

Relationship Map between Electrical & Electronic Business and Biodiversity User Guide

~ A tool for analyzing nature-related issues toward Nature Positive ~



About the Relationship Map

The Biodiversity Working Group (WG) of the four electrical and electronic industry associations*, established in 2011, began its biodiversity work by visualizing the relationship between corporate activities in the electrical and electronic industry and biodiversity. In 2013, the WG organized, by life-cycle stage, benefits received from biodiversity (ecosystem services), positive and negative impacts on biodiversity, actions to reduce impacts, and related risks and business opportunities into the “Relationship Map between Electrical & Electronic Business and Biodiversity” (the “Relationship Map”). This showed that the electrical and electronic industry also has many touchpoints with, and impacts on, biodiversity.

The TNFD final recommendations released in 2023 call on companies to understand the relationship between natural capital/biodiversity and their business activities and to disclose appropriately how their management is sustainable. Because the Relationship Map analyzes the relationships needed for this purpose, it has been substantially updated as Version 3.0. Its structure was rebuilt in line with the disclosure steps recommended by TNFD so that it can also be used for the LEAP approach and preliminary scoping.

Although the Relationship Map is analyzed from the perspective of the electrical and electronic industry, its contents may also serve as a useful reference for a wide range of other sectors. As efforts by all sectors are required to realize Nature Positive, we hope many users will find it valuable.

Biodiversity WG of the Four Electrical and Electronic Industry Associations

* Japan Electronics and Information Technology Industries Association (JEITA), Communications and Information network Association of Japan (CIAJ), Japan Business Machine and Information System Industries Association (JBMI), and Japan Electrical Manufacturers' Association (JEMA)

Map Specifications and Access

- The Relationship Map itself is created in Microsoft Excel format. There is a detailed version for member companies of the four electrical and electronic industry associations, and a simplified public version. This guidance explains the simplified version.
- The simplified version consists of the following sheets:
 - Dependency & Impact Analysis Sheet
 - Risk & Opportunity Analysis Sheet
 - Business Action Analysis Sheet
- The Relationship Map can be downloaded from the URL shown on the right.

<https://www.jema-net.or.jp/English/businessfields/sustainability/biodiversity.html>

Key Usage Notes

- The Relationship Map does not take into account the “Locate” phase in the TNFD LEAP approach. In an analysis aligned with the LEAP approach, the analysis should proceed only after identifying biodiversity-important areas (priority areas)—both places that are important to the company and places that are important to nature in the locations of your own operations and value chain. Therefore, the Relationship Map cannot be applied directly to your company’s LEAP approach without further adjustment.
- Copyright for the Relationship Map and this guidance file is held by the Biodiversity WG of the four electrical and electronic industry associations. When reusing content, figures, tables, or images from the map or this guidance, please indicate the source.
- Users may modify the map for their own internal use, but the Biodiversity WG assumes no responsibility for any content other than the original.

Map Development Process



*UNEP-FI, UNEP-WCMC and Global Canopy. ENCORE results as of May 2024.

**R&D/design, raw-materials/parts/semi-finished procurement, product manufacturing, packaging/transport, sales/use, collection/recycling/disposal; also dependencies and impacts from land use at business sites, etc.

Structure of the Relationship Map

- It consists of three sheets: “Dependencies and Impacts”, “Risks & Opportunities,” and “Business Actions.”

Lifecycle stages

Seven lifecycle stages:

R&D /design, Procurement,

Product manufacturing,

packaging/transport,

sales, use, recycling/disposal

(+ land use at business sites, etc.)

Business Activities			Research & Development, design	Procurement	Product manufacturing	Packaging and transportation	Sales	Use	Recovery, recycling and disposal	Business Land Use
1) Biodiversity Blessings we enjoy from biodiversity	Impact on nature	Maintenance services	● Reduce nitrogen through green infrastructure	● Maintaining and optimizing environments for biodiversity and ecosystem services	● Reduction of noise, vibration, and light	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● No water and soil purification/regeneration ● Protection from natural disasters ● Toxic waste disposal	
		Cultural services								
2) Factors affecting ecosystems	Impact on nature	Land, freshwater areas, and Use of oceans	● Land use and occupation by factories or shops in habitats due to construction							
		Climate change	● Climate change due to greenhouse gas							
		Resource use/restoration	● Depletion due to the use of biological resources							
		Pollution/ Pollution Removal	● Release of hazardous chemicals into the environment ● Contamination of water bodies and soil ● Noise, vibration, and light emissions to ecosystems							
		Invasive alien species Introduction/Removal								
3) Nature-related risks	Transition	Chronic	● Increased costs to develop products and services with low impact on nature and ecosystems							
		Policy	● Regulatory use of hazardous materials and other regulations on hazardous chemicals and materials							
4) Nature-related opportunities	Business performance	Market	● Increased costs to develop products and services with low impact on nature and ecosystems							
		Technology	● Innovation and digitalization to reduce environmental impacts							
5) Actions against impacts on ecosystems [Business/Product Life Cycle]	Impact on nature	Reputational	● Reputation and digitalization to reduce environmental impacts							
		Liability	● Market expansion of natural energy, renewable energy, etc.							
6) Business Actions	Sustainability Performance	Resource efficiency	● Creation of new markets for biodiversity conservation technologies, etc. ● Development of low-impact products and services throughout their life cycle ● Reduction of resource consumption by improving product service life ● Reduction of resource consumption through system change ● Development of products visualizing natural impacts							
		Products and services	● Investment in technologies that contribute to reducing environmental impact							
7) Business Actions	Sustainability Performance	Markets	● Expanded financing for products and services that reduce environmental impact or positively affect nature and ecosystems							
		Capital flow and financing	● Improvement of brand image							
8) Business Actions	Sustainability Performance	Reputational capital	● Development of low-impact products and services throughout their life cycle ● Reduction of resource consumption by improving product service life ● Reduction of resource consumption through system change							
		Sustainable use of natural resources	● Selection of low-impact raw materials, such as recyclables							
9) Business Actions	Sustainability Performance	Ecosystem protection, restoration and regeneration	● Product design that leads to reduced use of pollutants ● Use of lighting and equipment designed to reduce light and noise pollution ● Implementation of microplastic emission control functions in products ● Recycling ● Longer use and longer service life research and development of plastic substitutes and plastics							
		Invasive alien species Introduction/Removal								

“Dependencies and Impacts” Sheet

“Risks & Opportunities” Sheet

“Business Actions” Sheet

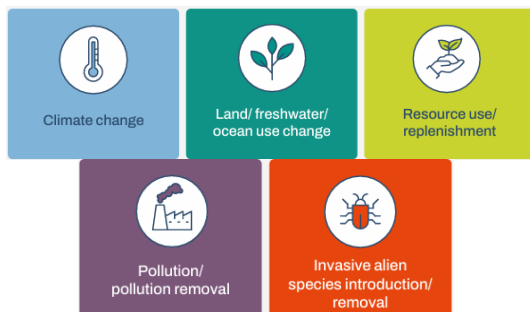
Product manufacturing, packaging/transport, sales, use, recycling/disposal (+ land use at business)

Structure of the Relationship Map: Dependencies and Impacts Sheet

- In the “Dependencies and Impacts” sheet, dependencies are organized on the vertical axis by ecosystem service category, and impacts are organized by the TNFD impact-driver categories.

