Shiseido Climate/Nature-Related Financial Disclosure Report

May 30, 2023

Background

"Give a human face to the global market."

The philosophy of the ESG investment called for by then UN Secretary-General Kofi Annan in his 1999 speech at the Davos Forum is changing the values of the global economy. Nonfinancial information is now being used to judge a company's future value, as well as financial information by investors, and companies are increasingly required to transparently disclose their goals and performance in sustainability-related initiatives, including climate change. The TCFD[1-3] and the TNFD[4] have demonstrated to corporate managers the importance of considering and addressing climate change and biodiversity issues as one of the business priority issues by providing a simple framework, including *governance, strategy, risk management*, and *metrics and targets*.

In the *Global Risks Report 2023* [5], the World Economic Forum warned of the "failure to mitigate climate change," "the failure of climate change adaptation," "natural disasters and extreme weather," and "biodiversity loss and ecosystem collapse" as the greatest long-term risk factors to the global economy. It is important to accurately analyze climate-related or nature-related risks and opportunities and to respond to those issues in advance in order to ensure sustainable business growth considering the recent severe damage caused by disasters.

For example, many cosmetic raw materials are made from agricultural products, such as oil palms. Stable climate conditions, including rain and temperatures, are essential for continuous business growth. If the weather conditions change because of climate change, it will cause water shortages and serious disasters, which will have significant impacts on society, as well as our value chain, including procurement, production, logistics, and sales activities. Therefore, we disclosed the science-based target along the 1.5° C trajectory in addition to analyzing sustainability-related risks and opportunities to mitigate climate change and its risks. We also committed to accelerating and to analyzing climate-related risks and opportunities and integrating them into company-wide actions. Furthermore, we will switch to RSPO-certified raw materials by 2026 for all cosmetic raw materials derived from oil palms in order to minimize supply chain risks and biodiversity loss as much as possible.

In this report, we present the results of our analysis of the climate-related and the nature-related risks and opportunities based on scientific and statistical evidence as comprehensively as possible in line with the TCFD framework of *governance, strategy, risk management*, and *metrics and targets*.

The analysis of global environmental issues, such as climate change, assumes a much longer time scale than that of normal business planning and risk management, and it is impossible to forecast all the various changes in society and markets that may occur as a result of environmental issues. Hence, the results contain a great deal of uncertainty and indeterminacy.

Governance

Shiseido is promoting sustainability initiatives through our brands and regional businesses. In 2022, the Shiseido Sustainability Committee was held regularly to ensure prompt decision-making in sustainability-related operations and company-wide implementation. The committee makes decisions on group-wide sustainability strategies and policies, manages the progress of medium- and long-term targets, and implements such activities as the TCFD and human rights actions. Attendees consist of representative directors and executive officers of corporate strategy, R&D, supply network, public relations, brand holders, who actively discuss issues from the perspective of their respective areas of expertise. For decisions regarding business execution, issues are also discussed by the Global Strategy Committee and the Board of Directors.

Strategy

1. Screening of factors related to risks and opportunities

In considering factors related to climate change, we conducted a scenario analysis for both the transitional and the physical risks and opportunities in terms of the 1.5/2° C and 4° C scenarios, respectively, based on the Representative Concentration Pathways (RCPs) and Shared Socioeconomic Pathways (SSPs). A variety of factors and relationships among them are assumed to contribute to climate-related risks and opportunities. Regarding transitional risk, the elements associated with the transition to a decarbonized society, such as the policy, regulation, technology, market, and consumer perceptions were considered. Since factors that pose climate-related risks and opportunities are influenced by a variety of events and relationships, we comprehensively identified key physical risk factors based on the IPCC *Sixth Assessment Report*[6)] and the Shiseido Group's areas of activity.

