【Business and Biodiversity Study Group】
---Gaining business competitiveness through biodiversity conservation---

Final Report

February 7, 2012

Council on Competitiveness-Nippon (COCN)

Contact us: cocn.office.aj@hitachi.com

産業競争力懇談会 COCN

【Executive Summary】

■Background and purpose of starting this study group

The 10th Conference of the Parties to the Convention on Biological Diversity (COP 10) was held in Nagoya in October 2011, in which the parties to the convention adopted a new strategic plan (Aichi Targets) toward 2020 and the Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization. Under these circumstances, companies have been increasingly facing demands that they address issues concerning biodiversity in terms of resource consumption and changes in natural environments associated with their business activities. Companies should voluntarily and actively enhance their efforts to address biodiversity, considering how they can evaluate their business activities in this respect and contribute to biodiversity conservation through their business activities.

■Viewpoint and scope of the study

In the 2010 study group, to learn from existing researches and practices in Japan and abroad, we invited experts who gave us lectures and advice about the latest trend, shared information about measures taken by each member company of the study group, and identified steps taken on biodiversity conservation by some member companies in their value chains as well as challenges to be addressed.

In the 2011 study group, we identified certain factors in business to be addressed with respect to biodiversity, and developed a checklist to assess their impacts. The PDCA (plan, do, check and action) cycle, which companies can use to understand the weaknesses of their measures and improve on them, is essential for companies to make progress in biodiversity conservation. The purpose of this checklist is to help each company to understand how they influence biodiversity by assessing their performance on each question, and continue to make progress in their efforts by trying to improve the score.

Test runs were given on the developed checklist by a total of 23 companies consisting of the member companies of this study group and some of the COCN member companies. Problems they encountered in the tests were identified and corrected.

The results of the tests by industry sector show that all industries have scored approximately 3 out of 5 points with no major differences among sectors. The score of the manufacturing industry (electronics) is higher than that of the other industries, with particularly higher scores in the disposal and reuse stage and the nature conservation stage. The other industries should improve their performances in these stages by learning from the steps taken by the manufacturing (electronics) industry.

■Recommendations, desirable role-sharing among industry, government and academy, and possible impacts created by the implementation of the recommendations

In 2010, the first year of this 2-year project, we identified factors that are already being addressed by some companies in their value chains as well as factors that need to be addressed for the conservation of biodiversity. In 2011 we developed a biodiversity checklist that can be used by all industries based on the factors identified in 2010. The Nagoya Chamber of Commerce & Industry created a guidebook for their member companies, "Business and Biodiversity - how to understand their relationships and take steps based on the Aichi Targets and Nagoya Protocol", in which they described the content of this checklist.

In addition, we are collaborating with the ISO Working Group on Biodiversity Standards of International Standard Innovation Technology Research Association (IS-INOTEK) to develop a proposal for an international standard.

The ISO Working Group on Biodiversity Standards has set a goal that Japan will propose an international standard on biodiversity, toward which they have continued discussion since October, 2011. We have requested the working group to use our Business and Biodiversity Checklist as one of the KPIs used in the discussion. We are currently working to see that the checklist will be adopted in the proposal. We will also promote this checklist to be used in projects planned by The World Business Council for Sustainable Development (WBCSD) as a performance evaluation tool for businesses developed by Japanese companies.

We would like to request support from the Technical Regulations, Standards and Conformity Assessment Policy Division, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry to the activities of this working group to propose international standards.

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【Introduction】

- Background and purpose of proposing this project

At the 10th Conference of the Parties to the Convention on Biological Diversity (COP 10) held in Nagoya in October 2011, the parties to the convention adopted a new strategic plan (Aichi Targets) toward 2020 and the Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization.

Five strategic targets and 20 specific targets were adopted in the new strategic plan. Many of them are qualitative goals with some quantitative goals including a 50% reduction in the rate of erosion of natural habitats, conservation of 17 % of terrestrial and inland water and 10 % of coastal and marine areas, and restoration of 15 % of degraded ecosystems.

In addition, the Nagoya Protocol was adopted which stipulated that the benefits arising from the utilization of genetic resources shall be shared in a fair and equitable way based on mutually agreed conditions, access to genetic resources shall be subject to prior consent, and each party shall designate one or more checkpoints for the purpose of monitoring.

Facing increasing demands that companies take steps to conserve biodiversity, companies engaged in production activities which consume resources and change natural environments are trying to find out how they can evaluate their own business activities in this respect and contribute to biodiversity conservation through their business activities. In 2010, under these circumstances, to learn from existing researches and practices in Japan and abroad, we invited experts who gave us lectures and advice about the latest trend, shared information about measures taken by each member company of the study group, and identified steps already taken on conservation of biodiversity by the companies in their value chains and challenges to be addressed. In 2011, the second year, we developed a checklist to evaluate the effects of measures taken by companies to address biodiversity conservation. In developing the checklist, we focused on the lifecycles of goods and services, and compiled action items to be considered by companies in each stage of those lifecycles. By conducting a self-assessment using this checklist, companies will be able to not only follow the PDCA cycle but also raise overall awareness of their impact on biodiversity, a problem that should be addressed by the business community as a whole to realize a sustainable society.

- Goals in and effects on strengthening industrial competitiveness we aim to achieve

We need to be involved in activities to reduce impacts of business activities on biodiversity (e.g., overharvesting wildlife significantly more than natural resilience, excessive consumption of forest resources, degradation of ecosystem services which is hard to repair, and fragmentation and loss of habitats caused by a drastic change in habitat environments by mining operations).

In 2010 we identified factors that are already being addressed by some companies in their value chains as well as factors that require improvement for the conservation of biodiversity. In 2011 we developed a biodiversity checklist that can be used by all industries, based on the factors identified in 2010. The Nagoya Chamber of Commerce & Industry created a guidebook for their member companies, "Business and Biodiversity - how to understand their relationships and take steps based on the Aichi Targets and Nagoya Protocol", in which they described the content of this checklist.

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Council on Competitiveness-Nippon
Sadayuki Sakakibara
Chairman of the Board

【List of Members】

Leader

Shigeru Azuhata	Senior Vice President and Executive Officer, Hitachi, Ltd., Hitachi Group Chief Environmental Strategy Officer

Members

Atsushi Watari	Kajima Corporation
Haruo Takayama	Kajima Corporation
Mamoru Nasu	Shimizu Corporation
Takahiro Ishida	Sharp Corporation
Tsukasa Kanai	The Sumitomo Trust and Banking Co., Ltd.
Fumiaki Goto	The Sumitomo Trust and Banking Co., Ltd.
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Takeshi Takagi	Hitachi Chemical Co., Ltd.
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Yuka Maezawa	Fujitsu, Ltd.
Hiroki Yamaguchi	Mori Building Co., Ltd.
Akihiro Suzuki	Mori Building Co., Ltd.
Hiroaki Kondo	National Institute of Advanced Industrial Science and Technology
Naoki Adachi	Response Ability, Inc.
Chiseki Haginoya	Hitachi Research Institute

Lecturers/observers

Yoichi Takahashi	Hitachi, Ltd.
Takao Nakatsuka	Council on Competitiveness-Nippon (COCN)

Secretariat

Manabu Hirano	Hitachi, Ltd.
Yoshihiro Ienaka	Hitachi Research Institute

1. Previous Efforts on Biodiversity

1.1. Concepts of Ecosystem and Biodiversity

Figure 1.1 illustrates the concepts of the entire ecosystem, biodiversity and ecosystem services. Biodiversity is the diversity of organisms living in ecosystems and habitat environments. Benefits from ecosystems can be defined as ecosystem services.

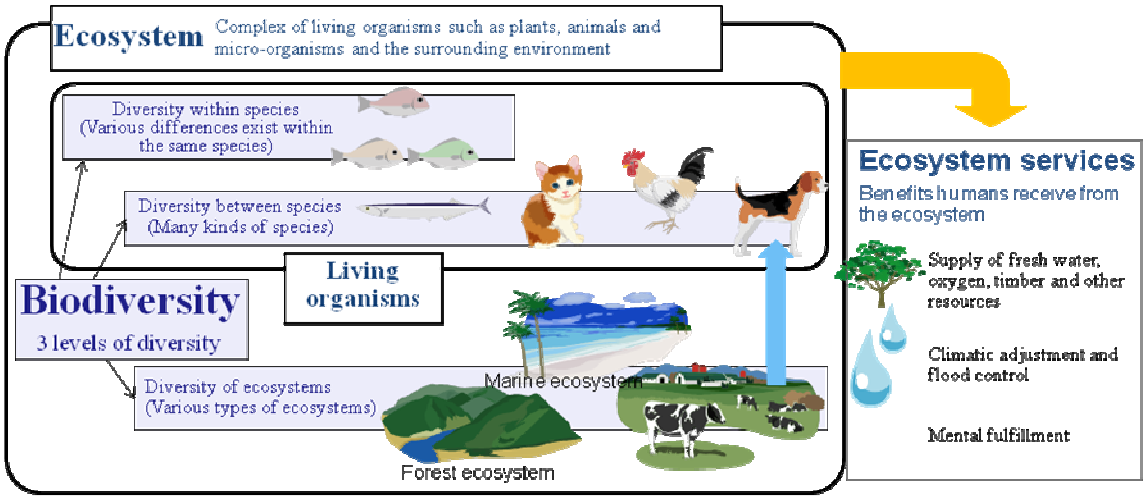

Figure 1.5 Relations between the ecosystem and corporate activities

Source: documents of United Nation's Convention on Biological Diversity

Ecosystem services are the benefits humans receive from ecosystems, which can be categorized into the services shown in Table 1.1.

Table 1.1 Main ecosystem service categories

Provisioning services	The services that supply resources indispensable to human life including food, fresh water, wood and fiber, and fuel including wood.
Regulating services	The services that regulate environment including regulation of climate, flood, disease and water purification. Artificial alternatives require huge costs.
Cultural services	The services that give spiritual enrichment, aesthetic joy, bases of religious or social structures, and recreational opportunities.
Supporting services	The services that support the production of "provisioning services", "regulating services" and "cultural services" including generation of oxygen by photosynthesis, soil formation, nutrient and salt cycling and water cycling.

Source: Millennium Ecosystem Assessment

According to the Convention on Biological Diversity, "'Biological diversity' means the variability among living organisms from all sources … this includes diversity within species, between species and of ecosystems". There are 3 levels of diversity shown in Table 1.2.

Table 1.2 Three levels of biodiversity

Biodiversity within species (genetic)	Genetic differences within the same species
Biodiversity between species	Differences between species
Biodiversity of ecosystems	Different types of nature (forests, swamps, mudflats, coral reefs, rivers, etc.)

Source: material provided by Hitachi, Ltd.

1.2. International Trends

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Based on the awareness that biodiversity supports the existence of humans and provides a variety of benefits to humans, which makes it important for the whole world to address conservation of biodiversity, the Convention on Biological Diversity was opened for signature in 1992 at the United Nations Conference on Environment and Development (UNCED, Earth Summit) held in Rio de Janeiro. Japan signed it in May 1993. The Convention entered into force in December 1993. The Convention on Biological Diversity states that its objectives are; (1) the conservation of biological diversity, (2) the sustainable use of its components, and (3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources (ABS: access and benefit sharing).

In order to meet these objectives, the Conference of the Parties (COP) to the Convention on Biochemical Diversity (CBD) is held approximately every 2 years as the forum where decisions are made to advance implementation of the CBD. The CBD defines biological diversity as "the variability among living organisms from all sources". The definition includes 3 aspects, "diversity of ecosystems", "diversity between species" and "diversity within species", each of which benefits humans. For example, we enjoy benefits such as oxygen generated through photosynthesis in forests and water source recharge provided by "diversity of ecosystems", and "diversity between species" provides us with methods to produce a larger amount of foodstuff including cereals, vegetables and livestock, and raw materials to produce medicine. Moreover, "genetic diversity" which supports the entire biological diversity is indispensable to all life on this planet including humans.

The Economics of Ecosystems and Biodiversity (TEEB) study conducted by the United Nations Environment Programme (UNEP) defines ecosystems as "a dynamic complex of plant, animal, and microorganism communities and the non-living environment interacting as a functional unit". These different benefits we receive from ecosystems rich in biological diversity are called "ecosystem services". While these concepts were shared among an increasing number of people in the world, the following major targets were adopted at the COPs after the first Conference of the Parties (COP1) in 1994.

At the 6th Conference of the Parties (COP6) held in the Hague, the Netherlands, in 2002, the Parties to the Convention adopted a strategic target (2010 Biodiversity Target) "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth".

At the 10th Conference of the Parties (COP10) held in Nagoya, Japan, in 2010, the Parties to the Convention adopted the Nagoya Protocol, a set of rules concerning the utilization of genetic resources and benefit sharing, and the Aichi Targets, a set of global targets towards 2020. Their details are shown in table 1.3 and table 1.4 respectively.

Table 1.3 Aichi Targets

No.	Target
1	People are aware of the values of biodiversity and the steps they can take to conserve it.
2	Biodiversity values have been integrated into national and local strategies and are being incorporated into national accounting, as appropriate, and reporting systems.
3	Incentives, including subsidies, harmful to biodiversity are eliminated or reformed, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied.
4	Stakeholders including business have implemented plans for sustainable production and consumption.
5	The rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.
6	Marine resources are and harvested sustainably.
7	Agriculture, aquaculture and forestry are managed sustainably.
8	Pollution has been brought to levels that are not detrimental.
9	Invasive alien species are controlled or eradicated.
10	Detrimental effects on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized.
11	At least 17 per cent of terrestrial and inland water and 10 per cent of marine areas are conserved through protected areas and other measures.
12	The extinction or decline of known threatened species has been prevented.
13	The genetic diversity of cultivated plants and domesticated animals is maintained, and its erosion is minimized.
14	Essential services are provided by ecosystems, and restored and safeguarded.
15	At least 15 per cent of degraded ecosystems are restored, contributing to climate change mitigation and adaptation.
16	The Nagoya Protocol on ABS is in force and operational.
17	Each Party has developed and has implemented an effective and participatory national biodiversity strategy.
18	Traditional knowledge is respected and fully integrated in implementation of the Convention.
19	Knowledge, the science base and technologies relating to biodiversity are improved.
20	The mobilization of financial resources for effectively implementing the Strategic Plan should increase substantially from the current levels.