Dependencies by ecosystem service category

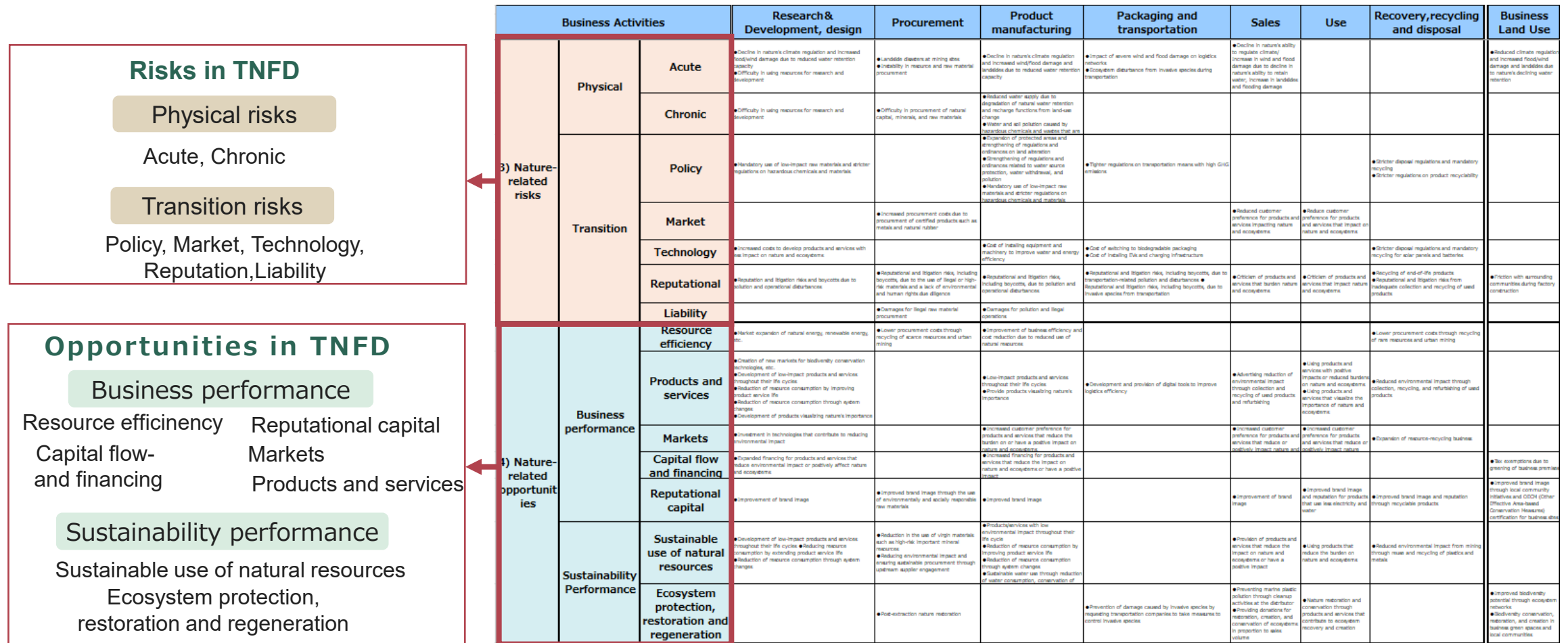
Impacts by TNFD impact drivers



Business Activities			Research&Development, design	Procurement	Product manufacturing	Packaging and transportation	Sales	Use	Recovery, recycling and disposal	Business Land Use
1) Biodiversity Blessings we enjoy from biodiversity	Dependence on nature	Provisioning services	●Inspiration for product development through biomimicry, etc. ●Supply of renewable resources	●Supply of energy resources ●Supply of renewable resources	●Supply of energy resources ●Supply of renewable resources	●Supply of energy resources ●Supply of renewable resources	●Supply of energy resources ●Supply of renewable resources	●Supply of energy resources ●Supply of renewable resources	●Supply of energy resources ●Supply of water resources	
		Regulation and maintenance services		●Maintenance of climate conditions suitable for operations ●Maintenance of water quality and quantity, and water purification ●Disaster mitigation through green infrastructure ●Regulation of pollination, biological control, and related ecosystem functions	●Air, water and soil purification/regulation ●Disaster mitigation and soil erosion control through green infrastructure ●Maintaining and optimizing environments for manufacturing and service provision ●Reduction of noise, odor, visual impact, etc.	●Disaster mitigation through green infrastructure ●Reduction of noise, vibration, and light		●Purified air brought by nature	●Air, water and soil purification/regulation ●Decomposition of organic waste and reduction of toxicity by soil microorganisms	●Air, water and soil purification/regulation ●Protection from natural disasters ●Organic waste disposal ●Biological control ●Soil erosion control
		Cultural services						●Beautiful natural scenery as a subject		●Recreation, spiritual fulfillment, and other cultural services ●Conservation and awareness-raising activities at business sites that respect local natural capital
2) Factors affecting ecosystems	Impact on nature	Land, freshwater areas, and Use of oceans	●Land use and occupation by factories and business sites, and changes in habitats due to construction	●Habitat degradation and fragmentation associated with land alteration ●Impacts on freshwater ecosystems caused by wastewater discharge and runoff ●Land use and occupation ●Impacts on terrestrial ecosystems caused by accidents ●Use and occupation of terrestrial, freshwater, and marine ecosystems	●Changes in habitats due to land use/occupation or construction by factories or business establishments	●Land, freshwater, and ocean use and occupation through the use of roads, airports, and port facilities, and the construction of logistics centers	●Habitat and habitat changes during construction of facilities at customer sites related to sales services and products	●Land use by landfill disposal, use and occupation of land and sea by reclamation of bays	●Change of habitats due to construction of factories and business establishments ●Reduction of groundwater recharge due to land use	●Reduction of CO2 sinks by construction of factories and business establishments
		Climate change	●Climate change due to greenhouse gas emissions	●Climate change due to greenhouse gas emissions		●Climate change due to greenhouse gas emissions	●Climate change due to greenhouse gas emissions from products at customer sites	●Climate change due to greenhouse gas emissions from products at customer sites	●Climate change due to greenhouse gas emissions	●Reduction of CO2 sinks by construction of factories and business establishments
		Resource use/restoration	●Depletion due to the use of biogenic materials	●Depletion of water resources due to excessive use, or excessive water withdrawal	●Depletion of water resources due to excessive use ●Depletion due to use of biogenic materials	●Depletion of water resources used in aircraft operations	●Sales promotion and awareness-raising activities at environmentally conscious business sites ●Water depletion due to use of water resources for cooling servers of cloud services	●Depletion due to excessive use of water resources	●Depletion due to excessive use of water resources during recycling	
		Pollution/ Pollution Removal	●Release of hazardous chemicals into water, air, and soil due to improper management ●Intentional release of waste plastics and other materials into the natural world ●Increase in water temperature in aquatic environments due to thermal wastewater discharge	●Soil, air, and water pollution caused by the release of hazardous chemicals ●Vibration, noise, and related disturbances ●Intentional release of plastic pellets into the natural environment ●Increase in water temperature in aquatic environments due to thermal wastewater discharge	●Release of hazardous chemicals into water, air, and soil due to improper management ●Intentional release of waste plastic and other materials into the natural world ●Noise, vibration, and light from factories affect ecosystems	●Release of hazardous chemicals into water, air, and soil due to improper management ●Noise, vibration, and light during transportation affect ecosystems	●Ecological pollution at customer sites related to sales services and products ●Intentional release of disposable plastic packaging materials used during sales into the natural world	●Release of chemical substances into water, air, and soil due to the use of products at customer sites ●Damage or plastic spillage during product use ●Discharge of waste at the time of reporing ●Ecosystem impacts from noise, vibration, and light during product use	●Release of hazardous chemical substances into water, air, and soil due to improper management of used products ●Intentional release of disposable plastic packaging materials into the natural world ●Waste from non-recyclable parts, etc.	●Release of hazardous chemical substances into water, air, and soil due to inappropriate management ●Non-plastics leakage via sewerage due to degradation of plastics in outdoor facilities ●Use of pesticides and insecticide used in the management of green areas on the premises