Table 1: Key risk factors reported by IPCC and Shiseido's activity area

Area	Key Risk	Procurement	Manufacturing	Distribution
Europe	(1) Coastal and inland flooding (2) Increasing temperatures and heat extremes (3) Ecosystem disruptions (4) Water scarcity (5) Losses in crop production	✓	✓	✓
North America	(1) Mental health and mortality (2) Increasing temperatures and heat extremes (3) Ecosystem disruptions (4) Water scarcity and quality (5) Losses in crop production (6) Sea level rising	✓	✓	✓
Central and South America	(1) Water scarcity (2) Infectious diseases (3) Coral ecosystem disruptions (4) Food security (5) Floods (6) Sea level rising	✓		✓
Asia	(1) Human health (2) Floods (3) Ecosystem disruptions (4) Sea level rising (5) Water scarcity (6) Food security	✓	✓	✓
Australasia	(1) Ecosystem disruptions in ocean or alpine area (2) Sea level rising (3) Losses in crop production (4) Increasing temperatures (5) Wildfire	✓		✓
Africa	(1) Ecosystem disruptions (2) Food security (3) Human mortality (Heat and infections) (4) Economic growth and poverty (5) Water scarcity	✓		

In the following sections, the results of the qualitative and quantitative analysis of financial impacts as of 2030 are described. The analysis was conducted based on scientific and statistical data by selecting items with significant impacts from among the individual risk and opportunity factors presented in the IPCC *Sixth Assessment Report*, considering the sustainability and uncertainty of the business and assets, and the lifetime of the business and facilities.

2. Carbon tax

The financial impact of a carbon pricing scheme is a concern in the transition to a decarbonized society. Various carbon pricing schemes are being discussed, including a carbon tax, a border carbon tax on the movement of goods from countries and regions with weak carbon regulations to those with strong carbon regulations, Cap & Trade, and an emissions trading system.

Currently, carbon tax prices are set at US$20–140 per ton of GHG emissions in European countries.[7].

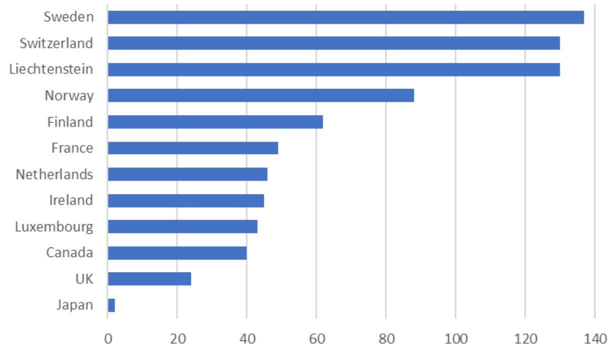

Figure 1: Price of carbon taxes worldwide (as of April 2022, USD/t-CO_2e)

Since the carbon tax is used to secure the budget for implementing mitigation, adaptation measures, and compensation for climate disasters, the carbon tax price is expected to be determined based on the social cost of carbon in the near future. The International Energy Agency (IEA) has projected a carbon price of US$120 in the Announced Pledges Scenario to US$130 in the Net Zero Emissions by 2050 Scenario per ton of GHG emissions in 2030, which includes the cost of implementing climate-related policies. With France and Iceland announcing carbon taxes of €100 and CA$170 in 2030, the trend toward higher carbon tax prices is likely to continue.

In recent years, a series of studies on the social cost of carbon have been published, and some reports put the appropriate future carbon price at $500–1,500[8, 9]. As the carbon tax becomes more expensive, the transaction price in the ETS market is expected to follow the carbon tax price. With this current situation regarding carbon pricing as background, we analyzed the financial burden of the carbon tax in 2025 as a short-term impact, adopting the current level in France, where we have a production plant, and the annual burden as of 2030 using the IEA AP and NZE scenarios for the medium- to long-term impact. Based on the projections for GHG emissions of Scope 1 and Scope 2, we considered the financial impact of the border carbon tax as well, according to the following formula with the assumption that a border carbon tax with the same level is introduced in Europe in 2030 or in all countries and regions where our production plants are located.

$$\text{Carbon tax impact} = GHG_{in} * CT_{in} + GHG_{out} * CT_{out} + GHG_{out} * (CT_{in} - CT_{out}) * S_{in}/(S_{in}+S_{out})$$