Source: adapted from a document prepared by the Japanese Ministry of the Environment

Table 1.4 Outline of the Nagoya Protocol

The benefits arising from the utilization of genetic resources shall be shared in a fair and equitable way to contribute to the conservation of biological diversity and the sustainable use of its components.
The benefits arising from the utilization of traditional knowledge associated with genetic resources shall be shared in a fair and equitable way with indigenous and local communities holding such knowledge.
Special considerations shall be given to non-commercial researches and cases of emergencies.
Access to genetic resources shall be subject to the prior consent of the Party providing such resources.

Each Party shall make information on procedures available to applicants seeking access to genetic resources.
Each Party shall designate checkpoints to monitor the utilization of genetic resources.

The Millennium Ecosystem Assessment conducted by the United Nations from 2001 to 2005 pointed out that "human activity has resulted in a substantial and irreversible change in biological diversity in the past 50 years". The main causes of the degradation of biodiversity included the loss of habitats including forests and overconsumption of biological resources. It is important that humans who receive many benefits from ecosystem services will promote ecosystem conservation to secure biodiversity.

In April 2011 the World Business Council for Sustainable Development (WBCSD) published Guide to Corporate Ecosystem Valuation (CEV), a framework to evaluate the relationships between business activities and ecosystems quantitatively.

In January 2012 the Business and Biodiversity Offsets Programme (BBOP) released Standard on Biodiversity Offsets which includes principles, criteria and indicators, effectively starting to create standards. Also in January 2012, The International Finance Corporation (IFC) revised the performance standard, fully integrating the concept of biodiversity offset.

1.3. Outline of the Domestic Legal Framework

The Basic Environmental Law enacted in 1993 establishes three basic principles for environmental preservation: enjoyment and inheritance of the bounties of the environment, creation of a society ensuring sustainable development with reduced environmental load, and active promotion of global environmental conservation through international cooperation. It also establishes that, based on these principles, various policies for environmental conservation shall be implemented in an integrated and systematic manner in Japan. In addition, the Basic Environmental Plan was established pursuant to Article 15 of the Law.

In accordance with the concept of the Law, the Basic Act on Biodiversity was enacted in 2008 which establishes basic principles and relevant policies on conservation and sustainable use of biodiversity. The National Biodiversity Strategy was formulated pursuant to Article 11 of the Act. The first statutory strategy based on the Basic Act on Biodiversity, the National Biodiversity Strategy 2010, was announced in March 2010, which set short and long term goals. Biodiversity was to be secured by individual laws pursuant to the Basic Act mentioned above.

In December 2010 the Act on the Promotion of Activities to Conserve Biodiversity through Cooperation among Local Diversified Actors (Act on Local Cooperation on Biodiversity) was enacted to conserve rich biodiversity by promoting biodiversity conservation activities carried out through coordination among local diversified actors. The Act was put in force in October 2011.

1.4. Relationships between Biodiversity and Business

Figure 1.2 shows how business is related with ecosystems with biodiversity. On one hand, companies receive free ecosystem services including provision of raw materials such as wood and clear water, and give positive effects to ecosystems through their goods and services to conserve ecosystems and nature protection activities carried out by employees. On the other hand, companies put environmental load to

ecosystems. The benefits companies enjoy will be degraded if the biodiversity of ecosystems is degraded. Possible relationships between ecosystems and steps taken by companies to minimize environmental load are shown in Table 1.5.

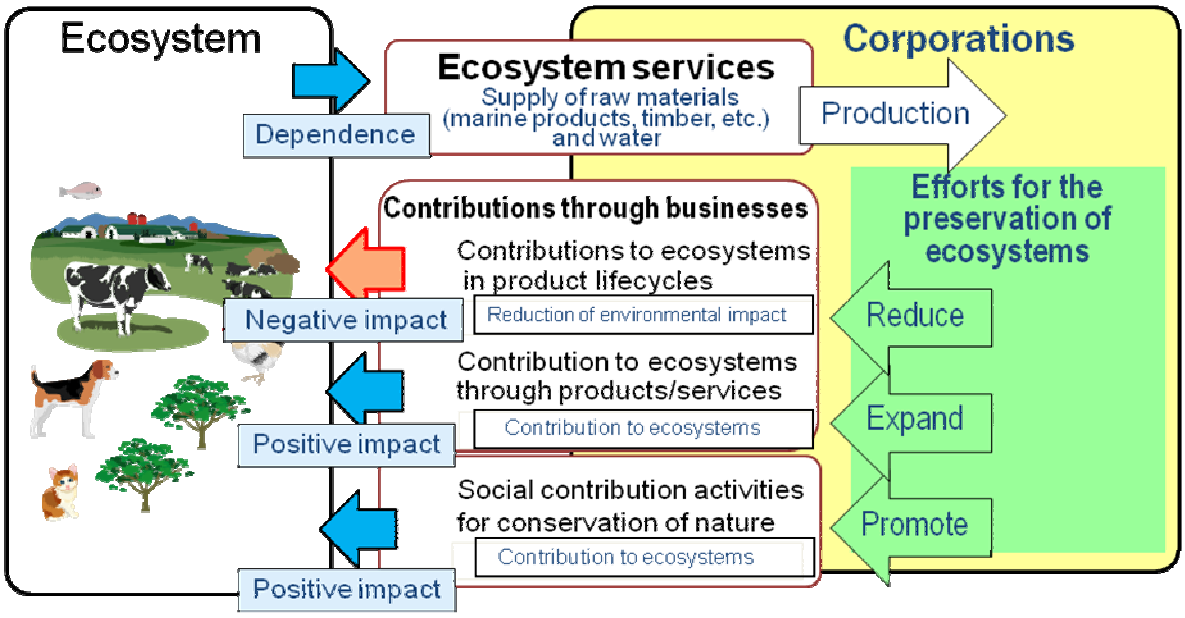

Figure 1.2 Relationships between ecosystems and business activities

Source: Hitachi, Ltd.

Table 1.5 Measures for reducing environmental load and how they relate to ecosystems

Energy saving	CO_2 emissions contribute to global warming and climate change. Temperature changes in ecosystems will lead to destruction of ecosystems (e.g., changes in sea water temperatures have already shown effects in coral reefs and other areas).
Water and gas discharge	Discharging contaminated water and/or gas without purification will lead to destruction of ecosystems. To what extent water and/or gas needs to be purified varies with each region.
Promotion of 3Rs	Mining of resources requires a modification of a wide area, which leads to destruction of ecosystems in many cases. Reducing resource use will lead to the reduction of the area to be modified, and protect the ecosystem in the saved area.
Waste treatment	The land used for landfill causes modifications to ecosystems. In addition, the burden of road traffic used for waste transportation may also have effects on ecosystems.
Biological resources including paper and wood	Using wood materials produced by excessive logging operations destructive to ecosystems will cause trouble. Using raw materials produced by properly managed operations which take ecosystem conservation into account will contribute to ecosystem conservation. Properly managed biological materials will be sustainable raw materials.

Source: Hitachi, Ltd.

In recent years, increased awareness of the relationships between biodiversity and business has led to specific policies including the Guidelines for Private Sector Engagement in Biodiversity released by the

Japanese Ministry of the Environment in 2009. Keidanren (Japan Business Federation) also published "Declaration of Biodiversity" in 2009, and encouraged member companies to make active efforts by publishing "A Guide for Action Agenda" which helps companies to start taking concrete actions. The nature of the relationship a business has with the ecosystem surrounding them depends on the category and size of each business. It is important for a business to start by trying to understand the nature of the relationship between its business activities and the ecosystem, and then, while taking feasibility into consideration, proceed to take specific steps in order of priority.

2. Trends in Biodiversity Relating to Overall Business Operations

2.1. Relationships between Business and Biodiversity

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Nowadays the international community puts strong emphasis on the importance of conserving biodiversity, which has rapidly attracted attention in the business world. The Convention on Biological Diversity entered in to force in 1993, several conferences of the parties (COP) have been held, which have resulted in a number of international agreements. The 10th Conference of the Parties to the Convention on Biological Diversity (COP 10) was held in Nagoya in October 2010, in which the parties to the convention adopted Aichi Targets, a set of global targets for conservation toward 2020, and the Nagoya Protocol, a set of international rules on ABS. On November 29th, 2010, 24 board member companies of the Consumer Goods Forum headquartered in Paris committed themselves to reducing forest destruction by development to net zero by 2020. Policy implementation has progressed also in Japan, including the amendment of the National Biodiversity Strategy (2007) and the implementation of the Basic Act on Biodiversity (2008). Some companies started to take steps on biodiversity conservation by setting a voluntary policy or a guideline on biodiversity. But a more active engagement is desirable in view of the important role biodiversity is likely to play in economy in the future. This study group has summarized policies on biodiversity conservation needed in the future to strengthen Japan's industrial competitiveness.

2.2. Emerging Risks Related to Biodiversity

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The demand for ecosystem-conscious raw materials has increased as awareness for biodiversity conservation is raised among the international community and consumers. In addition to forest certification programs and seafood certification programs that have become known in Japan to some extent, an increasing number of agricultural produce certification programs including those for coffee, palm oil, soybean and tea have been launched and implemented. However, there is a limit to the supply of this type of materials, and especially in the future, it might become difficult to obtain enough materials even if companies are willing to procure such materials. We should be aware in the first place that yields in agriculture, forestry and fishery in general are likely to become unstable because of the impacts by climate change, making a stable procurement of biological resources more difficult. With respect to mineral resources, mining and smelter operations have been attacked by armed groups who accused the companies of not responding to their demands about the problems caused by them such as forest destruction by mine developments and environmental pollution by the refineries. In July 2010, the US Financial Regulation Reform bill was signed into law which requires companies that use minerals produced in the Democratic Republic of Congo or an adjoining country to file an annual report with the Securities and Exchange Commission and disclose relevant information. The law will come into effect in 2012. In May 2011, OECD developed a guidance to help companies to avoid risks associated with minerals produced in conflict-afflicted areas, Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, and is carrying out projects to implement the guidance.

An increasing number of cases in which groups of people including NGOs criticize companies for their impact on biodiversity can also be a major risk to companies. For example, certain toys were boycotted because the paper used for their packaging was produced using wood originating from

tropical rainforests, and some Japanese companies were singled out and criticized for having deals with paper-manufacturing companies that were engaged in logging of natural forests. As a result, the Japanese companies stopped dealing with the manufacturers. Simply complying with environmental standards is no longer good enough. Now companies are expected to reduce the impacts they and their entire supply chains have on ecosystems around them.

Financing is another aspect to consider because an increasing number of investment and loan standards adopted by financial institutes include each company's stance on biodiversity.

2.3. Current Policies

As described in the Guidelines for Private Sector Engagement in Biodiversity released by the Ministry of the Environment in 2009, companies in Japan are expected to work actively on conservation of biodiversity. The guidelines demand that companies conserve biodiversity which supports healthy ecosystems through their own business activities to use ecosystem services indispensable to business operations in a sustainable way. To this end, they encourage companies to understand the relationship between their business activities and biodiversity, and avoid or minimize the impact they have on biodiversity. They also demand that each company develop a system to conserve biodiversity based on a long-term point of view.

However, the guidelines alone do not serve as incentives strong enough for companies to start making efforts to conserve biodiversity. We believe more aggressive policy incentives are needed to drive companies' efforts.

In the international arena, one of the Aichi Targets recommends that subsidies harmful to biodiversity should be eliminated, and positive incentives should be developed and applied, indicating that introducing policy incentives by governments has been agreed. Japan, the COP10 chair, is expected to implement active policies not only to strengthen Japanese companies' competitiveness but also to fulfill Japan's international responsibility.

2.4. What is Expected of Companies

Taking into consideration the situation mentioned above, companies should not wait for the government to develop new policies, but they must voluntarily and aggressively enhance their efforts to conserve biodiversity to minimize risks of their own, and manage those risks in an appropriate manner which helps them in strengthening competitiveness.

When actually launching biodiversity conservation activities, companies need to integrate them into their management system through managing methods including the PDCA cycle. In order to do that, first they need to understand the relationship between their business activities and biodiversity, and develop indicators they can use to mitigate their impact on biodiversity.

In addition, it is important for them to develop various guidelines to make their conservation activities a company-wide, thorough and integrated program. They must pay attention to the fact that the relationships between their business activities and biodiversity can cover a variety of areas including manufacturing, procurement processes, land use by their facilities, and use and disposal of goods by their customers. Therefore they need to develop guidelines that cover the whole lifecycle of goods and/or services.

2.5. Necessary Legislative Development

Development of legislation is important to fulfill the international responsibility of the government and administration as mentioned above, help companies to make efforts for biodiversity and strengthen their competitiveness, and conserve biological resources in Japan as a country rich in biodiversity. The following in particular need prompt legislative response.

- To develop a system to conserve domestic biological resources and properly manage their use to implement a domestic framework for the ABS concept as a resource providing country.
- To implement strategic environmental assessments which help to conserve important ecosystems, encourage fair load sharing among relevant businesses and create a new industry sector to conserve and restore ecosystems.
- To develop government procurement standards that give full consideration to biodiversity conservation. In particular, standards on legality and sustainability should be more clearly defined. They also should consider strict control of compliance.
- To encourage local governments to develop biodiversity action plans, and involve local companies.
- To make biodiversity-conscious business models created by Japanese companies good examples for developing countries, which will provide an additional value to Japanese companies that helps expand their business to other countries.