		Invasive alien species Introduction/Removal	●Ecosystem disturbance caused by transboundary movement of organisms ●Ecosystem disturbance caused by the introduction of invasive alien species	●Ecosystem disturbance caused by transboundary movement of organisms	●Prevention of damage caused by invasive alien species	●Prevention of damage caused by invasive alien species due to service migration during transportation			●Disturbance to local ecosystems by use of non-native species ●Spread of invasive alien species living on the site due to migration	

Structure of the Relationship Map: Risks & Opportunities Sheet

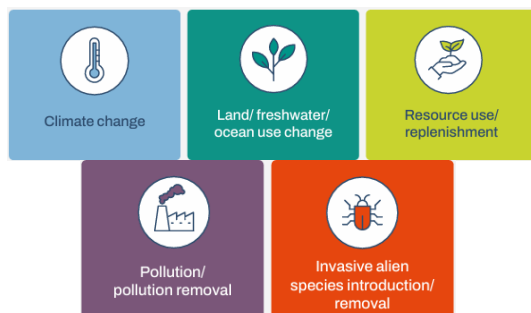
- In the “Risks & Opportunities” sheet, general risks and opportunities expected in the business activities of the electrical and electronic industry are organized on the vertical axis according to the TNFD classifications.



Structure of the Relationship Map: Business Actions Sheet

- In the “Business Actions” sheet, recommended business actions for positive and negative impacts on ecosystems are organized on the vertical axis using the same TNFD impact-driver classifications as impacts.

Impacts by TNFD impact drivers



Business Activities			Research & Development, design	Procurement	Product manufacturing	Packaging and transportation	Sales	Use	Recovery, recycling and disposal	Business Land Use
5) Actions against impacts on ecosystems [Business/Product Life Cycle] Impact on nature			- Quantitative assessment of impact on biodiversity using LCA - Implementation of PES (Payment for Ecosystem Services), such as water recharge - Monitoring and measuring impacts	- Evaluation of supplier initiatives based on green procurement and biodiversity conservation guidelines - Selection of biodiversity-conscious materials and encouraging suppliers to reduce waste, CO2 emissions, and chemical substances - Managing, reducing, or discontinuing the use of materials from mining sites with environmental or human rights concerns - Selection of low-impact raw materials, such as recyclables	- Implementation of PES (Payment for ecosystem services) - Monitoring and measuring impacts	- Biodiversity Consideration in Transportation Routes - Selection of biodiversity-conscious transportation contractors - Requesting transport companies to prioritize biodiversity and raising their awareness	- Expand sales of biodiversity-conscious products - Provide customers with information and education on the sustainable use of products and services - Third-party evaluation of products	Monitoring and measurement of impacts	- Efficient resource recovery through collection and recycling of used products - Improvement of reuse and recycling technologies	- Implementing environmental assessments for new business sites and applying the mitigation hierarchy - Voluntary biological and environmental surveys and planned management at existing facilities - Collaborating with the local community on facility management - Installation of rainwater infiltration tanks to maintain groundwater recharge capacity
			Evaluation of impact on biodiversity through quantitative assessment using LCA		Energy conservation and GHG emissions reduction at the manufacturing stage and increased use of clean energy	- Selecting transportation modes that emit less greenhouse gases - Promoting modal shift		Energy saving and GHG emission reduction at the stage of use	Energy conservation and GHG reduction at recycling plants	Reducing the heat island effect through rooftop greening, expanding green areas, and installing green curtains using native species
			- Resource conservation, recycling, and easy disassembly design - Use of recyclable resources in product design		- Implementation of PES (Payment for Ecosystem Services), such as water recharge through forest conservation - Curbing excessive use of water resources - Use of recyclable resources			Reduction of water consumption in the usage phase	Proper treatment and management of resources	
			- Product design that leads to reduced use of pollutants - Use of lighting and equipment designed to reduce light and noise pollution - Implementation of microplastic emission control functions in products - Recycling - Longer use and longer service life research and development of plastic substitutes and plastics	- Requesting suppliers to implement CHS (Chemical Substance Control System) and raising awareness - Reduction of plastic usage - Appropriate management of resin pellets - Selection of raw materials with low environmental impact	- Reduce emissions of waste and hazardous chemicals - Appropriate treatment of wastewater - Adoption of lighting to minimize light pollution and equipment to reduce noise - Reduction of plastic usage - Appropriate management of resin pellets	- Consideration of biodiversity in transportation routes - Selection of biodiversity-conscious transportation contractors - Requests and awareness-raising to transport companies - Reduce use of disposable plastics - Reduction of hazardous chemical substances contained in products provided	- Provide information and raise awareness for customers on the biodiversity-conscious use of products and services - Third-party evaluation of products - Reducing use of disposable plastic packaging	- Reduction in the use of disposable plastic packaging materials - Use of products with noise, vibration, and light pollution reduction functions	- Proper treatment of contaminants at recycling plants - Promoting proper disposal and separate collection of used products, including disposable plastic packaging and cushioning	- Biodiversity-conscious business site management - Replacement of easily deteriorated plastic materials with alternatives
						- Use of ships and shipping companies that treat ballast water properly - Measures against invasive alien species				Biodiversity-conscious management of business sites