GHG_{in}: GHG emissions in countries and regions with a border carbon tax

GHG_{out}: GHG emissions in countries and regions without a border carbon tax

CT_{in}: Carbon tax price in countries and regions with a border carbon tax

CT_{out}: Carbon tax price in countries and regions without a border carbon tax

S_{in}: Sales volume to countries and regions with a border carbon tax

S_{out}: Sales volume to countries and regions without a border carbon tax

As a result, it was estimated that the financial impact over the short term would be small (Scenario 1). However, for the medium to long term, if a carbon tax is introduced only within the EU, the annual impact would be approximately ¥53 million in 2030 (Scenario 2), and if the same level was applied globally, the annual impact would be approximately ¥0.87 billion per year (Scenario 3). If the level of renewable energy deployment in 2030 were to remain at the same level as in 2020, the annual carbon tax burden would be approximately ¥2.2 billion (Scenario 4).

Table 2: Projected financial impact from carbon tax

	Period	Tax price	Region	Impact
1	2025	\$52	France	¥12 mil.
2	2030	\$130	EU	¥53 mil.
3	2030	\$130	All	¥0.87 bil.
4	2030	\$130	All	¥2.2 bil.

At COP27, it was agreed to establish a fund to compensate for losses and damages caused by climate change. According to the *Sharm el-Sheikh Implementation Plan* [10], it is reported that US\$5.8 trillion to US\$5.9 trillion will be needed until 2030 to support such developing countries. Assuming that these losses and damages will be financed by a carbon tax in the future, we estimate that the annual burden would be approximately ¥250 million to ¥840 million under the 1.5° C scenario and ¥360 million to ¥1.2 billion under the 4° C scenario even if we had reduced our Scope 1 and Scope 2 GHG emissions by 95% in 2050.

The carbon tax would affect procurement costs. If only GHG emissions at Tier 1 suppliers were subject to a carbon tax, additional costs would be incurred for raw material procurement in proportion to the ratio of GHG emissions from electricity and fuel consumption of GHG emissions from raw material procurement, but in practice, it should be assumed that electricity and fuel consumption, especially at upstream suppliers located in countries and regions that have introduced carbon taxes, would also be considered. The share of GHG emissions that would be subject to a carbon tax if all upstream suppliers were covered is calculated as the sum of the following infinite sequence of numbers.

$$\text{Carbon tax coverage} = \sum_{n=1}^{\infty} \{(1-x)^{n-1} * x\}$$

x: Ratio of GHG emissions from electricity and fuel consumption of GHG emissions from raw material procurement

For 0 < x <1, this infinite series converges to 1. If a carbon tax were introduced globally, a carbon tax would be imposed on all GHG emissions from raw material procurement, but discussions at the Conference of the Parties to the United Nations Framework Convention on Climate Change often call for restrictions only on developed countries. Therefore, we calculated the impact of the carbon tax on raw material procurement costs under the IEA NZE scenario with a conservative approach, assuming that up to the tier 3 suppliers operate in countries and regions subject to the tax. The share of GHG emissions from procurement of cosmetic raw materials and packaging materials, which are emitted through electricity and fuel consumption at suppliers, was estimated based on our raw material procurement results using an analysis based on IDEA v2, a life cycle inventory database.

$$\text{Carbon tax impact} = \left(\sum_{n=1}^{3} \{(1-x_m)^{n-1} * x_m\} * GHG_{C1m} + \sum_{n=1}^{3} \{(1-x_p)^{n-1} * x_p\} * GHG_{C1p}\right) * CT$$

x_m: Ratio of GHG emissions from electricity and fuel consumption of GHG emissions from cosmetic raw material procurement

x_p: Ratio of GHG emissions from electricity and fuel consumption of GHG emissions from packaging material procurement

GHG_{C1m}: GHG emissions from cosmetic raw material procurement

GHG_{C1p}: GHG emissions from packaging material procurement

CT: Carbon tax price

As a result, an additional burden of approximately ¥3.5 billion per year was expected, suggesting the importance of working with direct and indirect suppliers to decarbonize the supply chain.

3. Floods

The impact of large-scale floods due to the temperature increase was evaluated. For the flood frequency in future, we used the return period of large-scale floods in the RCP 2.6 and theRCP 8.5 scenario reported by Hirabayashi *et al.*[11] As for the current frequency, we adopted the average number of floods per unit area by country and region for the decade from 2000 to 2019 based on the *Emergency Events Database* [12] published by the Universite Catholique de Louvain. The inverse of the number of return period in 2100 is taken as the probability of flooding per year. The sum of the probability of flood occurrence at present and one third of the difference between the current probability and the probability in 2100 was adopted as the probability of flooding in 2030.