2.6. Current Trends in Biodiversity

To understand the relationships between business and biodiversity, there are Corporate Ecosystem Services Review (ESR) and Corporate Ecosystem Valuation (CEV) for a company’s strategic tools, City Biodiversity Index (CBI) and Japan Habitat Evaluation and Certification Program (JHEP/HEP) for land use in cities, and The Economics of Ecosystems and Biodiversity (TEEB) to provide basic data to quantitate economic values. Approaches taken by financial institutions that have a large influence on companies' economic aspects also have become increasingly important. The outline of each tool is described below.

2.6.1 Corporate Ecosystem Services Review (ESR)

(1) Overview

The Corporate Ecosystem Services Review (ESR) is a systematic methodology to support companies to actively develop strategies for managing business risks and opportunities arising from the company's dependence and impact on ecosystems. Companies can use ESR as a methodology to understand to what extent their business activities depend on, and have impact on, ecosystems.

(2) Steps

ESR is conducted by taking the following steps.

1) Select the scope
2) Identify priority ecosystem services
3) Analyze trends in priority services
4) Identify business risks and opportunities
5) Develop strategies

(3) Business decisions and processes the ESR can support

- Development of corporate, entity or market strategies
- Planning for corporate infrastructure projects
- Identification of new markets, products or services
- Identification of new revenue sources from corporate landholdings
- Strategies to engage policy makers
- Environmental impact assessments
- Environmental reporting

(4) What the ESR is not

- It does not identify every environmental issue.
- It does not address every environmental issue.
- It is not strictly quantitative.
- It does not depend on economic valuation of ecosystem services.

(5) Strategies to address business risks

In general, there are two main methodologies to address business risks.

(1) To establish a goal in advance to keep risk factors from arising, and develop the best preventive steps that can be taken at the moment to accomplish the goal (e.g., zero accidents initiatives in production sites).

(2) To take steps that can be taken at the moment, being concerned about uncertainties that may lie ahead in the future (e.g., prevention measures for a new type of influenza).

⇒ Risk mitigation measures concerning biodiversity/ecosystems are similar to those taken to reduce business risks in general. There are the best possible measures and methodologies in each case.

The ESR can be downloaded from:
http://www.wri.org/publication/corporate-ecosystem-services-review
http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=28&nosearchcontextkey=true

(Reference) About WBCSD

World Business Council for Sustainable Development (WBCSD) is an organization which aims to encourage the global business community to take action to create a sustainable future for economy, environment, and society.

Member companies: 200 global companies with advanced environmental policies

Purpose: to improve the quality of environmental efforts by the business community and create a sustainable society

Focus areas (FA):

1) Business Role; 2) Energy & Climate; 3) Development; 4) Ecosystems

2.6.2 Guide to Corporate Ecosystem Valuation (CEV)

– A guide to the business community and case reports –

(1) Participation in the CEV road test: purposes and expectations

Hitachi Chemical, as a core member of the World Business Council for Sustainable Development (WBCSD) Ecosystem Focus Area, has undertaken company-wide activities to contribute to ecosystem conservation since 2007. In 2009 the FA decided to launch a new program, Ecosystems Valuation Initiative (EVI), to conduct quantitative valuations of the relationship between business and ecosystems and develop new methodologies to understand business risks and opportunities. The WBCSD invited their member companies to take part in a road testing project for the program. Hitachi Chemical, along with other 14 WBCSD member companies, decided to conduct pilot projects to give feedback about our experiences, aiming to establish a new methodology.

Note: The report is titled Guide to Corporate Ecosystem Valuation (CEV), while EVI is the name of the program.

In response to the invitation, Hitachi Chemical decided to take part in the road test for the following purposes. First, they wanted to become an early adopter of a quantitative valuation methodology. The findings of an ESR project conducted within the company had already made them realize that tools developed by WBCSD were excellent methods to review ecosystem conservation activities from a business point of view. As the next step, they wanted to introduce a new concept to the company to valuate ecosystem services quantitatively. Secondly, they wanted to integrate the new process into their existing business processes. Looking at their business activities objectively, they found that a quantitative valuation was a method they are familiar with in their routine business activities which they would not feel uncomfortable utilizing for this purpose. They expect that integrating the quantitative valuation method for ecosystem conservation activities into their existing business processes will enable them to link this new "ecosystem" concept to their business strategy and gain a new added value.

(2) Overview of Hitachi Chemical's CEV road test

(a) 5 stages

CEV is a methodology which consists of 5 stages (Figure 2.1). The company defines the scope for the valuation project in Stage 1, and develops a plan to undertake the project. Stages 1 and 2 comprise a preparation phase. Stage 3 involves the actual valuation which is carried out through 9 steps. This stage produces specific numerical values and study results. Then in Stage 4, the findings acquired from the study results are applied to influence the target business or region, or used for communicating with stakeholders. Lastly in Stage 5, recommendations for embedding the valuation method within company processes are provided.

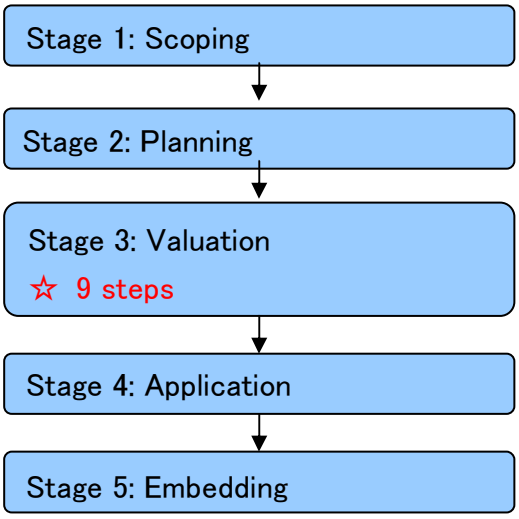


Figure 2.1: The five stages of the CEV

(b) Stage 3 (9 steps)

Stage 3 is the core of a CEV, carried out through 9 steps. Taking these 9 steps produces quantitative and other results including specific numerical values. The 9 steps are:

Step 1: Define the company “aspect”.
Step 2: Establish the environmental baseline.
Step 3: Quantify the physico-chemical impacts and dependencies.
Step 4: Determine the environmental changes.
Step 5: Assess the relative significance of ecosystem services affected.
Step 6: Monetize selected changes to ecosystem services.
Step 7: Identify internal and external costs and benefits.
Step 8: Compare costs and/or benefits.
Step 9: Apply sensitivity analysis.

(c) Overview of the road test

The first step of the CEV road test run at Hitachi Chemical was to focus the test on one product, copper-clad laminate. The scope of the project was defined to understand the quantity of CO_2 emission produced during the manufacturing processes and its monetized value. CEV defines CO_2 emission an externality of ecosystem services. The main CEV procedures taken at Hitachi Chemical were:

1. To calculate the quantity of CO_2 generated by 3 MCL manufacturing methods using the lifecycle assessment (LCA) method.
   (Note: the manufacturing methods are different to each other in the quantity and type of energy used.)
2. To convert the quantity of CO_2 emission (obtained in the above procedure) to CEV, i.e. monetized values using the European market value of CO_2.
   (Note: the European value was used because a formal CO_2 trade market had not yet been established in Japan.)
3. To run a sensitivity analysis on the 3 manufacturing methods using the calculated data.

They want to utilize the results of the sensitivity analysis as reference to streamline their manufacturing methods.

(d) What a CEV can/cannot do

Although CEV is a quantitative valuation method, it cannot be used (yet) to simply compare the results obtained at Company A with those obtained at Company B. It is because CEV's methodology is defined in such a way that the industry of each company and the scope of valuation, and hence its results, depend on the targets of valuation, units of assessment, selection of results and other factors.

Undertaking a CEV has the advantage that it makes quantification possible, expressing the current situation in numbers that are easier to understand and can be used for communications inside and outside the company. However, there is a concern that these numbers may take on a life of their own unless the conditions of each valuation project are fully understood. While chemical companies in particular, including Hitachi Chemical, do not directly use many ecosystem services, CO_2 emission was selected as the target of a CEV project based on the knowledge that CO_2 emission is indirectly related

to ecosystem conservation. We should try to show the results of the project in a report in such a way that the readers can easily understand the whole picture. CEV is purposely defined as a widely applicable and flexible methodology so that it can comprehensively address issues that all companies in every industry have with respect to quantitative valuation of ecosystems. As a result, when it is implemented in actual road tests, the way to put together a project plan largely depends on the decisions made by each road testing company.

Guide to Corporate Ecosystem Valuation can be downloaded from the following web page.
http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=104&nosearchcontextkey=true

2.6.3 JHEP: quantitative valuation of habitat suitability for wildlife and vegetation

Ecosystem Conservation Society - Japan (Incorporate Foundation)

(1) Development of JHEP

- The Economics of Ecosystems and Biodiversity (TEEB) study concludes "you cannot manage what you do not measure". These days quantitative valuation is required for biodiversity conservation as well as for global warming.
- The quality of biodiversity was traditionally expressed in the area of green space, number of trees planted, number of species inhabiting the area and other factors, but they did not give the accurate quality of biodiversity.
- For example, expanding the area of green space by introducing non-native tree species and alien horticultural species would not improve biodiversity. In addition, results of biological surveys are greatly influenced by external factors such as the ability of researchers and the local weather.
- In that situation, the society has been communicating with the US Department of the Interior since 2000 to study a highly reliable quantitative evaluation method for biodiversity called the Habitat Evaluation Procedures (HEP) which has been widely used in the US and other countries.
- With HEP the environmental structure of an area is not evaluated by confirming the existence of certain species but in terms of habitat suitability for wildlife. A number of evaluation species are selected based on the environment type and size of the target area. Then a quantitative evaluation is conducted on the environmental structure of the area using the habitat suitability model which quantifies habitat suitability for each evaluation species (HSI model; Figure 2.2).

Figure 2.2 The HSI model which quantifies habitat suitability for each evaluation species
Source: Ecosystem Conservation Society – Japan

- Now the international community, seeking for conservation or restoration of biodiversity, demands that companies should cause "no net loss" of biodiversity while they continue their

business activities, and aim for "net gain".

- Taking these trends in society into consideration, and adjusting HEP's evaluation method using baseline conditions accordingly, the society has developed the Japan Habitat Evaluation and Certification Program (JHEP) as a certification system which companies and others can use to prove their contribution to biodiversity based on quantitative evaluation results. In addition, while HEP provides evaluation based on the habitat suitability index for wildlife, JHEP adds another basis, the vegetation evaluation index, to allow a more accurate quantitative evaluation.

(2) About the JHEP

- The baseline year for the JHEP is 30 years before the year when either the land to be evaluated is acquired or an application for acquisition is submitted.
- Based on the above condition, a comparison is made between (a) the accumulated value of biodiversity for 50 years which is calculated based on the values obtained in the past 30 years since the baseline year, and (b) the accumulated value of biodiversity for 50 years which is calculated using estimated changes in the value of biodiversity during the period between the baseline year and 50 years later. If (b) is equal to or higher than (a), it means the goal of "no net loss" or "net gain" has been accomplished, which can be the basis for a certification through approval by the JHEP Review Committee comprising external academic experts.
-
- JHEP has the following characteristics.
  - ✓ It can objectively prove the effects of biodiversity efforts, whether large or small, based on scientific data.
  - ✓ It can estimate the level of contribution of a plan to biodiversity, and certify the plan, even if it is still in the planning (design) stage.
  - ✓ It can reveal, in the course of evaluation, challenges in contributing to the conservation and improvement of biodiversity, highlighting the areas to put priority on and the direction of improvement efforts.
  - ✓ The concepts and guidelines of the evaluation and the reports of certification review results will be made public on the society's website to ensure the transparency of the certification process.

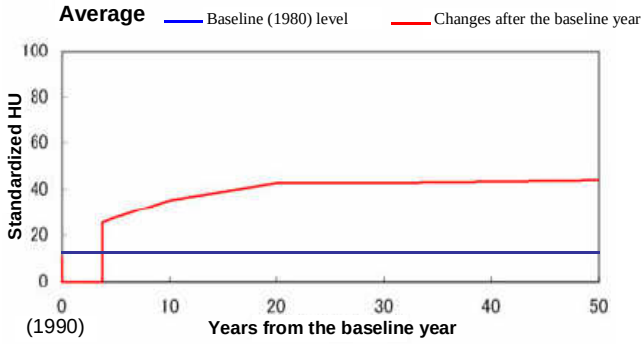
(3) Certification case study

The Toranomon-Roppongi district urban redevelopment project (planned, designed and managed by Mori Building Co. Ltd.,)

- The value of biodiversity of the redevelopment site:＋26.6 points (JHEP certification ranking: AAA)
- The following features of the redevelopment project helped to increase its evaluation value.
  - ✓ The area of green space accounts for about 40% of its effective open space (doubled from the pre-project value)
  - ✓ Its green space is planted mainly with native plant species, avoiding the use of non-native species as much as possible.
  - ✓ The wooded area includes a well-balanced mixture of tall trees, bushes, grass and wildflowers, building a three-dimensional vegetation structure.
  - ✓ Standing dead trees which provide a suitable habitat for woodpeckers and other wildlife

were planted.

Figure 2.3: Exterior view
Source: Mori Building Co., Ltd.