How to Read *

1. By reviewing each column, you can understand material dependencies and impacts at each lifecycle stage (e.g., red box: product manufacturing stage)

Business Activities			Research&Development, design	Procurement	Product manufacturing	Packaging and transportation	Sales	Use	Recovery, recycling and disposal	Business Land Use
1) Biodiversity Blessings we enjoy from biodiversity	Dependence on nature	Provisioning services	● Inspiration for product development through biomimicry, etc. ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of renewable resources	● Supply of energy resources ● Supply of water resources	
		Regulation and maintenance services		● Maintenance of climate conditions suitable for operations ● Maintenance of water quality and quantity, and water purification ● Disaster mitigation through green infrastructure ● Regulation of pollination, biological control, and related ecosystem functions	● Air, water and soil purification/regulation ● Disaster mitigation and soil erosion control through green infrastructure ● Maintaining and optimizing environments for manufacturing and service provision ● Reduction of noise, odor, visual impact, etc.	● Disaster mitigation through green infrastructure ● Reduction of noise, vibration, and light		● Purified air brought by nature	● Air, water and soil purification/regulation ● Decomposition of organic waste and reduction of hazardous substances	● Air, water and soil purification/regulation ● Protection from natural disasters ● Organic waste disposal
2) Factors affecting ecosystems	Impact on nature	Land and Use of oceans	● Land changes in response to construction	● Impacts on terrestrial ecosystems caused by accidents ● Use and occupation of terrestrial, freshwater, and marine ecosystems	● Changes in habitats due to land use/occupation or construction by factories or business establishments.	● Land changes in response to construction				
		Climate change	● Climate change due to greenhouse gas emissions	● Climate change due to greenhouse gas emissions		● Climate change due to greenhouse gas emissions	● Climate change due to greenhouse gas emissions from sales services and products at customer sites.	● Climate change due to greenhouse gas emissions from products at customers' sites	● Climate change due to greenhouse gas emissions	● Reduction of CO2 sinks by cutting down trees to secure land for business sites
		Resource use/restoration	● Depletion due to the use of biogenic materials	● Depletion of water resources due to overuse, or excessive water withdrawal	● Depletion of water resources due to excessive use ● Depletion due to use of biogenic materials	● Depletion of water resources used in aircraft operations	● Sales promotion and awareness-raising activities at environmentally conscious business sites. ● Water depletion due to use of water resources for cooling servers of cloud services	● Depletion due to excessive use of water resources	● Depletion due to excessive use of water resources during recycling	
		Pollution/Pollution Removal	● Release of hazardous chemicals into water, air, and soil due to improper management ● Unintentional release of waste plastics and other materials into the natural world ● Noise, vibration, and light emissions from factories affect ecosystems.	● Soil, air, and water pollution caused by the release of hazardous chemicals ● Vibration, noise, and related disturbances ● Unintentional release of plastic pellets into the natural environment ● Increase in water temperature in aquatic environments due to thermal wastewater discharge	● Release of hazardous chemicals into water, air, and soil due to improper management ● Unintentional release of waste plastic and other materials into the natural world ● Noise, vibration, and light from factories affect ecosystems.	● Release of hazardous chemicals into water, air, and soil due to improper management ● Noise, vibration, and light during transportation affect ecosystems.	● Ecological pollution at customer sites related to sales services and products ● Unintentional release of disposable plastic packaging materials used during sales into the natural world.	● Release of chemical substances into water, air, and soil due to the use of products at customers' sites ● Damage or plastic spillage during product use. ● Discharge of waste at the time of opening ● Ecosystem impacts from noise, vibration, and light during product use.	● Release of hazardous chemical substances into water, air, and soil due to improper management of used products ● Unintentional release of disposable plastic packaging materials into the natural world. ● Waste from non-recyclable parts, etc.	● Release of hazardous chemical substances into water, air, and soil due to inappropriate management ● Micro-plastics leakage via rainwater due to degradation of plastics in outdoor facilities ● Use of pesticides and insecticides used in the management of green areas on the premises
		Invasive alien species Introduction/Removal		● Ecosystem disturbance caused by transboundary movement of organisms ● Ecosystem disturbance caused by the introduction of invasive alien species	● Prevention of damage caused by invasive alien species	● Prevention of damage caused by invasive alien species due to species migration during transportation				● Disturbance to local ecosystems by use of non-native species ● Spread of invasive alien species living on the site due to neglect