The amount of damage was calculated for all domestic and overseas factories. Assuming that 50% of the facilities are to be replaced at the factories located in areas where flooding is predicted to be greater than 50 cm, according to hazard maps published by local governments and other sources, the financial impact was the total amount of loss if shipments were suspended with the assumption that production activities at the affected factories would be halted for one month. And for the factories whose hazard maps predicted inundation of 50 cm or less, the financial impact was calculated as the impact of a three-day suspension of production activities due to disruption of surrounding logistics and difficulty in commuting for employees, assuming no damage to facilities caused by the inundation.

The reported data are evaluated at a spatial resolution of 0.25 degrees in latitude and longitude. Therefore, the results may differ significantly due to slight differences in location information. For this reason, we calculated the average score for each river basin and used them in this analysis. An impact assessment was conducted for all factories, and the total was calculated as the impact of the flooding on the Shiseido Group as a whole. The Kurume factory, which began operations in June 2022, is not included in this evaluation because its contribution to sales is unclear.

$$f(F_{2030}) = FR_0 * FF_{2030} * (S + C)$$
$$\text{Flood impact} = \Sigma f(F_{2030})$$

FR_0: Initial value of flood risk

FF_{2030}: Probability of large-scale flooding in 2030

S: Hypothetical sales amount suspended by flooding

C: Value of facility of the target factory

As a result, the potential impact of flooding in 2030 under the 4° C scenario was estimated to be about ¥830 million per year of which ¥120 million is attributable to climate change under the RCP 8.5. Especially in Japan, where factories are concentrated, the impact of flooding is expected to increase toward the end of this century; therefore, the importance of taking such measures as developing a business continuity plan and predicting flooding from a long-term perspective was pointed out.

Such extreme weather events have a significant impact not only on shipping from our factories but also on logistics. Therefore, we started to investigate the flood risk of important distribution centers. First, we carried out an analysis based on the same methodology for our distribution centers in Japan and confirmed that the flood risk was low according to the hazard maps published by the local governments. In some countries and regions other than Japan, as detailed hazard maps are not provided by local governments, a detailed method of analysis based on topographical and other information is under consideration for overseas factories and distribution centers.

4. Drought and water shortage

Shiseido has 13 factories in Japan, France, the United States, China, Taiwan, and Vietnam that use approximately 1.04 million m^3 of water resources annually. According to the Aqueduct[13)] provided by WRI, two of these factories in China are rated as being located in high water stress areas. On the other hand, even if water resources are abundant at present, rainfall in some areas is expected to decrease in the future due to climate change. In this section, the result of the analysis of how access to freshwater resources may change because of reduced rainfall associated with climate change and demographics and how the operations of production factories may be affected by these changes will be described.

Table 3: Water usage at factories in 2022

Water stress	Country and region	Withdrawal (m^3)
Low – Medium	Japan France US Vietnam Taiwan	937,000
High	China	102,000

According to the report *Current Status of Water Resources in Japan* [14)] published by the Ministry of Land, Infrastructure, Transport and Tourism, a survey of approximately 170 sites throughout Japan showed that water supply restrictions were implemented 590 times during the 30 years from 1991 to 2020 due to drought. Long-term water supply restrictions were imposed 40 times for 2,865 days. This means that per year, water supply restrictions are in place for 96 days. Short-term water supply restrictions are in place for 128 days per year based on the assumption of 7 days for each short-term restriction. When assuming that the percentage of factory production capacity lost due to short-term and long-term water supply restrictions is 10% and 100%, respectively, the potential drought risk for factories in Japan today can be set at 0.041% of production capacity lost. For the factories located in countries and regions other than Japan, the initial value of the drought risk in Japan was used as the standard value, and the value weighted by the Water Unavailability Factor (f_{wua})[15)] for surface water was adopted as the initial risk. The f_{wua} is a characterization factor that weights the scarcity of water resources by the size of the land area required to collect 1 m^3 of rainwater, surface water, and groundwater, respectively.