※Standardized HU: Value of biodiversity at the evaluation site

Figure 2.4: Changes in the value of biodiversity
Source: adapted from JHEP material

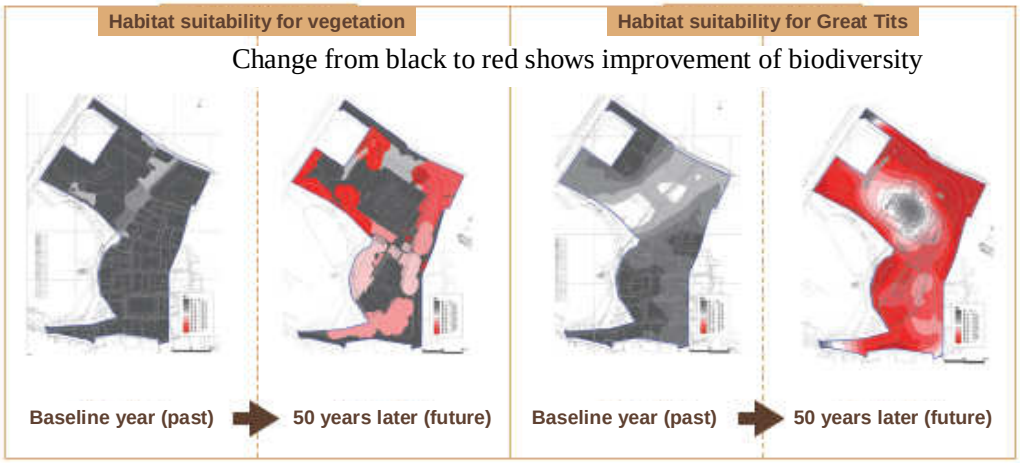


Figure 2.3: A comparison of the value of biodiversity in the baseline year and 50 years later
Source: JHEP

2.6.4 The City Biodiversity Index (CBI)

(1) Overview

We chose the City Biodiversity Index (CBI) as an example of biodiversity indices about cities, and discussed its development process, the frame for evaluation, targets for evaluation, integration and the assessment results of actual cases. The CBI is a communication tool used for self-assessments of potential abilities of city ecosystems and cities' problem solving abilities which can enhance collaboration among citizens. In addition, we explained an evaluation index for land use which included the perspective of biodiversity to make the position of the CBI clear.

(2) Development of the City Biodiversity Index (CBI)

The development of the CBI was started by a proposal made by the Government of Singapore at the Urban Biodiversity & Design (URBIO) conference held in Germany in May 2008. In February 2009 the first workshop was held. In June 2009, after a review by a taskforce, a draft version of user's manual was prepared and made public through the Internet and other media. In May 2010, At the second URBIO conference held in Nagoya, the results of the evaluation projects conducted in 4 cities, Singapore, Brussels, Curitiba and Nagoya were reported, and the evaluation indicators were revised. The user's manual was also revised after these discussions. In October 2010, Aichi/Nagoya Declaration on Local Authorities and Biodiversity which included items related to the CBI was adopted at the International Conference of the Network Urban Biodiversity and Design held as a side event to COP10.

(3) The frame of the CBI

The indicators of the CBI comprise three components; (1) native biodiversity in the city, (2) ecosystem services provided by native biodiversity in the city, and (3) governance and management of native biodiversity in the city.

(1) Native biodiversity in the city: includes indicators such as the proportion of natural areas and semi-natural areas, fragmentation and networks of natural areas, the number of native species of birds in built-up areas and the proportion of protected areas. The following issues were raised about this component: the definition of a natural and semi-natural area, the relative importance of the number of native species versus the total number of species, and techniques to measure networks.

(2) Ecosystem services provided by native biodiversity in the city: includes indicators such as the proportion of water permeable areas, carbon storage and cooling, the natural park area per 1000 people, and the annual number of visitations to parks and/or protected areas. The following issues were raised about this component: whether mitigation of the heat island phenomenon and urban flood control should be included as well as carbon fixation, and whether access to the green can be added.

(3) Governance and management of native biodiversity in the city: includes indicators such as the proportion of the budget allocated to biodiversity projects, the annual number of projects and programs, the existence of local biodiversity strategy, the number of biodiversity-related institutions, the number of experts, the existence of partnerships, and the annual number of educational events. There was a controversy on whether it would be appropriate to estimate the status of governance and management of biodiversity based on the numbers and budgets. A particular question was raised concerning how to deal with CEPA (Communication, Education and Public Awareness).

(4) About the test cases

Test evaluations were conducted in 4 cities, Singapore, Brussels, Curitiba and Nagoya, using the draft version of the user's manual. A comparison of data collected from these cities showed that there was a significant difference in the proportion of natural and semi-natural areas from 38% in Curitiba to 9% in Nagoya, but the number of species in the whole city area was not always proportional to it. The number of wildlife was more strongly influenced by locational factors including the climate and terrain of the city. The number of species occurring in the built-up areas of these 4 cities was higher than usually expected, which means that the CBI has proved that urban ecosystems have a high potential.

In conclusion, it was determined there was a high possibility that the CBI could be applied to inter-annual monitoring of city biodiversity. However, the following issues were raised: creating

indices unique to each city is also important, how CEPA can be embedded in the CBI, and the city-level indicators should be broken down into projects-level indicators.

(5) About other indices

The CBI is positioned as an index to evaluate city-level biodiversity. Other indices include the Environmental Sustainability Index (ESI), a global index, the Ecological Footprint, the Sustainable Sites Initiative (SITES), an index being developed as project-level indicators, and Social and Environmental Green Evaluation System (SEGES), an index which targets company-owned green areas in Japan. In addition, widely applied green building evaluation programs such as LEED in the US, BREEAM in the UK and CASBEE in Japan also include biodiversity-focused indicators in their evaluation items.

Figure 2.4: The evaluation items of the SITES being developed as a biodiversity index
Source: SITES official site (http://www.sustainablesites.org/)

【Reference】AICHI/NAGOYA DECLARATION ON LOCAL AUTHORITIES AND BIODIVERSITY (excerpt)

1. Cooperating with national governments

In the development of relevant tools, best practice examples, capacity building programs and innovative financial mechanisms to implement the 2011‐2020 Strategic Plan of the CBD.

2. Developing, enhancing and implementing local biodiversity strategies and action plans

In line with national biodiversity guidelines, frameworks and National Biodiversity Strategies and Action Plans (NBSAPs).

3. Collaborating with other initiatives

Simultaneously addressing various elements of a sustainable society, including climate change mitigation and adaptation, water resource management, poverty alleviation, education, health etc., in the recognition that these elements are all closely linked.

4. Monitoring and evaluating progress on biodiversity initiatives

As an integrated part of the overall reporting system; setting benchmarks for local level biodiversity management in line with the 2011 ‐ 2020 CBD indicator framework to be developed in the future; and using tools such as the City Biodiversity Index; reporting on progress to national governments in line with their CBD reporting obligations.

5.Participating in CBD activities, meetings and initiatives

in support of their national delegations to the extent as appropriate and feasible.

2.6.5 Overview of TEEB

(1) What is TEEB?

TEEB, an abbreviation of The Economics of Ecosystems and Biodiversity Report for Business, is the title of a report of a UNEP-led study on the economic values of ecosystems and biodiversity. The governments of Germany, UK, Norway, Netherlands and Sweden financially supported the study to create the report. The D0 to D4 reports have been published targeted to the following audiences respectively.

D0: The TEEB Synthesis Report D1: For policymakers

D2: For local and regional policymakers D3: For business D4: For citizens

(2) Main recommendations in TEEB D0 to D4

(a) D0: The TEEB Synthesis Report

The D0 report, which describes the overview of the approach, conclusions and recommendations of the comprehensive TEEB study, was published at COP10 on October 20, 2010. It aims to recommend specific solutions to promote ecosystems/biodiversity conservation and encourage each stakeholder to take actions voluntarily. Its key word, "mainstreaming", indicates that they hope TEEB will play the role of a trigger for companies to start raising awareness and taking actions. The TEEB study adopted a tiered approach consisting of the following 3 basic concepts.

- Recognizing value: to recognize the values of ecosystems
- Demonstrating value: to illustrate the economic values of ecosystems to help decision-making
- Capturing value: to introduce mechanisms that incorporate the values of ecosystems

According to this report, not all ecosystem services can be valued in monetary terms. With respect to spiritual or cultural values, for example, recognizing their values may be sufficient. In other cases, capturing values may be needed. These points are taken into consideration in conducting the study.

(b) D1: TEEB for policymakers

D1 was published on November 13, 2009 as a report for national policymakers. The report urges policymakers in each country to take actions on the following 4 challenges.

1. The global biodiversity crisis: challenges and opportunities for policy makers
2. Measuring what we manage: information tools for decision-makers
3. Available solutions: instruments for better stewardship of natural capital
4. The road ahead: responding to the value of nature

(c) D2: TEEB for local and regional policymakers

D2 was published on September 9, 2010 as a report for local and regional policymakers. It recommends a stepwise approach to help local policymakers (city, town and village administrations) evaluate the benefits of nature (value estimation), which comprise the following 6 steps.

Step 1: Specify and agree the policy issue with stakeholders

Step 2: Identify which ecosystem services are most relevant

Step 3: Define the information needs and select appropriate methods

Step 4: Assess ecosystem services

Step 5: Identify and appraise policy options

Step 6: Assess distributional impacts of policy options

This approach has been actively adopted at the local level in each country to implement some of the

actions proposed in D2. Several progressive cities including Chiba, Ishikawa and Quebec plan to develop strategies on biodiversity from 2011 to 2020. In Japan, the Basic Act on Biodiversity enacted in 2008 provides that local governments must develop regional plans with regard to biodiversity. In response to this, Chiba, Saitama, Hyogo, Ishikawa, Aichi and other prefectures are already working on a prefecture-level biodiversity strategy.

(d) D3: TEEB for business

D3 was published on July 13, 2010 as a report for business. It consists of the Executive Summary and Chapters 1 through 7. Markets for biodiversity and ecosystem services are quantified (estimated) in the D3 report. With certain services, the market scale for certified agricultural products estimated at 40 billion US dollars in 2008 is projected to grow up to 900 billion US dollars in 2050.

It is important to understand the true meaning of TEEB's trial on economic valuations of ecosystems. TEEB argues that the integration of biodiversity and ecosystem services (BES) into business can create significant added value for companies. Specifically, it suggests that the following benefits can be provided.

- Ensuring the sustainability of supply chains
- Penetrating new markets and attracting new customers
- Reducing input costs through improved efficiency
- Developing and marketing low impact technologies
- Promoting projects to reduce ecological footprint
- Risk assessment, environmental management and adaptation

(e) D4: TEEB for citizens

As part of D4, a project called TEEB4me is carried out in collaboration with the Bank of Natural Capital which distributes TEEB's messages to consumers and citizens in an easy-to-understand, attractive and imaginative way. Instead of using printed reports, they invite young people to submit videos (i.e., short films) that are related to TEEB and distribute excellent works on their website (http://bankofnaturalcapital.com/), and also on YouTube.

(3) TEEB's road ahead

After the final report at COP10 held in Nagoya in October 2010, it is expected that TEEB's recommendations will be implemented and other actions will be taken.

(a) Establishment of IPBES

Intergovernmental Science and Policy Platform on Biodiversity and Ecosystem Services (IPBES) was established based on the UN Millennium Assessment of Biodiversity as an intergovernmental science policy platform about biodiversity and ecosystem services. There is a high expectation that scientific findings about biodiversity will be accumulated, making it possible to make political decisions by integrating economic values and scientific values.

(b) Embedding TEEB to national accounting

The World Bank announced at COP10 that they would start a study to establish a method which each country can use to reflect ecosystem and biodiversity properties to national accounting within the next 5 years. The World Bank will develop a method during these 5 years, planning to give a mid-term report at Rio+20 in 2012. In addition, a universal guideline will be prepared using the results of the test projects.

3. Checklist to Take Biodiversity into Account in Business Activities

3.1. Purpose of the Checklist

Companies need to pursue biodiversity conservation efforts voluntarily and actively to minimize risks arising from their business activities and use business opportunities it presents to strengthen their competitiveness. The PDCA cycle, which companies can use to understand and improve on their weaknesses, plays a vital role in advancing biodiversity conservation efforts.

This study group has developed a checklist which helps companies to pursue constant efforts to conserve biodiversity. We have identified factors in business activities to consider with respect to biodiversity in this checklist. By conducting an objective self-assessment on each question and repeating the PDCA cycle, companies can understand their impact on biodiversity and improve their efforts for biodiversity conservation.

3.2. Overview of the Checklist

Companies must pay attention to the fact that the relationships between their business activities and biodiversity can cover a variety of areas including manufacturing, procurement processes, land use by their facilities, and use and disposal of goods by their customers. Therefore a checklist that covers the whole lifecycle of goods and/or services is needed.

The product lifecycle in this checklist comprises 6 stages: design, procurement, manufacturing, transportation, use and operation, disposal and reuse. In addition, 3 business activities, land use, nature conservation and business opportunities, which do not comprise the lifecycle but have a strong influence on biodiversity, have been added. These 9 stages in total are subject to an assessment on a 5-point scale (Figure 3.1).

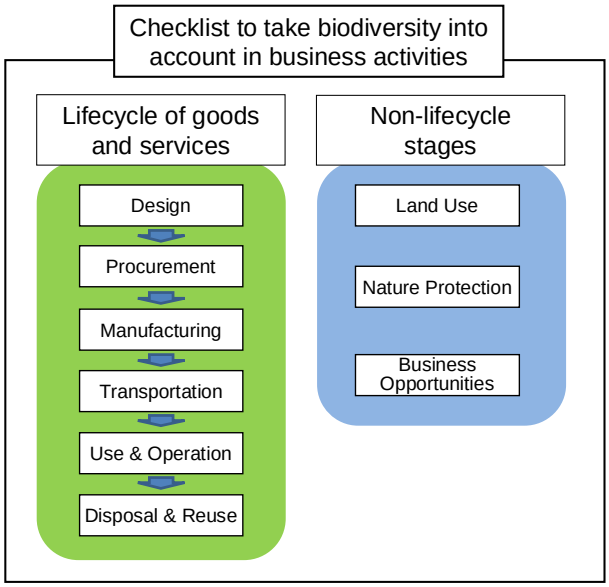


Figure 3.1: Framework of the checklist

The scope of evaluation includes products, services, businesses and companies, which must be specified by the evaluator. Although this checklist covers items that generally need to be considered in business activities, the items to be evaluated vary with each industry. Each evaluator can change the items in accordance with the circumstances of his/her company.

The following is an explanation of each question in the checklist, the purpose to evaluate the item and the impacts the item has on biodiversity. The superscript[*)] represents the reference number listed at the end of the document.

In the Rating column, those described as "relevant" are the items on which the company has decided that they should take voluntary action.

