than urban development and city planning, which were the main targets of this research group.
- A global perspective is also important. We are now in an era where global environmental issues can no longer be tackled by individual countries, but rather by all countries moving forward with a common understanding under international rules. From this perspective, it is important to consider how we can get involved in global rule-making. We must keep in mind to expand Japan’s system globally, as well as translating it into English.
- Promoting green infrastructure is a social change effort. It is our hope that a diverse range of actors from industry, academia, government and finance institutions will work together to address these various issues, and that green infrastructure will move forward only by a few small steps.
- This guideline would be revised according to the progress.

Background

◯Based on the new "*Green Infrastructure Promotion Strategy 2023*" (September 2033) and global trends such as the TNFD, this research group systematically organizes and analyzes the market on the effectiveness of green infrastructure and related evaluation mechanisms and holds extensive discussions and studies to promote private investment in the market.

<Objective>

◯ ***Green Infrastructure Promotion Strategy 2023*** (released in Sept. 2023) (excerpt)

- To broadly promote green infrastructure, it is important to understand, visualize and evaluate the effects of green infrastructure.
- Green infrastructure is a promising field for ESG investment, but to attract such investments, it is crucial properly evaluate how meaningful an investment target green infrastructure is.
- For green infrastructure to become widespread in society, the green value in real estate must be accurately evaluated in the market and clearly communicated to a various market participants, such as tenants, developers, and investors.

◯ Additionally, considering global trends such as the TNFD recommendations (September 2003) and the progress of ESG investment, it is necessary to systematically organize and analyze the effects of green infrastructure and related evaluation mechanisms, and to broadly discuss and examine ways to promote private investment in the market.

*** Taskforce on Nature-related Financial Disclosure (TNFD)**

Futako Tamagawa Rise
(Property value: approx. 1.33 times (1989/2012))

Otemachi Forest
(Arrival of hawks and falcons was also confirmed.)

Various evaluation mechanisms

TNFD Recommendations
(Sep. 2023)

<Committee Members> (in alphabetical order, ◎: Chairperson)

	Chisato Asahi	Professor, Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University
	Sho Katoh	Chief Manager, Regional Research & Planning Department, Development Bank of Japan
	Eiji Furuyama	Deputy Director of Operations, Japan Real Estate Institute
◎	Chihiro Shimizu	Professor, Graduate School of Social Data Science, Hitotsubashi University
	Makoto Haraguchi	Senior Vice President for TNFD, Sustainability Promotion Division, MS&AD Insurance Group Holdings, Inc.
	Ryuichi Horie	President and CEO, CSR Design Green Investment Advisory, Co., Ltd.

<Workshops>

The 1st workshop: December 14, 2023
The 2nd workshop: March 12, 2024
The 3rd workshop: May 7, 2024
The 4th workshop: May 28, 2024
The 5th workshop: June 17, 2024

Research Group Committee Members

Chihiro Shimizu, Professor, Graduate School of Social Data Science, Hitotsubashi University

Shimizu was born in Ogaki City, Gifu Prefecture, 1967. Withdrew from the doctoral program at the Graduate School of Science and Engineering, Tokyo Institute of Technology, and obtained a Ph.D. (Environmental Studies) from the Graduate School of Frontier Sciences, University of Tokyo.
Shimizu holds the current position after serving as a professor at Reitaku University and Nihon University and a specially appointed professor at the Center for Spatial Information Science, University of Tokyo.
Fields of Expertise: Economic measurement and big data analysis.
Shimizu published over 200 papers, including research papers in Japan while over 50 papers were accepted for publication in international academic journals.
Shimizu concurrently serves as Deputy Director General of the Reitaku Research Institute and the Advisor to the President of Reitaku University.

Chisato Asahi, Professor, Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University

Academic Background: Ph.D. (in Urban Science), Tokyo Metropolitan University. After serving as a professor at Tokyo Metropolitan University. Asahi has been in the current position since 2022. Fields of Expertise and Research Areas: Environmental Economics/Urban Regional Economics, Policy Evaluation, and Cost-Benefit Analysis.
Asahi authored numerous books, papers, and reports and achieved the Japan Land and Environment Institute's Young Professional Award and Best Paper Award; successively serves as a member of various government councils, primarily in the specialized fields of project evaluation; and concurrently holds the position of a visiting researcher at the Policy Research Institute for Land Infrastructure, Transport and Tourism.