Rainfall projections were based on the relative precipitation change from 2011 to 2040 under the RCP 8.5 scenario, reported by Hanasaki *et al.*[16)] The reported data are evaluated at a spatial resolution of 0.25 degrees in latitude and longitude. Therefore, the results might differ significantly due to slight differences in location information. For this reason, we calculated the average score for each river basin and used them in this analysis. The amount of damage was calculated based on the assumption that factory operations would be suspended depending on the severity of the water shortage. In addition, the demographic change of the country or region where the factory was located was adopted as one of the explanatory variables based on the medium scenario of the United Nations demographic projections[17)] because access to water resources is also affected by the population. The effect of demographic change is weighted 1/9 compared to the effect of precipitation change.

The financial impact due to suspended factory operation was calculated for all domestic and oversea factories by the risk function with a sinusoidal curve in response to the risk factors of rainfall reduction or population increase between the thresholds where the impact becomes apparent and where the impact is maximized because the effect of the fluctuation and the buffer effect of water storage infrastructure should be taken into consideration.

The reciprocal of the standard deviation σ_N of the rainfall variability from the average rainfall in the years without long-term water supply restrictions over the past 30 years was used as the threshold at which the impact begins to become apparent. The standard deviation σ_L of the rainfall variability from the average rainfall in the year when long-term water supply restrictions were implemented is taken, and the threshold at which the impact is maximized is the amount of rainfall that decreases by an amount equivalent to $3\sigma_L$. The following formula was used to model the relative change in drought risk to initial risk, and the amount of damage caused by the suspension of manufacturing operations for each domestic and overseas factory was evaluated as the financial impact. And the sum of these was calculated as the impact of water shortages for the entire Shiseido Group.

$$f(P) = (\sin((T_{Pmin} - P)/(T_{Pmin} - T_{Pmax}) * \pi - \pi/2) + 1)/2$$
$$f(D) = (\sin((T_{Dmin} - D)/(T_{Dmin} - T_{Dmax}) * \pi - \pi/2) + 1)/2$$
$$\text{Drought impact} = \Sigma\{R_0 * (0.9 * f(P) + 0.1 * f(D))\} * S$$

P: Relative change in rainfall from 2011 to 2040
D: Population growth rate from 2011 to 2040
R_0: Initial risk magnitude
TP_{min}: Threshold for the rate of rainfall decrease at which impacts begin to become apparent
TP_{max}: Threshold of the rate of rainfall decrease at which the impact is maximized
TD_{min}: Threshold for the rate of population growth at which the impact begins to become apparent
TD_{max}: Threshold of population growth rate at which the impact is maximized
S: Sales of products shipped from the target factory

As a result, the potential financial impact of water shortages as of 2030 was projected to be about ¥3.5 billion of which the risk was assessed to be about ¥10 million less due to climate change. This is because the competition for water resources in Japan, the center of production, is expected to ease as rainfall tends to increase toward the end of the century and the population is expected to decline. On the other hand, the potential risks in China, which is currently experiencing high water stress, and in Europe, where rainfall is expected to continue to decline toward the end of the century, were rated as high, and attention should be paid to water risk management, especially in these regions. In order to manage water risk from a long-term perspective, we selected "water consumption at our business sites per net sales" as the metric and set the target as a reduction by 40% per unit of sales by 2026. We will work to mitigate the risk and reduce the impact on the watershed environment by reducing water consumption through the introduction of water-saving and reclaimed water facilities, especially at factories that use a lot of water.

In addition, as a pioneering initiative for water resource management through the Ohta River basin, the Nasu factory has begun surveying the water environment of the Nasu area. By comparing the input and output of water resources by the natural water cycle in the influencing area of the basin with the status of water intake and drainage throughout the entire basin society, including the Nasu factory, we aim to share the criterion for sustainable water resource management among the stakeholders in the basin.