3.3. Design

(1) Definition

The design process is essentially an activity which should take into account all process of the entire lifecycle, while being conducted respectively in each stage of a lifecycle. In other words, it is difficult to set boundaries for the design process in a lifecycle.

Therefore we have limited the scope of "design" in this checklist to "a process to decide the specifications of products and/or works". As a result, the design process delivers design drawings and specifications (collectively deliverables) which show the specifications of products and/or works. This activity comprises a stage preceding a stage in which products are created or works are started.

Companies can check in this stage of the checklist whether biodiversity or ecosystems are taken into account in the deliverables produced by the design process.

We have also included the research and development process which is tightly connected with the design process in this stage of evaluation.

(2) Relationships with and impacts on biodiversity

The level of influence the design stage has on biodiversity is evaluated based on the following 4 points.

(No.1) Do you have an evaluation system in place to assure objectively that biodiversity has been taken into account in design drawings and specifications?

An evaluation by a third party other than the designer is required to assure the quality of the deliverables (i.e., whether biodiversity and ecosystems are taken into account in the deliverables). An adequate quality assurance should be made possible by building a system with which a third-party with expert knowledge about biodiversity can evaluate the deliverables. The status of the implementation of such a system is evaluated here, using examples such as internal and external audits including those in ISO[1)].

(No.2) Do you include biodiversity assessments in design drawings and specifications using an objective, scientific or quantitative method※? ※ A quantitative assessment method based on JHEP, CASBEE, SEGES, LIME or other assessment tools

Whether biodiversity and ecosystems are taken into account in the deliverables should be evaluated using an objective, scientific or quantitative method. Each company must decide which method is most appropriate for them because the evaluation method varies with each industry.

These methods should be widely recognized in society, objective, and equivalent to JHEP[2)], CASBEE[3)], SEGES[4)] and LIME[5)]. If the designer prefers a quantitative evaluation method other than those listed above, it can be included in the quantitative evaluation methods specified here on condition that its objectivity has been proved.

(No.3) Do you take biodiversity into account in all product lifecycle stages in design drawings and specifications?

As defined in the definition section, "design" needs to be considered in every stage of a lifecycle. The main purpose of this question is to check whether the designer has fully reviewed the points to consider for conserving biodiversity that can be assumed when the deliverables are produced, and reflect these points in the deliverables.

(No.4) Do you take biodiversity into account in research and development projects※?

※ Development of materials and technologies which have less impact on ecosystems (e.g., materials which are easier to recycle or reuse, biofuel plants using non-edible biomass, etc.)

It is important to introduce research and development results on biodiversity along with findings about related products or works into the design. This question is asked because enhancement of research and development departments and collaboration among them often result in biodiversity-conscious deliverables.

3.4. Procurement

(1) Definition

Here, consideration to biodiversity is evaluated with regard to the stage when a company procures raw materials and parts (or equipment as components of services) to produce goods (or provide services).

Procured items include raw materials, parts, semi-finished products, finished products, tools, utilities, plants and animals for greening, and materials for temporary constructions. The entire lifecycle of each procured item is subject to evaluation for its impact on biodiversity. Specifically, the impact on biodiversity in the mining stage should be included for raw materials; the impact in the mining stage and processing stage should be included for parts; the impact in the assembly stage and logistic stage should be included for semi-finished and finished products.

(2) Relationships with and impacts on biodiversity

The level of influence the procurement stage has on biodiversity is evaluated based on the following 4 points.

(No.5) Do you comply with laws and regulations (*) concerning biological resources and other materials you purchase?

Companies are required to assure compliance to international laws such as the Ramsar Convention and/or the national laws of each source country in the mining or collecting stage of the materials they procure. Being aware of this requirement, they should develop a mechanism and system to manage and constantly monitor compliance. The laws to be complied with include Japanese domestic laws including Invasive Alien Species Act, Wildlife Protection and Hunting Act and Cartagena Act, international conventions including CITES and Ramsar Convention, and laws in other countries concerning protection of rare and endangered species and genetically modified organisms.

(No.6) Do you gather and understand information concerning suppliers' impact on biodiversity (e.g., the country of origin of raw materials, certification status, etc.)?

Companies need to ask suppliers in the procurement stage to report how much impact the procured items had on biodiversity to understand the level of impact the purchase has on biodiversity. They need to build a mechanism to do so between them and suppliers.

(No.7) (No.8) Do you procure parts/components made from materials with less impact on biodiversity?

Companies need to procure materials with less impact on biodiversity in the procurement stage.
If certain items can be purchased from more than one supplier, companies should set criteria to select suppliers with less impact on biodiversity and strictly follow the criteria.
If certain items can be purchased from only one supplier, companies are required to give guidance to the supplier to reduce their impact on biodiversity.

(No.9) When you procure biological and other resources, do you make proper arrangements about distribution of the benefits gained therefrom with the source country based on ABS ? ※ABS: Access and Benefit Sharing (fair and equal sharing of the benefits arising from the use of biological diversity)

When companies procure biological resources, they are required to share the benefits generated by certain characteristics of the resources fairly with the source country. Therefore, when companies procure biological resources, it is necessary to make the entire company aware of the fact that they must make proper arrangements with source countries, and manage their implementation.

3.5. Manufacturing

(1) Definition

Manufacturing is a process in which raw materials and other procured materials are used to produce goods.
All companies in the manufacturing industry are supposed to have the manufacturing process. However, considering a fact that an increasing number of companies outsource the manufacturing process to other companies, we have limited the scope of "manufacturing" in this checklist to the manufacturing process performed in the factories of each company and its group companies (i.e., within the range the company is responsible for environmental governance). Outsourced manufacturing activities are not evaluated using this checklist.

This checklist is used to check whether goods are produced in a process which gives consideration to conservation of biodiversity and ecosystems.

(2) Relationships with and impacts on biodiversity

The level of influence the manufacturing stage has on biodiversity is evaluated based on the following 7 points.

(No.10) Do you comply with regulations (under environmental laws) that aim to minimize impact on the environment around factories, trying to conduct business activities in a manner which mitigates effects on the surrounding areas?

Companies are required to operate manufacturing processes in compliance with various environmental laws. Keeping these processes compliant to environmental laws to conserve the environment is a measure which not only leads to biodiversity conservation but also contributes to sustainable and stable operations

of factories.

(No.11) Do you try to reduce risks (use, discharge and harms) associated with chemical substances used in your business activities?

Discharging chemical substances used in manufacturing processes into the air or water may affect the organisms inhabiting the area. Therefore companies need to take steps to conserve the biodiversity around their business facilities by reducing the quantity of chemical substances used in manufacturing processes and/or replacing them with other chemicals that have lower risks to biodiversity.

(No.12) Do you introduce and use renewable energy sources (*)?
* Solar, wind, hydro, geothermal, solar-thermal and biomass energies

Energy is indispensable in manufacturing. Replacing fossil fuel energy sources with renewable energy sources which do not include carbon is a measure which greatly contributes to the reduction of greenhouse gas emission.

It may be difficult to replace them completely because the current cost of introducing renewable energy sources is relatively high. However, companies are required to consider doing it as part of their social responsibility to prevent global warming.

(No.13) Do you control and reduce water use?

Conservation of water resources is said to be the very basic of biodiversity conservation. Companies may affect the ecosystems around their factories by taking a great quantity of water used in manufacturing processes from the surrounding areas.

Moreover, because of a global concern about the depletion of water resources, making factories less dependent on their water intake from the surrounding areas contributes to a more stable operation of the factories. Therefore controlling the quantity of water used in manufacturing processes is an important measure in terms of biodiversity conservation.

(No.14) Do you try to reduce greenhouse gas emission produced in manufacturing processes?(In terms of emission per unit of output)

The manufacturing stage may cause global warming, which affects biodiversity, through the emission of greenhouse gases generated by energy consumption and/or consumption of specialty gases.

For this reason, it is important to reduce greenhouse gas emissions in the manufacturing stage by promoting energy saving measures in factories and other facilities. Each company needs to make continued efforts to reduce greenhouse gas emissions.

(No.15) Taking into consideration environmental standards and information about the area into which waste water is discharged*, do you try to reduce the effect of waste water on the area surrounding your business facilities by setting the quantity and temperature of discharged water at a level appropriate for the surrounding ecosystem?
* Information about the rivers, seas and other areas into which water is discharged, the environmental standard applied to the area, and the conservation status of the ecosystem.

The waste water produced in manufacturing processes is discharged after being treated through an appropriate water purification process. Even the purified water may have a great impact by disrupting the

balance of the aquatic environment around business facilities when the quantity and temperature of the waste water are detrimental to the aquatic environment.

For this reason, companies need to make efforts to reduce the effects of waste water discharged from their factories based on a thorough understanding of the aquatic environment (environmental information) around their business facilities.

(No.16) Do you promote reduction/reuse/recycling of emissions (wastes) produced in manufacturing processes?

Many of the components and sub-materials procured for manufacturing directly or indirectly depend on the benefits of ecosystems (i.e., biological resources). Therefore reducing emissions and wastes produced in manufacturing processes contributes to a reduction in excessive consumption of biological resources and biodiversity conservation.

In addition, reuse and recycling of emissions and wastes produced in manufacturing processes by converting them into resources with other uses lead to the promotion of effective use of biological resources, which in turn contributes to biodiversity conservation.

3.6. Transportation

(1) Definition

Each company conducts an evaluation on transportation of goods in the transportation stage only when the company is the consigner (i.e., the actor who bears the shipping charge). Transportation when the company is not the consigner (i.e., the supplier is the consigner) shall be included in the evaluation of the procurement stage. For example, transportation of parts between departments within the company and shipping to customers are included in the type of transportation evaluated in this stage.

(2) Relationships with and impacts on biodiversity

The level of influence the transportation stage has on biodiversity is evaluated based on the following 3 points.

(No.17) Do you try to reduce environmental burden created by transportation?
Possible measures include change of transportation routes, joint transportation, improved load efficiency, balanced shipping, modal shift, use of low-pollution vehicles, etc.

Trucks and airplanes frequently used in transporting parts and products are known to emit a larger quantity of CO_2, NO_x and SO_x than other modes of transportation. In addition, these transportations generally involve long-distance movements compared to other transfers such as those within a factory. As a result, a large quantity of CO_2, NO_x and SO_x is emitted during transportation. It has been shown that CO_2, NO_x and SO_x, once emitted to the air, may cause global warming, which in turn may have effects on biodiversity. Companies should use modes of transportation which emit less CO_2, NO_x and SO_x as much as possible to minimize the impact.

(No.18) Do you take precautionary measures in packaging and transportation to prevent invasion of any of the specified foreign organisms defined by the government and other invasive alien species, and unintentional removal of indigenous species?

Species accidentally attached to the parts and goods to be transported may be unintentionally transported

in the transportation process. These unintentionally transported species may disrupt the ecosystems of the destination as alien species. Companies need to establish and implement transportation and packaging rules which help prevent the invasion or removal of species to avoid this problem. In addition, in consideration of a possibility that species become attached in the transportation process, companies should confirm that a scheme has been established to prevent invasion of alien species and removal of indigenous species in the transportation process.

(No.19) Are you reducing packaging material use?

Packaging materials are used for transportation to prevent damages to parts and goods and make them easier to handle. These packaging materials, especially wood and paper, are frequently discarded after use. However, a lot of resources have been used to produce those packaging materials. Discarding packaging materials may affect biodiversity in various ways such as an impact of resource mining on species and CO_2 emission associated with disposal. Therefore companies should reduce the quantity of packaging materials used for transportation by measuring the amount used and reusing those that can be reused.

3.7. Use and Operation

(1) Definition

We have defined "use and operation" as "use and operation of goods and/or services, and their administration and management including maintenance such as regular inspections". In this stage, goods and services, the output of companies' production activities, provide values to society through consumption, while they burden the global environment at the same time (Figure 3.2). The difference between this stage and the previous stages in lifecycle from the design stage to the transportation stage is the lineup of players who bring the burden to the environment. In this stage, the general public as consumers is also a player in addition to companies as the producers of the goods and services.

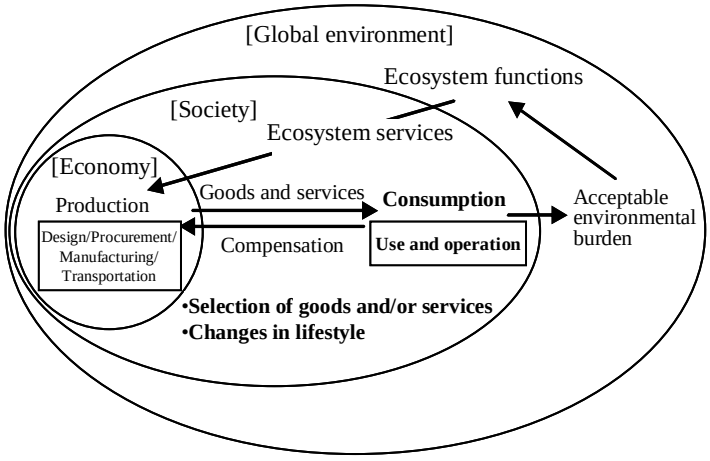


Figure 3.2: the position of the use and operation stage [6)11)]

Thus this stage is the source of a challenge; everybody in society is contributing to the problem, which makes global environmental problems more difficult to solve. Therefore companies are expected to collaborate with various players including consumers to change their lifestyle so that they will select and buy goods and services that are beneficial to the global environment including biodiversity[7)] .

(2) Relationships with and impacts on biodiversity

In the use and operation stage, consumer behavior in selecting goods and services is the key in terms of human relationships with biodiversity. This selection behavior influences biodiversity in the previous production stages (i.e., procurement, manufacturing and transportation stages) as well, because production is ultimately determined by consumer selection. The impacts arising in this stage include climate change caused by energy consumption, emissions of chemical substances and water use, environmental pollution,

and habitat loss [8].