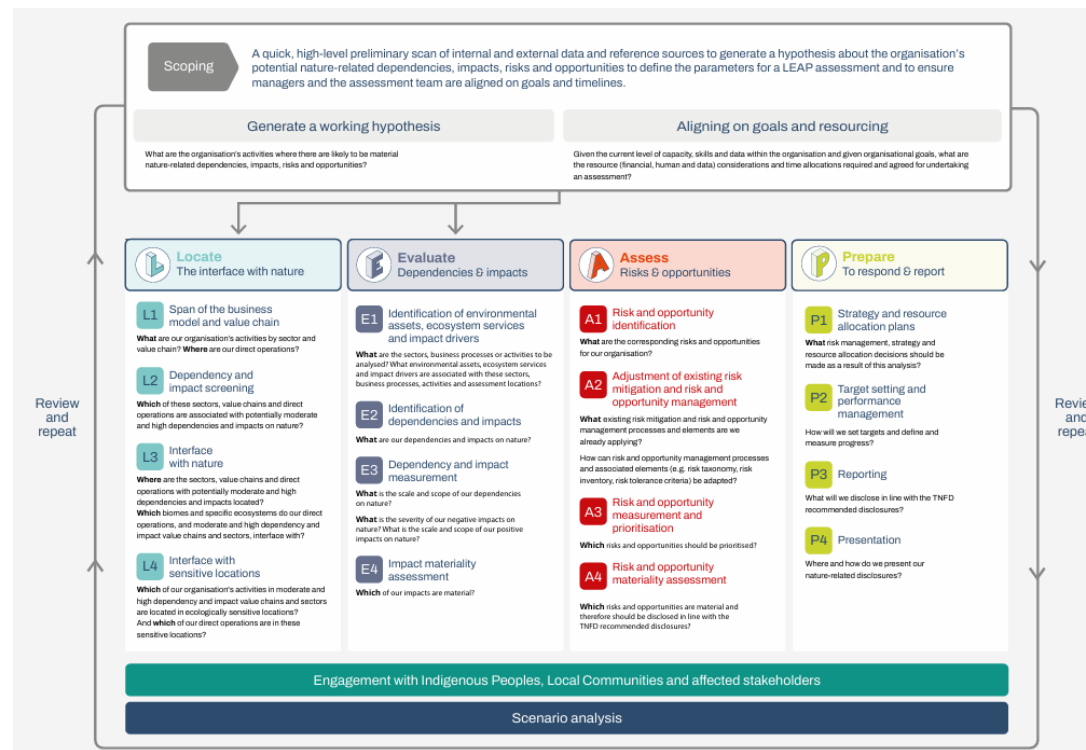
2. By reviewing each row, you can identify material dependency and impact factors at each life cycle stage (e.g., blue box: resource use and recovery)

3. By cross-referencing lifecycle stage columns with dependency and impact rows, you can identify material dependencies and impacts. (Example - Brown box: In the product manufacturing stage, the material dependency and impact under resource use and recovery is “excessive use of water resources”)

* Risks/opportunities and business actions are read in the same way.

TNFD and the LEAP Approach

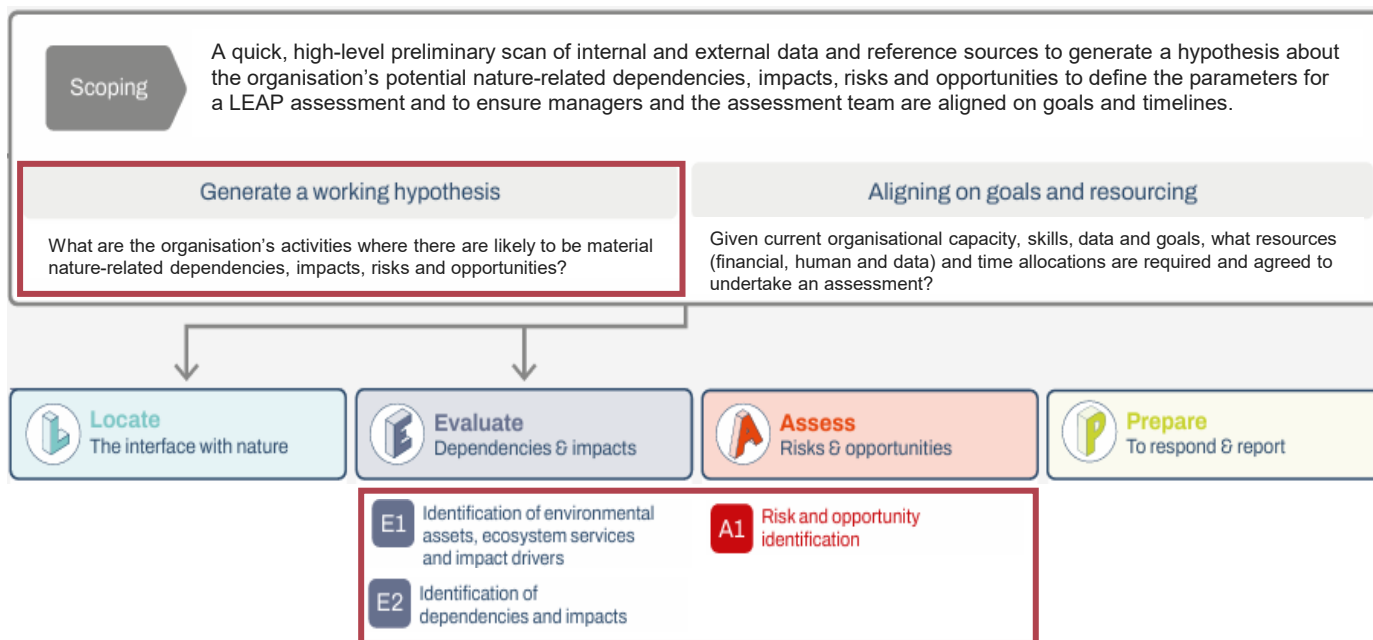
- TNFD (Taskforce on Nature-related Financial Disclosures) provides a framework for companies to assess and appropriately disclose nature-related dependencies, impacts, risks and opportunities.
- For assessing nature-related dependencies, impacts, risks and opportunities, TNFD proposes the voluntary “LEAP approach.” LEAP stands for Locate, Evaluate, Assess, and Prepare.



Source: Recommendations of the Taskforce on Nature-related Financial Disclosures

Use during LEAP implementation

- Since it is difficult to apply the LEAP approach across all businesses and the entire value chain, TNFD recommends conducting scoping in advance to determine the priority targets for analysis.
- The revised Relationship Map organizes material nature-related dependencies, impacts, risks and opportunities in the electrical and electronic industry, and can be used as a support tool for **Scoping, Evaluate (E1, E2) and Assess (A1)**.
- Because the Relationship Map does not incorporate regional characteristics, it is recommended that the Locate phase be conducted separately.