5. Impacts on procurement

Many of the cosmetic raw materials purchased by Shiseido are made from plants. The precipitation change due to climate change also affects raw material production derived from agricultural harvests. Based on our actual raw material procurement results in 2021, we analyzed how much and in which regions water resources were used to grow raw material crops on the basis of water footprint methodology[18]. The sustainability of water consumption was analyzed by the precipitation change until 2100 and the demographic projections for each country and region used in the previous chapter.

As a result, we identified the material crops and locations whose cultivation would be significantly affected by climate change. These crops may make procurement impossible along with significant increases in costs. We will implement measures to avoid or mitigate the risk by changing the materials and diversifying the production areas for the material crops that might be severely affected.

Second, we analyzed the increase in procurement costs for palm oil and palm kernel oil, which are the most commonly used oilseed crops for cosmetic raw materials, because of the instability of agricultural production. First, we identified the raw materials containing ingredients derived from palm oil and palm kernel oil, such as glycerin and fatty acids, based on the actual procurement of raw materials in 2019, and calculated the total usage of palm oil and palm kernel oil. Then, we estimated the usage of palm oil and palm kernel oil for raw material production in 2030 based on our business growth scenario. Next, a regression analysis was conducted based on the monthly market transaction prices of palm oil and palm kernel oil over the past 25 years (1997–2021) to determine the average price increase, the standard deviation of the ratio of price fluctuations to the average price, and the frequency of prices exceeding the average. Based on the price trends, we forecasted the average price of palm oil and palm kernel oil in 2030 and calculated the potential price increase due to production instability caused by climate change by assuming a contribution of 0.5 from extreme weather events to the frequency of price upswings. The rate of increase in the frequency of once-every-10-year hot temperatures over land, heavy precipitation, and droughts as reported in the IPCC *6th Assessment Report* was applied to project the increase in the frequency of production destabilization. The IPCC report shows the frequency of extreme weather events in 2100. Therefore, the frequency of extreme weather events in 2030 was set for the 1.5/2° C (RCP 1.9, RCP 2.6) and 4° C temperature increases (RCP 8.5) based on the assumption of a linear increase in frequency from 2020 to 2100. We calculated the potential price increase of palm oil and palm kernel oil due to climate change by multiplying the average price, estimated procurement volume in 2030, standard deviation of the price fluctuation rate, and the frequency of extreme weather events.

$$\text{Procurement impact} = A_{2030} * P_{2030AVE} * \sigma * R_{AW}$$

A_{2030}: Expected procurement amount in 2030

$P_{2030AVE}$: Expected average price in 2030

σ: Standard deviation of the percentage change in price relative to the moving average

R_{AW}: Percentage of price upswing by extreme weather events

As a result, we estimated that the potential cost increase as of 2030 would be about ¥140 million per year due to climate impacts under the 1.5/2° C scenario and about ¥290 million under the 4° C scenario. In addition to promoting the procurement of sustainable palm oil, with regard to material crops other than oil palm, we should also be aware of the possibility that material demand might lead to higher procurement costs in the future, as well as the possibility that procurement itself might become impossible because of climate change. We will continue to analyze the financial impact and implement measures to avoid or mitigate risks, such as changing materials and diversifying production areas.

6. Geopolitical risks

In 2021, while Asian countries and regions were accelerating the phase out of coal, coupled with the economic stagnation caused by the Covid-19 pandemic, fuel shortages became apparent in Europe. The global shortage of the natural gas supply rapidly increased fuel dependence on some natural gas producing countries and regions, and this became one of the factors that triggered the military invasion. At first glance, international military conflicts and decarbonization may seem unrelated, but decarbonization is closely linked to energy security. The global expansion of renewable energy will promote local energy production for local consumption and be able to stabilize the energy supply for the long term. But in the short term, it may destabilize the balance between international energy supply and demand and result in serious financial impacts. In addition, the civil war that broke out in the Middle East region in 2011 made the acceptance of refugees a major social issue in Europe. A severe drought that lasted for several years devastated agricultural production in rural areas, and the influx of many people into urban areas is said to have been one of the causes of this civil war. A climate model analysis suggests that this drought was caused by climate change[19)]. The breakdown of risks related to such conflicts and civil wars can include the following items:

(1) Opportunity losses resulting from the suspension of production and sales activities in the countries involved in the conflict
(2) Increased procurement costs due to shortages in the supply of raw materials and energy produced in the countries involved in the conflict
(3) Decrease in sales in other countries due to stagnation of the global economy

The potential financial impact of international conflict is expected to be significant compared to other transition and physical risks. We should consider geopolitical instability and destabilization of the energy supply-demand balance as new climate-related risks, and we should also recognize that analyzing the magnitude of the potential impact and developing countermeasures are also important issues to be addressed in the future.