Looking at biodiversity in this stage from business management point of view, on one hand it is a risk factor companies need to deal with to prevent social problems caused by the consumption of goods and services. On the other hand, it provides business opportunities in that companies can distinguish themselves in competition by promoting their biodiversity-conscious goods and services to consumers.

Taking these characteristics of this stage into account, we selected checklist questions to evaluate biodiversity conservation from business management point of view. The questions were selected based on the following points that we thought should be evaluated.

【Points we considered in selecting checklist questions】

1. To understand the actual impacts that business activities have on biodiversity and give feedback to the impact mitigation activities by companies and society.
2. To be accountable for the impacts of business activities to build and maintain reliability.
3. To contribute to a lifestyle change that creates preference for biodiversity-conscious goods and services.
4. To improve company brands and acquire new customers through company's efforts to enhance biodiversity.

The level of influence the use and operation stage has on biodiversity is evaluated based on the following 4 points.

(No. 20) Do you identify, and then monitor and evaluate, factors(*) that have effects on biodiversity when goods and/or services are used or operated? *Factors to monitor and evaluate include activities which promote goods and/or services and lifestyle changes that enhance biodiversity.

The purpose of monitoring and evaluation in this stage is to show the actual impact and environmental performance of goods and/or services, and the background and factors of selection. The results provide basic data that companies can use to address environment management in both aspects of risks and opportunities by avoiding risks arising from highly uncertain biodiversity issues, improving goods and services and raising awareness among consumers.

(No. 21) Do you take steps such as reduction of environmental burden to mitigate adverse effects on biodiversity caused by the use and/or operation of goods and/or services?

There are many biodiversity-related phenomena that have not been explained scientifically. Therefore companies need to adopt the adaptive management methodology and try to mitigate effects by continuously monitoring the status of use and operation of goods and/or services, conducting scientific and quantitative evaluation on the monitoring data, and reflecting the result on goods and/or services.

(No. 22) Do you disclose information about goods and/or services in terms of their impact on and your considerations to biodiversity?

It is said that "the primary function of information disclosure by companies is to remove distrust and/or create trust toward companies and management and to support monitoring functions" [9] . Companies need to disclose information about the results of monitoring and assessments of the impacts on biodiversity arising when goods and/or services are used and operated (No. 20) and activities to mitigate effects based on the results (No. 21) to build and maintain company brands and relationships of mutual trust with

various stakeholders.

(No. 23) Do you collaborate with citizens, NPOs, universities, administrations and/or other entities with respect to use, operation and management of goods and/or services?

Companies are expected not only to provide biodiversity-conscious goods and/or services but also to contribute to a change in lifestyle and society so that people will select and buy them. However, a company cannot solely make a difference, which makes it important for companies to collaborate with different stakeholders. One such example undertaken by a construction company is the Collaborative Biotope Project in which a university and people in the neighborhood collaborate in using and managing the biotope [10)]. This project, which is part of a greenery management program in a university campus, contributes to environmental education of the children in the neighborhood and development of human resources with a high environmental awareness.

3.8. Disposal and Reuse

(1) Definition

Disposal is a stage where used goods are disposed of as wastes. In Japan, waste is classified, based on the type of places where they were used, as either general waste (i.e., wastes from homes) or industrial and construction waste produced in business activities. "Reuse" comprises reduce, reuse and recycle conducted to reduce environmental load, which is broadly defined as a process to treat the used goods described above.

(2) Relationships with and impacts on biodiversity

Direct conservation activities such as forest conservation, coral reef protection or wetland protection projects are generally recognized as ecosystem conservation activities. We should understand, however, that an efficient management of waste produced by business activities can also contribute indirectly to ecosystem conservation. Resources can be saved through the supply chain by reducing waste and reusing or recycling waste once it is produced, which leads to a reduction in the quantity of minerals produced, resulting in a contribution to conservation of the ecosystems around mining sites. It is important for businesses to adopt the 3Rs of reduce, reuse and recycle. Companies are expected to take steps in a proper order to give top priority to waste reduction, then try to reuse waste produced in their business activities, and finally, try to recycle waste. A proper waste management like this leads to conservation of natural resources, and hence contributes to biodiversity conservation.

This idea is recognized internationally. For example, "TEEB - The Economics of Ecosystems and Biodiversity Report for Business - Executive Summary 2010" states, "Direct drivers of biodiversity loss include…pollution, over-exploitation"[12)].

【Points we considered in selecting assessment questions】

We have decided to check if companies adopt the 3Rs because they need to know that, if they are to reduce the burden on ecosystems at the stage after goods have been used, they must understand a fact that the quantity of minerals mined can be minimized by utilizing waste as resources. In addition, we want to confirm that companies provide necessary information for end users to dispose of used products properly.

The level of influence the waste and reuse stage has on biodiversity is evaluated based on the following 3 points.

(No. 24) Do you try to reduce, reuse and recycle (3R's) used products?

Facilitating the building of a recycling-oriented society and reducing burdens on ecosystem requires promotion of the 3Rs not only during the production stage but also in the products offered to society. Although the method and level to do that depend on the industry and products of each company, it is preferable that each company promotes the 3Rs across their entire value chain by studying a possibility of developing a plan in accordance with their situation.

(No. 25) Do you provide documentation about how to dispose of used products?

Reducing waste requires its reuse or recycling as resources by properly treating sold goods when they are discarded. Even if it is ultimately disposed of as waste, it needs to be disposed of in the least polluting way. The purpose of this question is to attract owners' attention to this matter or encourage them to dispose of the products in a proper way by providing documentation which provides an explanation about disposal methods.

(No. 26) Do you give your stakeholders explanations about disposal and recovery of products?

To be able to explain about the disposal and recovery of products, it would be necessary to fully grasp the situations. Therefore, explaining your efforts to stakeholders helps raise the levels of control and transparency. In addition, it will also help stakeholders better understand the importance of disposal and recovery of products.

3.9. Land Use

(1) Definition

Some of the activities companies should engage in with regard to biodiversity including those for maintenance, conservation, restoration and creation of ecosystems are strongly connected with land use by companies. Here we have defined "land" as "the land which the organization uses and manages for business operations, material procurement and customer use, which includes the surrounding land, space and buildings". In this stage, companies evaluate the extent to which they give consideration to biodiversity in their land use.

When a company evaluates their biodiversity efforts, the land used for business activities are broadly classified into 2 categories based on how the land is used. One category includes the premises of offices, factories, warehouses and other facilities which they use for management, manufacturing, logistics and other business activities. The other category includes forests and farm land used for the production of raw materials procured for manufacturing, and the land used by customers such as sites of construction work contracted to the company. The former is used and managed by the company itself, and the latter is the land needed to procure raw materials or used by customers. Some lands used in certain industries such as forests owned by paper manufacturing companies belong to both categories.

The surrounding lands should be evaluated as well because not only the land used by the company but also the neighboring lands and a broader ecosystem are relevant in terms of biodiversity conservation. Consideration for biodiversity in the use and utilization of space and buildings should also be evaluated because in addition to land, walls and rooftops of buildings, and other spaces can also be used for purposes such as planting.

(2) Relationships with and impacts on biodiversity

The level of influence the land use stage has on biodiversity is evaluated based on the following 8 points.

(No.27) Do you use any third-party evaluation systems and/or certification systems with respect to biodiversity and/or ecosystem conservation?

Companies are expected to review the contents and results of their efforts objectively although there are not many widely accepted methodologies to conduct qualitative or quantitative evaluations on biodiversity and ecosystem conservation in a rational and transparent way. Alternatively, companies should be evaluated or approved by a third party such as HEP/JHEP or SEGES before making them public.

(No.28) Do you conduct biodiversity impact assessments on land use?

Use of land or alterations to the shape and quality of land zoning through development, construction and planting may affect biodiversity. Companies should assess these effects in advance and respond to them in accordance with the level of the effects. Three questions from No.28 to No.30 can be put together as an approach to assessment, monitoring and action.

(No.29) Do you monitor land use to understand the status of biodiversity?

Companies are expected to monitor regularly what impacts their continuous land use has on biodiversity. Monitoring makes it possible to verify the effects of their approach by comparing them with the prior assessment results and to replace it with a more effective approach.

(No.30) If your land use is likely to affect biodiversity do you take steps to avoid possible impacts?

Companies need to take measures to avoid or reduce negative impacts when prior assessment results indicate possible negative impacts on biodiversity arising from their land use, or the results of a subsequent monitoring reveal negative impacts on biodiversity arising from their land use.

(No.31) Do you conduct biodiversity conservation projects including activities to protect endangered species, rare species and/or indigenous species?

Companies are expected to give consideration to protection of endangered species, rare species and indigenous species in their planning and implementation of land use to maintain and conserve the ecosystems in the land and its surrounding area. Each company is responsible for the use of their premises to conserve broader ecosystems. Here reforestation and other activities conducted through volunteer efforts are not evaluated. Only those activities conducted in the limited scope of land as defined above, including the land owned by the company, are evaluated.

(No.32) Do you request suppliers to consider biodiversity in their land use?

Conserving biodiversity requires that suppliers who provide raw materials, goods and/or services give consideration to biodiversity in the process of providing them. Companies need to encourage suppliers to give consideration to biodiversity and request biodiversity-conscious land use. When suppliers undertake land development, construction or planting projects, it is important to request, at the design and construction stages, that they use designs and methods beneficial to ecosystem conservation such as those which use indigenous species and conserve habitats. The same consideration should be

requested at the management stage.

(No.33) Do you estimate economic values of biodiversity and ecosystem services?

One of the factors that keep biodiversity initiatives from progressing more rapidly is a fact that its economic values have not been integrated into decision-making. Although presently a rational and widely accepted method to calculate its economic values has not been established, the contingent valuation method (CVM) and conjoint analysis have been applied to some cases. Companies are expected to evaluate, compare and review biodiversity conservation or ecosystem services in economic terms to use the results in decision-making.

(No.34)Do you prevent invasion of any of the specified foreign organisms defined by the government and other invasive alien species?

Invasion of an alien species can disrupt the ecosystem of the invaded area. Once an alien species has invaded, its removal takes significant time and it is economically inefficient. Therefore taking a proactive measure to prevent invasion of alien species is more effective to conserve biodiversity. Companies should pay a special attention not just to the specified foreign organisms[13)] of which rearing, cultivation, transportation, release and planting are prohibited by the Invasive Alien Species Act, but also to the alien species listed in the invasive alien species list specified by the Ministry of Environment[13)], "100 of the World's Worst Invasive Alien Species"[14)] specified by the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN) and "100 of Japan's Worst Invasive Alien Species"[15)] specified by the Ecological Society of Japan. Companies are expected to prevent such invasions by developing plans and implementing them so that alien species will not be brought in the land development, construction, planting and management processes. There is also a possibility that domestic alien species brought by humans from other regions in the country affects the ecosystems and biodiversity of the region. Even if the species occurs in the region, its gene may be disrupted by the entry of genetically different individuals occurring in other regions. Companies are expected to prevent invasion of organisms from other regions and use local seeds and seedlings[16)] for greening.

3.10. Nature Conservation

(1) Definition

Companies evaluate their guidelines and policies with respect to biodiversity conservation, distribution of information, environmental education and actual nature conservation activities.

Guidelines and policies about biodiversity conservation are important in that they show companies' stances on biodiversity conservation and give guidance to their biodiversity conservation activities. Companies can clarify their responsibilities in conserving biodiversity by articulating their guidelines and policies and announcing them within and outside their companies.

Companies distribute information about biodiversity conservation by disclosing information about their stances on biodiversity conservation and the state of their conservation activities in reports including environmental reports and CSR reports, and their websites. Disclosing information may have an influence on society in promoting biodiversity conservation, allow their biodiversity conservation efforts to be evaluated objectively by the outside world, or lead to more advanced biodiversity conservation efforts.

Nature conservation initiatives evaluated here are corporate social responsibility (CSR), volunteer and other activities that are not directly related to business activities. Basically biodiversity conservation

activities undertaken as part of business activities including alterations of land such as land development are evaluated in the "land use" stage. However, some nature protection initiatives may be evaluated in both stages because it is difficult to decide under which category they fall in some cases such as activities conducted within companies' own factory premises. There are numerous possible activities companies can undertake to protect nature: biotopes, protection of endangered species and indigenous species, removal of invasive alien species, greening with native species and local species, planting fruiting plants which attract butterflies and birds, bird-watching events during the Bird Week, setting nests for birds, nature observation events, weeding to improve habitats, and other activities to help sustainable use and proper management of greens, taking in to account the native organisms occurring in the area, and environmental education with regard to biodiversity. Those that can be judged to be beneficial to biodiversity conservation, whatever kinds of activities they are, are eligible for evaluation.

There are a number of possible ways for companies to cooperate with nature protection initiatives undertaken by outside organizations such as providing human resources, funds and spaces. The type of cooperation is not questioned as long as it is beneficial to biodiversity conservation.

Environmental education comprises two types of educational activities: those given to executives and employees, and those conducted outside the company such as visiting lectures. Environmental education encompasses a very large area, but here only those with contents regarding biodiversity conservation are taken into account. However, it does not have to be the type of environmental education which specifically targets biodiversity conservation. Although purchasing books and reference materials about biodiversity and nature for libraries and other facilities contributes to environmental education, what is taken account here is not just purchasing books and reference materials but whether the company actively engages in environmental education or supports environmental education given to the executive and employees. Visiting lectures have a different significance from in-house environmental education in that they give companies opportunities to show their technologies and findings to society, they raise awareness among many people about biodiversity conservation, and they help develop human resources who will play important roles to conserve biodiversity. For this reason, both types of environmental education activities, those given to executives and employees and those conducted outside the company such as visiting lectures are taken into account.

(2) Relationships with and impacts on biodiversity

The level of influence the nature protection stage has on biodiversity is evaluated based on the following 5 points.

(No.35) Do you have guidelines and/or policies on conservation of biodiversity?