電機・電子関連事業と生物多様性との関係性 Ver.2

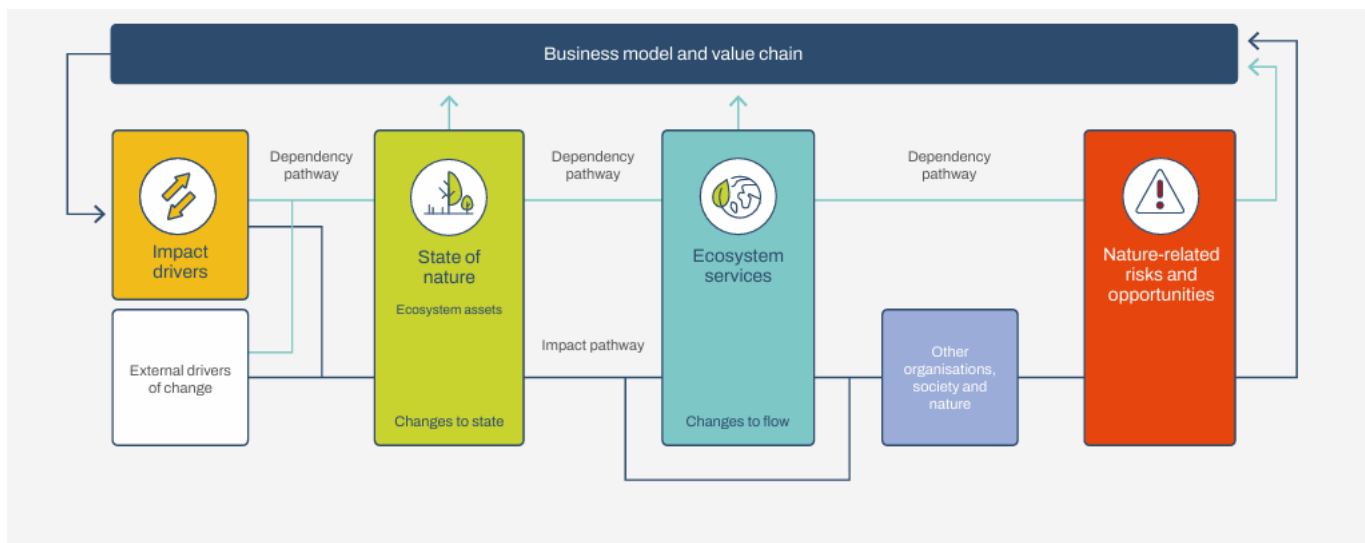
企業活動	研究開発・設計	原材料・部品・半製品調達	製造製造 (自社工場・事業所)	販売・輸送
企業活動	研究開発・設計	原材料・部品・半製品調達	製造製造 (自社工場・事業所)	販売・輸送
1	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)
2	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)
3	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)	● 企業活動による生物多様性への影響 (直接的・間接的)

Relationship Map

Source: Prepared by MS&AD InterRisk Research & Consulting, Inc. based on the TNFD Recommendations

Use Notes for Risks, Opportunities and Responses

- Nature-related risks and opportunities arise from pathways of dependency on nature and impact on nature.
- TNFD recommends identifying (E2) and measuring (E3) dependencies and impacts by considering impact drivers generated by the company, external factors, changes in the state of nature, and changes in the availability of ecosystem services, and then identifying risks and opportunities.
- Therefore, when using the Relationship Map, it is necessary to identify external factors and dependency/impact pathways separately and then check whether risks and opportunities beyond those shown in the Relationship Map should be identified.
- In addressing risks and opportunities, it is necessary to prioritize avoiding and minimizing negative impacts on nature, and then proceed with restoration and regeneration (the mitigation hierarchy in the AR3T framework).



Risks

- **Company impacts** alter nature and reduce ecosystem services.
- **External factors** alter nature and reduce ecosystem services.
- Business impacts harm stakeholders and reputation.

Opportunities

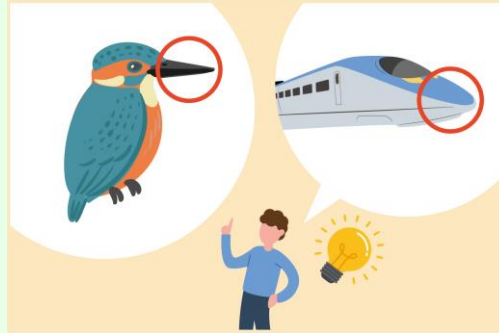
- **Avoiding, reducing, mitigating and managing nature-related risks.**
- Prevent and reverse nature loss through products, services, restoration and Nature-based Solutions.

- 1 R&D / Design
- 2 Procurement of Raw Materials, Parts, and Semi-finished Products
- 3 Product Manufacturing
- 4 Packaging / Transport
- 5 Sales / Use
- 6 Collection / Recycling / Disposal
- 7 Land Use at Business Sites



1. R&D / Design (Dependencies and Impacts)

Dependencies on Nature



Product inspiration from biomimicry



Supply of natural resources

Activities (R&D / Design)

Impacts on Nature



Factory land use and
habitat loss



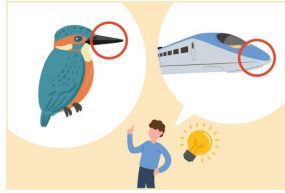
Hazardous substance and
plastic leakage



Noise vibration and
light disturbance

Relevant dependencies and impacts

Depen- dencies



Product inspiration from biomimicry



Supply of natural resources

Impacts



Factory land use and
habitat loss



Hazardous substance
and plastic leakage



Noise vibration and
light disturbance

! Nature-Related Risk Examples

- Mandatory low-impact materials and stricter hazardous-material regulations
- Higher costs for technologies reducing environmental impacts
- Pollution incidents may trigger reputational damage, litigation and consumer boycotts

✓ Nature-Related Opportunity Examples

- Eco-design and low-impact products can attract customers and reduce resource use
- Environmental technologies may create investment opportunities and new sustainable services



Actions Reducing Risks and Enhancing Opportunities

- Design products for circularity, easier disassembly and lower resource use
- Use circular materials and reduce hazardous substances across product-design
- Minimize light and noise impacts through improved equipment design standards
- Assess biodiversity impacts quantitatively and extend product lifetimes where possible

2. Procurement (Dependencies and Impacts)

Dependencies on Nature



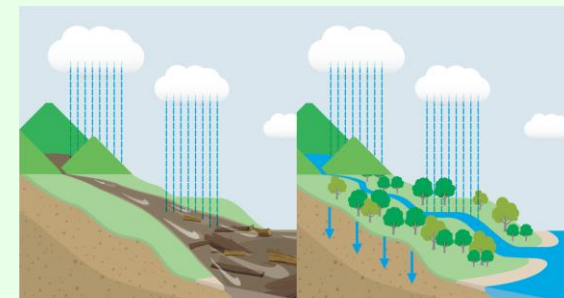
Supply of water
resources



Supply of timber
and biomaterials



Supply of mineral
resources



Water quality and
quantity maintenance

Activities (Procurement)

Impacts on Nature



Water depletion from
over withdrawal



Plastic pellet release
into nature



Habitat degradation
from land conversion



Wastewater impacts on
freshwater ecosystems

2. Procurement (Risks, Opportunities and Actions)

Relevant dependencies and impacts

Depen- dencies



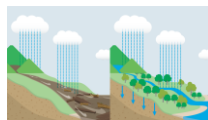
Supply of water
resources



Supply of timber
and biomaterials



Supply of
mineral
resources



Water quality and
quantity maintenance

Impacts



Water depletion
from
overwithdrawal



Plastic pellet
release into
nature



Wastewater impacts
on freshwater
ecosystems



Habitat
degradation from
land conversion

⚠ Nature-Related Risk Examples

- Nature degradation may disrupt raw material procurement
- Regulations may tighten supply and increase certified-material costs
- High-risk sourcing may trigger reputational issues, litigation and boycotts