7. Increased sales opportunities related to climate change

In a 4° C scenario with a significant increase in temperatures, sales opportunities for products used in the summer will expand. Shiseido has elucidated the mechanism by which cool-touch ingredients, such as menthol, influence more effectively and continuously through research in the structure of the cell surface[20)]. Cool-touch products based on these findings and technologies are expected to expand the opportunities not only in Japan and Asia but also in Europe where heat waves have caused significant damage in recent years.

Furthermore, the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) announced that the amount of UV radiation reaching the ground surface in the mid-latitudes of the Northern Hemisphere is expected to increase toward the end of this century due to the various environmental factors, including climate change[21)]. The mid-latitudes of the Northern Hemisphere have many large cities with concentrated populations, such as Tokyo and Beijing. The increase in UV radiation is expected to lead to opportunities for the sale of sunscreen products or skincare products that treat skin damaged by UV rays.

In addition to these expectations, we are attempting to identify temperature-dependent consumption and consumer behaviors by a regression analysis of the relationship between temperatures and cosmetics sales performance in Japan over the past five years (2017–2021). Analyzing the relationship between weather, climate, and business is one of the key objectives of climate risk and opportunity analysis because it can lead to the acquisition of new business opportunities.

8. Risks and opportunities related to nature and biodiversity

Biodiversity and ecosystem issues are the aggregation of a myriad of problems at the local level that form a global problem, which are much different from the GHG emissions considered to have a uniform effect on change in radiative forcing. While there are many reports on the effects of economic activities and climate change on biodiversity, there are very few examples of quantitative and macroeconomic correlations between the effects of biodiversity loss on society and the economic activities of the cosmetic or personal care business sector because the conditions of biodiversity loss and the magnitude of the effects may vary depending on the region where the problem occurs. Therefore, a screening analysis was conducted to identify the dependencies and impacts related to ecosystem services of the personal care industry in accordance with ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)[22) provided by the Natural Capital Finance Alliance.

Table 4: Dependencies suggested by ENCORE and Shiseido's activities

Factor	Shiseido's activity
Dilution by atmosphere and ecosystems	Unintentional release of pollutants Release ingredients from products
Fibers and other materials	Raw material procurement
Surface water	Cultivation of raw material crops Raw materials production Manufacturing and facility cleaning Use of products
Ground water	Raw materials production Manufacturing and facility cleaning Use of products

Table 5: Impacts suggested by ENCORE and Shiseido's activities

Factor	Shiseido's activity
Water use	Cultivation of raw material crops Raw materials production Manufacturing Use of products
GHG emissions	Energy consumption Activities on the value chain
Non-GHG air pollutants	NOx, SOx, and PMs from fuel combustion
Water pollutants Soil pollutants	Eutrophication, acidification, heavy metal
Solid waste	Waste from our business Waste from sold products

The results indicate that the impacts of raw material procurement and production activities should be considered from the perspective of both the dependencies and impacts on ecosystem services. Since the impact of water resources used in production activities overlaps with the risk of drought and water shortages as climate change-related risks, the results of the assessment of land occupation and water resource consumption at the raw material procurement stage and the biodiversity impacts at our production sites will be described in the following sections.

9. Biodiversity impacts due to raw material procurement

In general, cosmetic raw materials, such as surfactants and moisturizers, are classified as chemicals, but many of them actually are made from bio-based resources for all or part of their ingredients. Since many materials, such as paper and bio-based plastics, are also made from bio-based resources for packaging, it is important to analyze the characteristics of individual ingredients and their regional characteristics in order to procure raw materials that have a large biodiversity impact. For this reason, TNFD recommends the LEAP approach as a way for investigating nature-related risks/opportunities.