Establishing and showing guidelines and/or policies regarding company-wide stances and specific activities with respect to biodiversity conservation, and announcing them to the outside world, turn companies into a position where they have no choice but to implement those guidelines and/or policies. They effectively make companies voluntarily take on a responsibility for biodiversity conservation and commit themselves to those activities, which will promote biodiversity conservation. Moreover, they can be seen as models of initiatives that other companies can imitate, and they have an impact to increase social demand of biodiversity conservation.

(No.36) Do you spread information about biodiversity conservation?

Distributing information regarding biodiversity conservation by disclosing information about their conservation activities and qualitative and/or quantitative evaluations of the results in reports including environmental reports and CSR reports, and their websites may enable companies to show a model to other companies, distribute and deploy their technologies and findings to society, and promote biodiversity conservation. Meanwhile, it gives companies a chance to check whether their approaches are not self-righteous.

(No.37) Do you voluntarily carry out nature conservation activities in factory premises, company-owned woods including leased land, and surrounding areas?

Evaluations on nature protection activities are different from those direct ones conducted in business processes because they target nature protection activities undertaken as CSR or volunteer activities that are not directly associated with business activities. Extra biodiversity conservation activities in addition to the activities conducted for biodiversity conservation in the previous stages are evaluated. This question is not necessarily asked to check the impacts that their products and so forth have on biodiversity. Its objective is to evaluate companies' stances on biodiversity; hence it is related to company climates or company cultures. It is also one of the axes of evaluation to project future impacts as it indicates directions of companies' approaches on biodiversity.

(No.38) Are you involved in nature conservation activities mainly through cooperation with external organizations such as NGOs/NPOs, community groups, local governments and research institutions?

Each company is not solely responsible for adverse effects on biodiversity. Nonetheless, cooperation with nature conservation programs undertaken by external organizations not only contributes directly to biodiversity conservation but also has a significant educational influence by raising awareness in society regarding nature protection and biodiversity conservation.

(No.39) Do you carry out internal and/or external environmental education activities on biodiversity?

Even if companies provide no environmental education, it may not have immediate and direct effects on biodiversity. In many cases, environmental education probably does not affect at least the kind of biodiversity that has relationships with products currently being produced. However, environmental education provided to employees and other people is likely to have a strong influence on biodiversity conservation in the future. In that sense, it is important because it indicates directions and policies regarding companies' biodiversity conservation approaches in the future. Because environmental education to external people or organization including visiting lectures may lead to distribution and development of companies' findings and technologies regarding biodiversity, which in turn may greatly promote biodiversity conservation.

3.11. Business Opportunities

(1) Definition

Companies evaluate whether their approaches related to biodiversity have been integrated into their business strategy, whether they try to communicate with society regarding their approaches, and whether they engage in activities which contribute to ecosystem conservation and biodiversity through actual products and/or services, business activities themselves or encouragement to other companies,

and as a result, lead to creation of business opportunities or sales.

Companies evaluate in the other stages of this checklist whether they sell products procured and manufactured in a biodiversity-conscious way. Here they evaluate whether their activities are economically rational, and their activities are used in marketing.

(2) Relationships with and impacts on biodiversity

Companies can indirectly contribute to biodiversity by integrating biodiversity into business management and marketing products and/or services associated with biodiversity, which is evaluated from the following 5 points.

(No.40) Do you have a governance structure and a system in place to make decisions on biodiversity?

Biodiversity conservation measures integrated into business activities may result in improvement of business values and sustainability of companies. Having such measures securely in place in business management requires securing human and monetary resources for them. It also means that the measures are likely to be continuous efforts instead of temporary ones.

(No.41) Do you communicate externally concerning policies and goals on biodiversity?

Disclosing policies and goals on biodiversity and their results plays an important role in communications with external stakeholders. Communications with stakeholders help raise the level of the measures, leading to improved company brands and investment values.

(No.42) Do you provide goods and/or services in an economically sustainable way? (i.e. are biodiversity-conscious practices economically compatible with your business performance?)

This question is to evaluate whether companies provide goods and/or services that contribute to biodiversity conservation in the procurement, manufacturing and use processes based on an economically rational way. It is important that they are not offered as "social actions" but that they make business sense. Even if they incur a loss in the end, it does not matter as long as they are established as a business opportunity.

(No.43) Do you develop and sell goods and/or services which indirectly contribute to biodiversity?

Companies can contribute to biodiversity conservation by providing goods and/or services which indirectly contribute to biodiversity. The existence of such activities is evaluated here.

For example:

- Marketing activities in which a proportion of the sale is donated to biodiversity conservation activities
- Financing arrangements that recognize biodiversity-conscious companies

(No.44) Do you develop and sell goods and/or services that focus on biodiversity?

For example, the following businesses do not directly increase biodiversity, but contribute to biodiversity through other companies and consumers.

- Consulting services focused on biodiversity for companies
- Tours focused on biodiversity
- Selling clean natural water produced in a biodiversity-rich land

4. Checklist Development Process and Test Results

4.1 Checklist Development Process

In the checklist development process, tests were run twice by study group members and once by COCN member companies. The draft version was revised reflecting the comments provided in these tests about the contents and ease of use (Figure 4.1). The final version, revised after Test 3 is attached to this report.

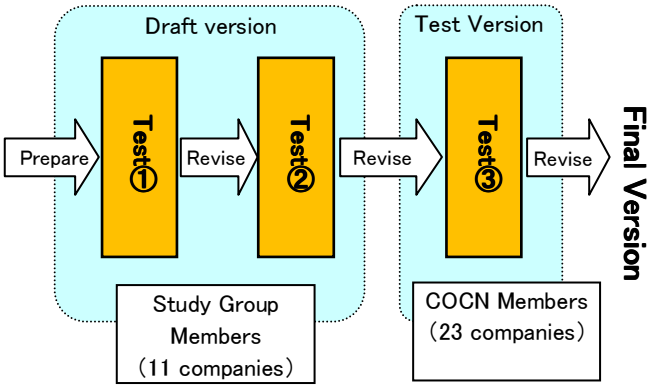


Figure 4.1: Checklist development flow

4.2 Checklist Test Results (Test 3)

For the sake of convenience, the 23 COCN member companies which responded to our request for running a test are classified into 5 industries as shown in Table 4.1.

Table 4.1 Industries of COCN member companies and number of responses

Industry	No. of responses	Category of business
Manufacturing (electrical)	9	Electrical
Manufacturing (chemical/pharmaceutical)	5	Chemical, pharmaceutical
Manufacturing (other)	5	Machinery, petroleum, transportation equipment, textile, others
Construction	2	Construction
Services	2	Bank, real estate
Total	23	—

The scores of the test are shown in Figures 4.2 and 4.3, and Table 4.2. The average score was 3.3. There is room for improvement in the scores by implementing the PDCA cycle. Taking this into consideration, we have judged our level setting is appropriate at the moment.

Looking at the scores by industry, we have found that the scores in each industry category are centered around 3.0. No large variations among industries have been found. The average score of the manufacturing (electrical) industry is 3.5, which is high compared to the other industries. Table 4.2 shows that its scores of the disposal and reuse stage and the nature protection stage are especially higher than the scores of the other industries. The other industries should be encouraged to improve their scores in these stages, learning from the efforts in the manufacturing (electrical) industry.

Looking at the scores by stage, we have found that the scores in the manufacturing stage are particularly high. The scores in this stage are high in the manufacturing (electrical), manufacturing (chemical/pharmaceutical) and manufacturing (other), suggesting that the manufacturing industry as a whole gives full consideration to biodiversity in the manufacturing stage. On the other hand, the scores in the use and operation stage are low in every industry. This result suggests the current situation that presently companies do not give much consideration to biodiversity in this stage because end users, not companies, are the ones who directly handle products in this stage.

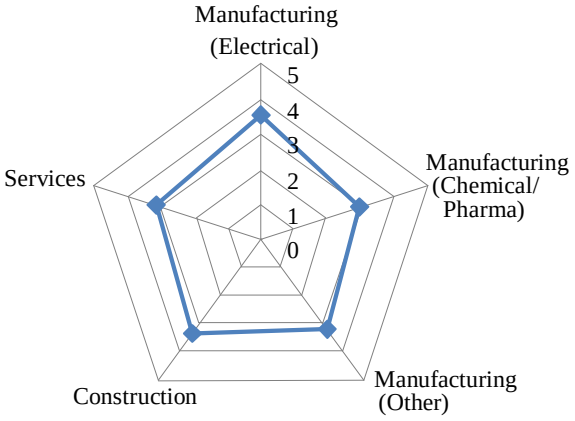


Figure 4.2: Average score (by industry)

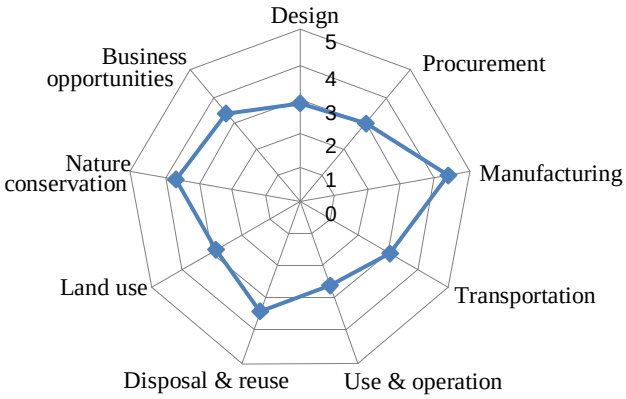


Figure 4.3: Average score (by stage)

Table 4.2: Scores in Test 3

	Manufacturing (Electrical)	Manufacturing (Chemical/ Pharma)	Manufacturing (Other)	Construction	Services	Average (all stages)
Design	3.2	2.2	2.5	3.5	3.0	2.9
Procurement	3.0	3.1	2.6	3.3	3.0	3.0
Manufacturing	4.4	4.5	4.5	3.6	3.5	4.3
Transportation	3.2	3.1	3.1	2.0	1.5	3.0
Use & Operation	2.8	2.3	2.0	2.9	3.0	2.6
Disposal & Reuse	4.1	2.1	3.3	2.3	3.0	3.4
Land Use	2.8	2.2	2.8	3.6	2.8	2.8
Nature Conservation	4.1	2.9	3.6	3.9	3.4	3.6
Business Opportunities	3.8	2.5	3.3	3.3	3.7	3.4
Average (all stages)	3.5	2.9	3.2	3.3	3.1	**3.3**

Table 4.3 shows a summary of the results on NA ratios. An NA ratio is the proportion of "Not Applicable" responses in all questions. By industry, the service industry shows a high ratio, 28.4%. The NA ratio in each of the procurement, manufacturing, transportation and disposal and reuse stages of the service industry is higher than 50%. By stage, the NA ratio is high in the procurement and disposal and reuse stages. In the procurement stage, the proportion of NAs is particularly high for No.9, the question about ABS, suggesting that resources to which ABS can be applied are not frequently used except in the manufacturing (chemical/medical/pharmaceutical) industry. In the disposal and reuse stage, the results are divided into 2 distinctive groups: the low-NA group comprising the manufacturing (electrical) and construction industries and the high-NA group comprising the rest. Even if a company belongs to the manufacturing industry, it seems to be difficult to give consideration to biological diversity if the company is not a final supplier who offers products to end users, but a supplier who provides raw materials.

As shown above, the evaluation items in this checklist increase or decrease depending on the industry and products. Because the purpose of using this checklist is to allow self-improvement by continuously rotating the PDCA cycle, we expect each evaluator will make appropriate changes to the contents of this checklist in accordance with their specific conditions.

Table 4.3: Proportion of NA (%) in Test 3

	Manufacturing (Electrical)	Manufacturing (Chemical/Pharma)	Manufacturing (Other)	Construction	Services	Average (All stages)
Design	0.0	10.0	20.0	0.0	0.0	6.5
Procurement	26.7	4.0	28.0	20.0	80.0	26.1
Manufacturing	0.0	0.0	0.0	7.1	57.1	5.6
Transportation	3.7	13.3	0.0	0.0	66.7	10.1
Use & Operation	0.0	40.0	20.0	0.0	0.0	13.0
Disposal & Reuse	3.7	53.3	40.0	0.0	66.7	27.5
Land Use	0.0	5.1	0.0	0.0	0.0	1.1
Nature Conservation	0.0	0.0	0.0	0.0	10.0	0.9
Business Opportunities	4.4	16.0	20.0	10.0	0.0	10.4
Average (all stages)	4.1	12.3	11.8	4.5	28.4	9.7

5. Recommendations, Necessary Role-Sharing among Industry, Government and Academy, and Possible Impacts Created by Implementing the Recommendations

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In 2010, the first year of this 2-year project, we identified factors that are already being addressed by some companies in their value chains as well as factors that need to be addressed for the conservation of biodiversity. In 2011 we developed a biodiversity checklist that can be used by all industries based on the factors identified in 2010. The Nagoya Chamber of Commerce & Industry created a guidebook for their member companies, "Business and Biodiversity - how to understand their relationships and take steps based on the Aichi Targets and Nagoya Protocol", in which they show the content of this checklist.

In addition, we are collaborating with the ISO Working Group on Biodiversity Standards of International Standard Innovation Technology Research Association (IS-INOTEK), which was established in January 2011, to make a proposal for international standards. The ISO Working Group on Biodiversity Standards has set a goal that Japan will propose international standards on biodiversity, toward which they have continued discussion since October, 2011. We have requested the working group to use our Business and Biodiversity Checklist as one of the KPIs used in the discussion. We are currently working to see that the checklist will be adopted in the proposal.

We also plan to promote this checklist so that it will be used in projects planned by the World Business Council for Sustainable Development (WBCSD) as a business performance evaluation tool developed by Japanese companies.

We would like to request support from the Technical Regulations, Standards and Conformity Assessment Policy Division, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry to the activities of this working group to propose international standards.