Eiji Furuyama, Deputy Director of Operations, Japan Real Estate Institute

Furuyama joined the Japan Real Estate Institute in 2000 and engaged in the DBJ Green Building Certification program and the operations of the real estate resilience certification (ResReal) system.
Furuyama successively served as a member of the ESG Investment Promotion Study Group, the Ministry of Land, Infrastructure, Transport and Tourism, and an expert member of the ESG Investment Subcommittee, Japan Association of Real Estate Appraisers.
Certified Real Estate Appraiser, ARES Certified Master, Urban Renewal Planner, and CASBEE Property Assessor.

Sho Katoh, Chief Manager, Regional Research & Planning Department, Development Bank of Japan

Katoh joined the Development Bank of Japan after graduating from the Faculty of Law at Waseda University in March 2005. Katoh involved in addressing the financial crisis of the post-Lehman Shock at the Kansai branch and supporting the recovery efforts after the Kumamoto Earthquakes at the Kyushu branch and engaged in creating new projects in the Finance and Industry Research Departments, and other sections. Currently, Katoh is working in the Regional Research & Planning Department, supporting regional decarbonization efforts, conducting research on green infrastructure, and serving as a committee member for the Ministry of Land, Infrastructure, Transport and Tourism.

Makoto Haraguchi, Senior Vice President for TNFD, Sustainability Promotion Division, MS&AD Insurance Group Holdings, Inc.

Haraguchi joined MS&AD Insurance Group in 1996 and promoted the establishment of JBIB (Business Initiative for Biodiversity in 2008, and since then, supported Japan's leading nature-oriented companies in collaboration activities to achieve the Aichi Biodiversity Targets as an advisor of the JBIB. Haraguchi participated in establishing the ABINC in 2013 and provided training on biodiversity-conscious development to approximately 1,000 real estate and construction professionals and Engaged in developing a disclosure framework under the TNFD co-chair as a selected member of the Taskforce on Nature-related Financial Disclosures (TNFD) in 2021, which was released in September 2023. Currently, Haraguchi is addressing its promotion as the second phase.

Ryuichi Horie, President and CEO, CSR Design Green Investment Advisory, Co., Ltd.

Horie graduated from the University of Tokyo's Faculty of Law and obtained an MBA from the Haas School of Business at the University of California, Berkeley. After working for the Industrial Bank of Japan and Merrill Lynch and serving as the Managing Director at Deutsche Bank, Horie co-founded the CSR Design Green Investment Advisory, which mainly provides advisory on ESG investment to real estate in 2010 and has been in the current position. Horie serves as the chairperson of the Study Group on the ESG Investment Promotion, the Ministry of Land, Infrastructure, Transport and Tourism, an advisor to the United Nations Environment Programme Finance Initiative (UNEP FI) Real Estate Working Group, the chairperson of the Japan Network Real Estate Working Group and Infrastructure Working Group, Principles for Responsible Investment(PRI), a co-chair of the Environmental Real Estate Working Group, the Principles for Financial Action for 21st Century, and etc.

Workshop Topic Providers

<The 1st Workshop>

- Makoto Haraguchi, MS&AD Insurance Group Holdings
- Junichiro Onishi, Xymax Real Estate Research Institute Corporation

<The 2nd Workshop>

- Yoshikazu Kitae, Development Bank of Japan Inc.
- Megumi Matsumoto, Tokyu Land Corporation

<The 3rd Workshop>

- Takaaki Nishida, Kyoto Sangyo University
- Ryutaro Adachi, NEC Corporation

<The 4th Workshop>

- Keigo Nakamura, Public Works Research Institute
- Hokuto Nakata, Nomura Research Institute Ltd.
- Toshinori Sasaki, BOOSTRY Co., Ltd.

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