✓ Nature-Related Opportunity Examples

- Recycling scarce resources and urban mines can reduce procurement costs
- Lower virgin material use can improve resource efficiency and resilience

📄 Actions Reducing Risks and Enhancing Opportunities

- Select low-impact and circular materials, including certified biodiversity-conscious options where available
- Reduce plastic use and phase down environmentally high-risk raw materials
- Engage suppliers to strengthen environmental consideration across procurement practices consistently
- Identify and reduce raw materials with environmental or human-rights concerns

3. Product Manufacturing (Dependencies and Impacts)

Dependencies on Nature



Supply of water
resources



Air water and soil regulation



Noise odor and
visual mitigation

Activities (Product Manufacturing)

Impacts on Nature



Land-use impacts on habitats



Excessive water
resource use



Hazardous substances
and plastic pollution



Noise vibration and
light disturbance

3. Product Manufacturing (Risks, Opportunities and Actions)

Relevant dependencies and impacts

Depen- dencies



Supply of water
resources



Air water and soil
regulation



Noise odor and
visual mitigation

Impacts



Factory land use
and habitat loss



Excessive water
and biomaterial use



Hazardous
substance and
plastic leakage



Noise vibration and
light disturbance

! Nature-Related Risk Examples

- Reduced retention/recharge may threaten manufacturing water supply
- Water, pollution and efficiency regulations may increase operating and equipment costs
- Operational pollution/disturbance may trigger reputation/litigation/boycott

✓ Nature-Related Opportunity Examples

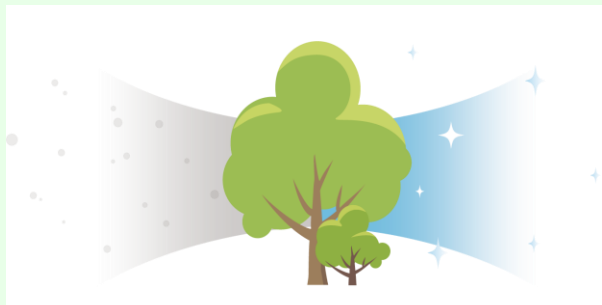
- Low-impact products and eco-design can increase demand and reduce resource consumption
- Cleaner manufacturing measures can improve customer preference and sustainability performance

📄 Actions Reducing Risks and Enhancing Opportunities

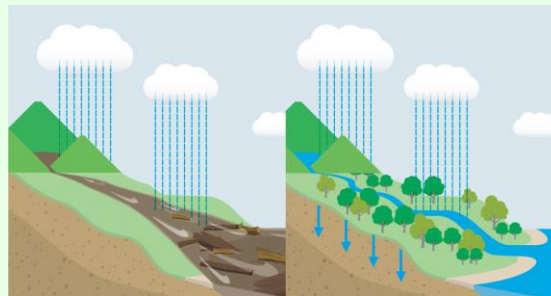
- Implement ecosystem-service payments, such as forest conservation for water recharge
- Cut manufacturing GHG emissions through energy savings and clean power
- Use circular resources and reuse materials, parts and components widely
- Reduce waste and hazardous chemical releases through proper treatment systems

4. Packaging / Transport (Dependencies and Impacts)

Dependencies on Nature



Air purification
and regulation



Disaster mitigation with
green infrastructure



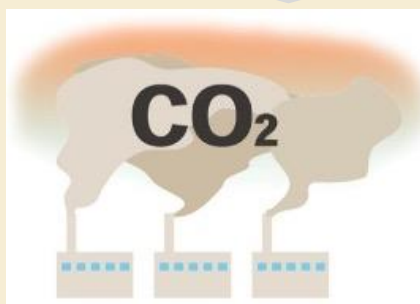
Transport noise vibration
and light mitigation

Activities (Packaging / Transport)

Impacts on Nature



Logistics land and
water occupation



Greenhouse gas
emissions



Noise vibration
and light impacts



Disturbance by
invasive alien species

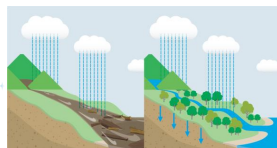
4. Packaging / Transport (Risks, Opportunities and Actions)

Relevant dependencies and impacts

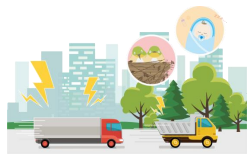
Dependencies



Air purification and regulation



Disaster mitigation with green infrastructure

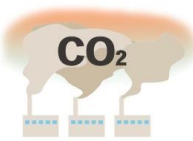


Transport noise vibration and light mitigation

Impacts



Logistics land and water occupation



Greenhouse gas emissions



Noise vibration and light impacts



Disturbance by invasive alien species

! Nature-Related Risk Examples

- Severe wind/flood events may disrupt logistics networks
- High-GHG transport regulations may tighten
- Transport emissions, pollution and invasive species can create regulatory and litigation risks

✓ Nature-Related Opportunity Examples

- Digital tools can optimize routing, loads and logistics efficiency across networks



Actions Reducing Risks and Enhancing Opportunities

- Select biodiversity-conscious routes that avoid sensitive areas where operationally feasible
- Choose transport modes with lower greenhouse gas emissions where practical
- Reduce single-use packaging plastics and improve reusable packaging options systems
- Prevent invasive alien species through procedures, communication and eradication measures

5. Sales / Use (Dependencies and Impacts)

Dependencies on Nature



Supply of water resources



Supply of energy resources



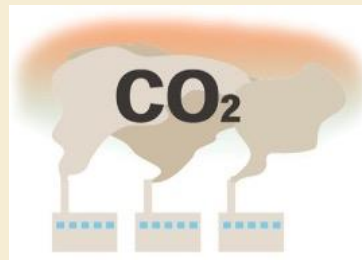
Natural scenery for photography

Activities (Sales / Use)