List of abbreviations

ABS	:	Access and Benefit Sharing
BBOP	:	Business and Biodiversity Offsets Programme
CASBEE	:	Comprehensive Assessment System for Built Environment Efficiency
CBD	:	Convention on Biological Diversity
CBI	:	City Biodiversity Index
CEV	:	Corporate Ecosystem Valuation
COP	:	Conference of the Parties
CVM	:	Contingent Valuation Method
ESR	:	Ecosystem Services Review
IFC	:	International Finance Corporation
ISO	:	International Organization for Standardization
JHEP	:	Japan Habitat Evaluation and Certification Program
LIME	:	Life-cycle Impact assessment Method based on Endpoint modeling
MA	:	Millennium Eco-system Assessment
SEGES	:	Social and Environmental Green Evaluation System
TEEB	:	The Economics of Ecosystems and Biodiversity Report for Business
UNEP	:	United Nations Environment Programme
WBCSD	:	World Business Council for Sustainable Development
3Rs	:	Reduce, Reuse and Recycle

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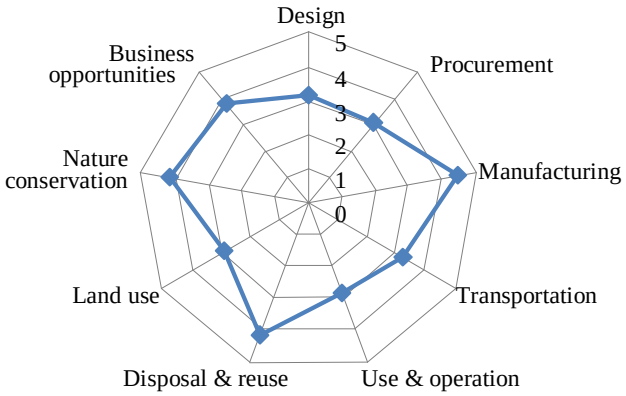
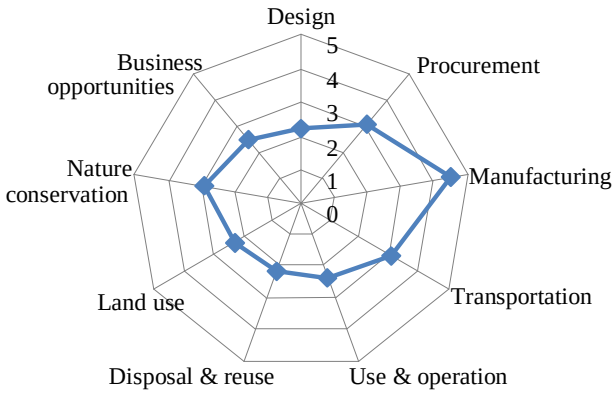
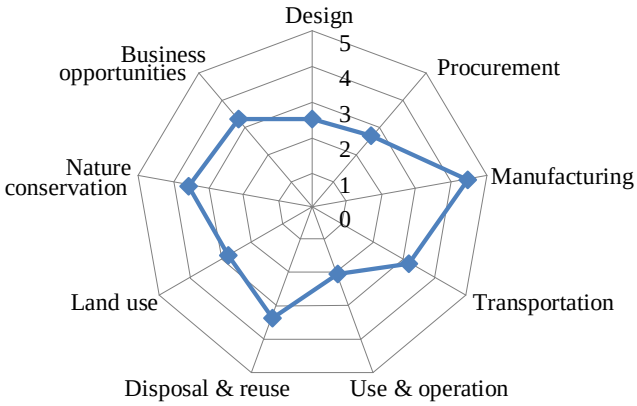
<Appendix 1> Test results (by industry)



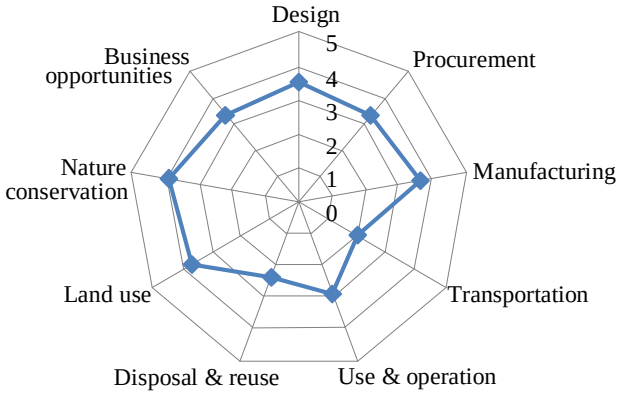
Appended figure 1-1: Manufacturing (Electric)



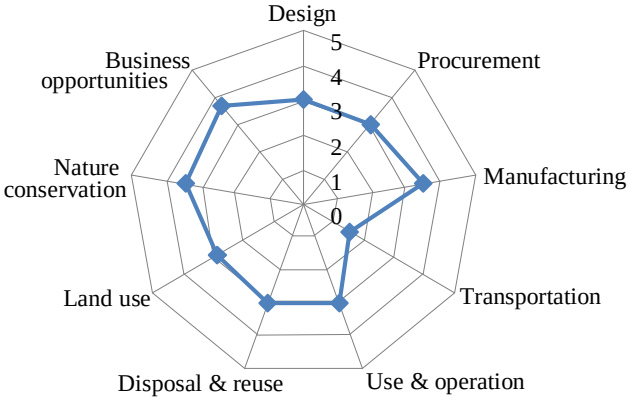
Appended figure 1-2: Manufacturing (Chemical/Pharma)



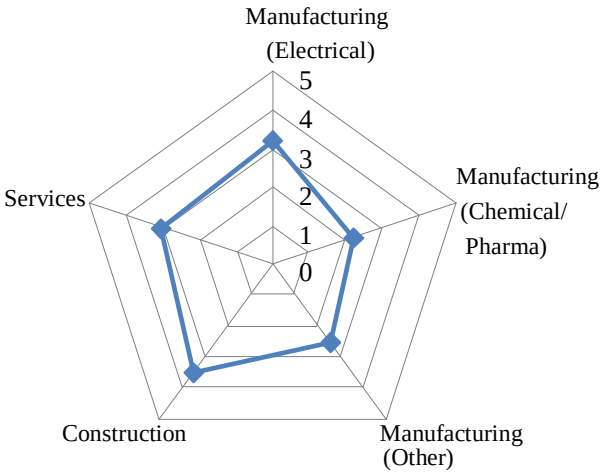
Appended figure 1-3: Manufacturing (Other)



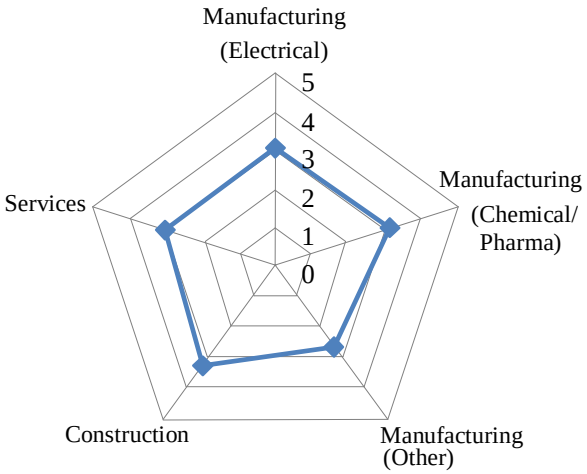
Appended figure 1-4: Construction



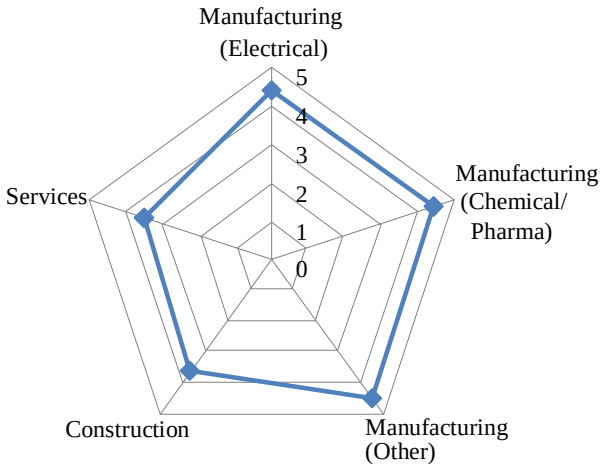
Appended figure 1-5: Services



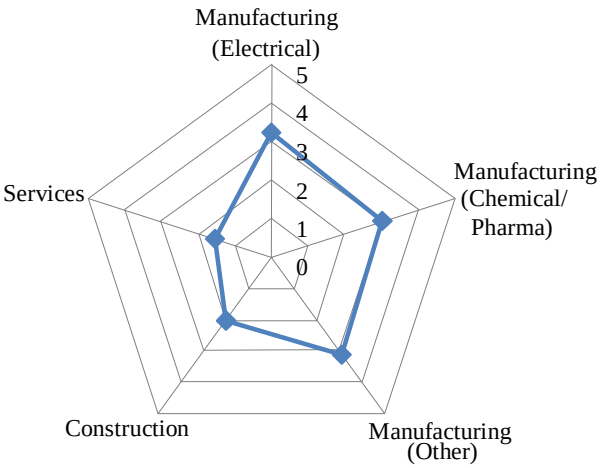
Appended figure 2-1: Design stage



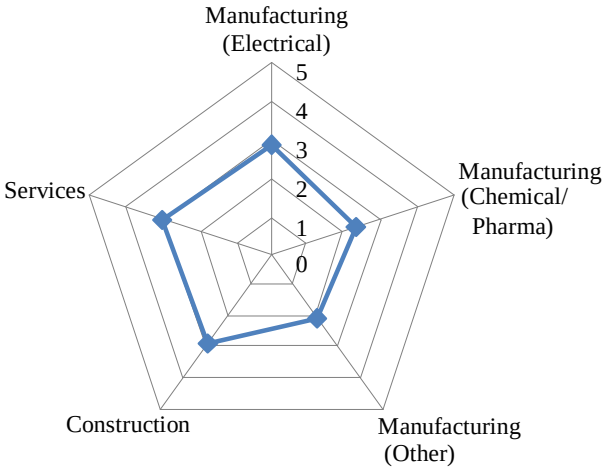
Appended figure 2-2: Procprocurement stage



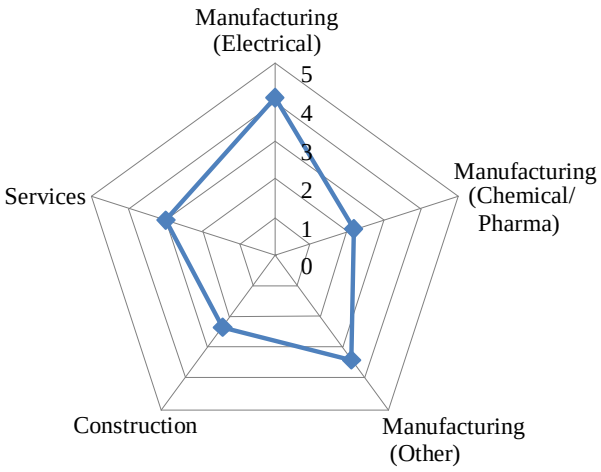
Appended figure 2-3: Manufacturing stage



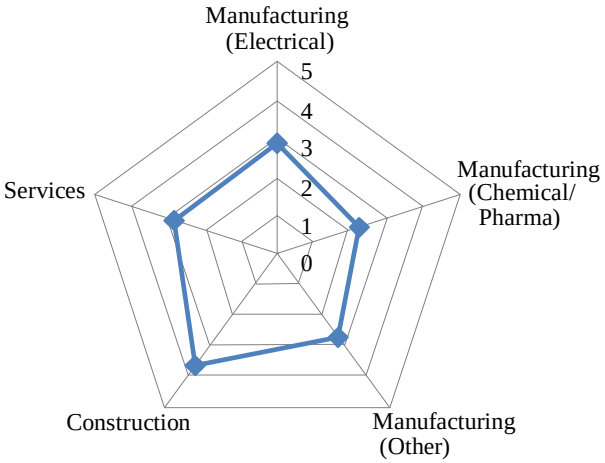
Appended figure 2-4: Transportation stage

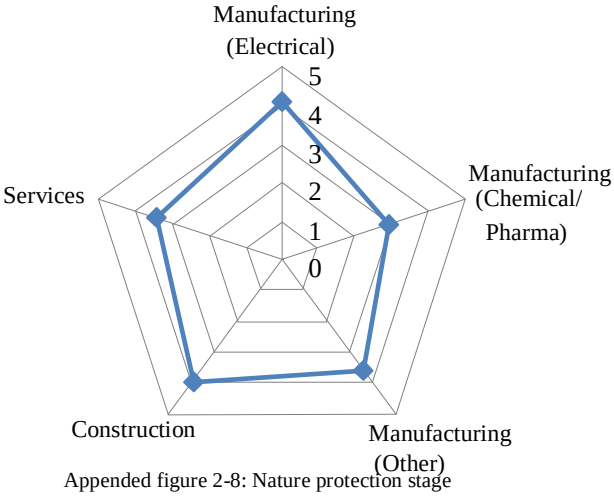


Appended figure 2-5: Use & operation stage

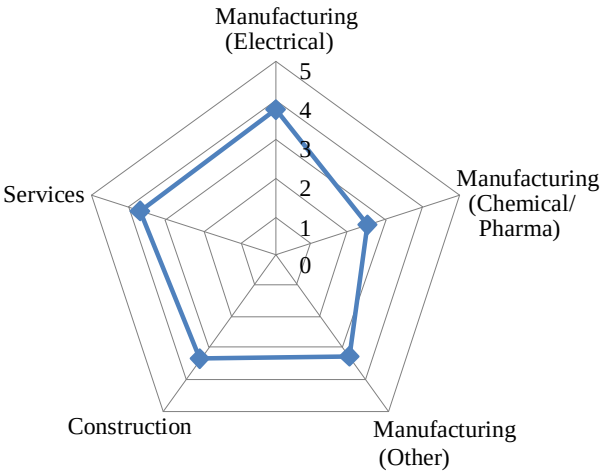


Appended figure 2-6: Disposal & reuse stage





Appended figure 2-8: Nature protection stage



Appended figure 2-9: Business opportunities stage