Impacts on Nature



Excessive water
and biomaterial use



Greenhouse
gas emissions



Waste generated
during unpacking



Unintentional plastic
packaging release

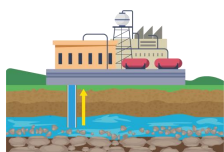


Noise vibration
and light impacts

5. Sales / Use (Risks, Opportunities and Actions)

Relevant dependencies and impacts

Depen- dencies



Supply of water
resources



Supply of energy
resources

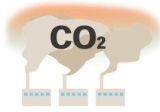


Natural scenery for
photography

Impacts



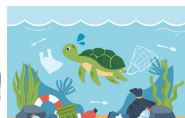
Excessive
water and
biomaterial
use



Greenhouse
gas emissions



Waste
generated
during
unpacking



Unintentional
plastic
packaging
release



Noise vibration
and light impacts

! Nature-Related Risk Examples

- High-impact products may lose customer preference and attract public criticism
- Severe weather may increase flooding, landslides and use-phase disruption risks

✓ Nature-Related Opportunity Examples

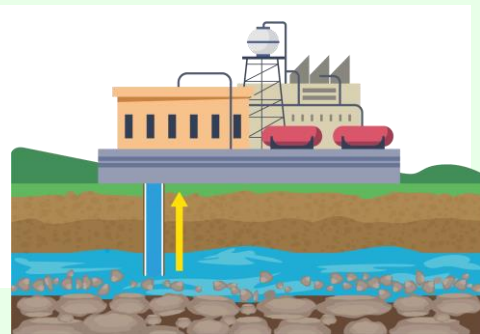
- Eco-friendly products can increase customer preference and differentiate services offerings
- Products showing nature value can raise awareness and market appeal

📄 Actions Reducing Risks and Enhancing Opportunities

- Provide information helping customers use products with biodiversity in mind
- Promote biodiversity-conscious products and services across sales channels consistently and responsibly
- Deploy products that reduce energy, GHG emissions and water use
- Reduce single-use packaging and offer noise, vibration and light-reduction features

6. Collection / Recycling / Disposal (Dependencies and Impacts)

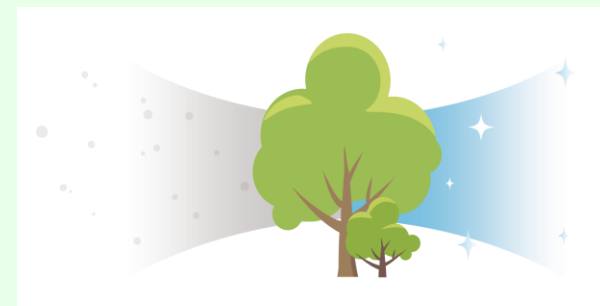
Dependencies on Nature



Supply of water resources



Supply of energy resources



Air water and soil regulation

Activities (Collection / Recycling / Disposal)

Impacts on Nature



Hazardous chemical
release risks



Plastic packaging and
cushioning release



Non-recyclable waste
generation risks

Relevant dependencies and impacts

Depen- dencies



Supply of water
resources



Supply of energy
resources



Air water and
soil regulation

Impacts



Hazardous chemical
release risks



Plastic packaging and
cushioning release



Non-recyclable waste
generation risks

! Nature-Related Risk Examples

- Stronger waste regulations and recycling mandates may increase compliance requirements substantially
- Poor collection or recycling can create reputational and litigation risks

✓ Nature-Related Opportunity Examples

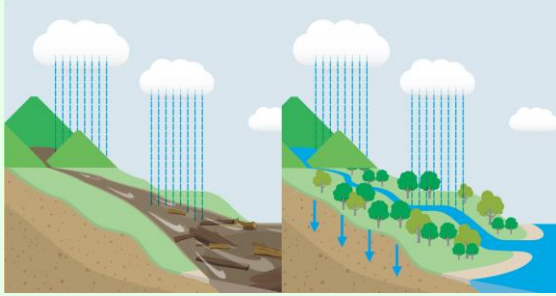
- Recycling scarce resources and urban mines can reduce procurement costs
- Collection, refurbishing and reuse can reduce extraction and disposal impacts

📄 Actions Reducing Risks and Enhancing Opportunities

- Recover resources efficiently through collection and recycling of used products
- Properly treat pollutants generated at recycling plants and disposal sites
- Ensure used products are treated properly through reliable disposal processes
- Promote separated collection of single-use packaging and cushioning materials widely

7. Land Use at Business Sites (Dependencies and Impacts)

Dependencies on Nature



Soil erosion and disaster protection



Air, water and soil regulation



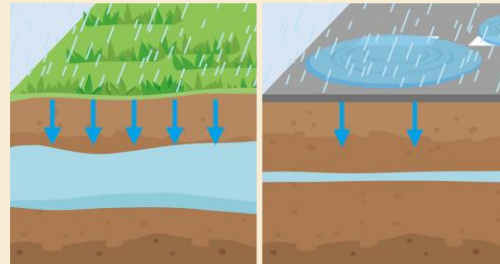
Recreation and mental wellbeing services

Activities (Land Use)

Impacts on Nature



Habitat changes from building construction



Reduced groundwater recharge capacity



Pesticide use in green-space management

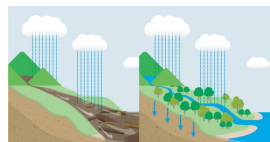


Alien species ecosystem disturbance

7. Land Use at Business Sites (Risks, Opportunities and Actions)

Relevant dependencies and impacts

Dependencies



Soil erosion and disaster protection



Air, water and soil regulation

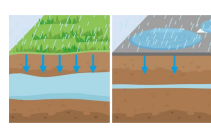


Recreation and mental wellbeing services

Impacts



Habitat changes from building construction



Reduced groundwater recharge capacity



Pesticide use in green-space management



Alien species ecosystem disturbance

! Nature-Related Risk Examples

- Intensifying wind, flood and landslide events may damage sites and operations
- Construction activity may create friction with surrounding communities and stakeholders

✓ Nature-Related Opportunity Examples

- Site greening may reduce taxes and strengthen relationships with communities
- Biodiversity conservation and restoration can improve brand image and ecological potential

📄 Actions Reducing Risks and Enhancing Opportunities

- Manage sites with surrounding communities to strengthen ecological networks locally
- Install rainwater infiltration facilities to maintain groundwater recharge capacity onsite
- Expand native greenery, rooftop greening and heat-island mitigation measures broadly
- Manage biodiversity by using chemicals properly and removing alien species

Related Websites

Please make use of the various information and tools provided to support biodiversity conservation promotion by companies in the electrical and electronic industry.

- Biodiversity Conservation Site of the Four Electrical and Electronic Industry Associations – Top Page
<https://www.jema-net.or.jp/English/businessfields/sustainability/biodiversity.html>

Production Contributors

The Relationship Map and this guidance were prepared with the cooperation of FANPS and MS&AD InterRisk Research & Consulting, Inc..

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<https://www.jema-net.or.jp/English/businessfields/sustainability/biodiversity.html> (English)