Table 6: LEAP approach

L Locate	Understand the relationship between business activities and nature, including local characteristics
E Evaluate	Analyze the magnitude of the impacts on nature from business and the dependencies on nature
A Assess	Identify the risks/opportunities with double materiality method from a perspective of dependencies and impacts
P Prepare	Set metrics and targets to manage risks/opportunities for nature conservation and restoration, and disclose the efforts

As part of the "L" and "A" investigations in the LEAP approach, based on the molecular structure of ingredients used in cosmetic ingredients, we identified raw materials derived from the bio-based resources of fats, oils, fatty acids, sugars, and alcohols that are used in the production of ingredients and estimated the amount of crop inputs for the agricultural crops that serve as raw materials. Since it is important to identify the regions where these crops are grown in order to assess the biodiversity impact, we mapped the producing countries and regions for each major agricultural crop related to our procured raw materials based on the results of interviews with suppliers, FAOSTAT[23], and the market price of crops. Based on that, we calculated the area of land transformation, land occupation, and water consumption.

We are focusing on these items as candidates for the metrics to measure the biodiversity impact of our business activities, and we are currently developing a plan to conduct a more detailed analysis and mitigate the impact.

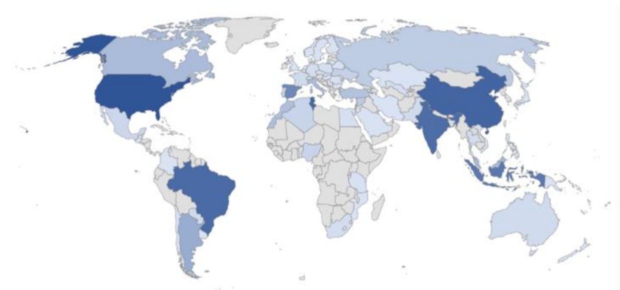

Figure 2: Area of land occupation for material crop production

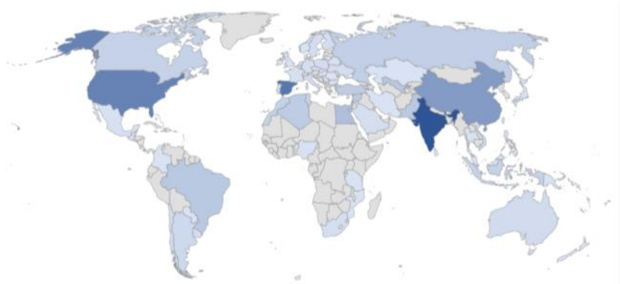

Figure 3: Consumption of irrigation water for material crop production

10. Impacts on biodiversity of land occupation of our business sites

Although the relative degree of impact is small, approximately 1% of the entire value chain, we recognize the importance of understanding and minimizing the impact of land occupancy on our own sites on biodiversity from the perspective of land manager responsibility. We, therefore, conducted a study of the relationship between the location of production sites with large areas of exclusive use among our own sites and the habitats of endangered species using the WWF Biodiversity Risk Filter[24] and the J-BMP (Japan Biodiversity Mapping Project)[25] provided by ThinkNature, Inc.

As a result, it was confirmed that in Japan, the areas surrounding the Kakegawa and Osaka-Ibaraki factories have high populations of endangered species of vascular plants and freshwater fishes, respectively. In addition to these plants and vertebrates, in France, where the Gien and VDL factories operate, there has been concern in recent years about the decline in the number of honeybees. In order to solve this region-specific problem, the factory stopped the use of pesticides on its premises and installed beehives in the factory to protect the bees. In the future, we will promote the consideration of initiatives to preserve the ecosystem, including endangered species, at other sites by utilizing green areas and water ponds at the sites in accordance with region-specific conditions.

Table 7: Condition of biodiversity and endangered species habitat around production sites

	Country/ Region	Condition of Biodiversity	Physical Biodiversity Risks	Endangered species around site
Kakegawa	Japan	7	6	Vascular plants
Osaka		5	6	Freshwater fishes
Ibaraki		5	6	—
Nasu		6	5	—
Kurume		6	8	—
Kuki		8	7	—
Gien	France	5	9	Under investigation
VDL		5	9	
SAI	USA	6	7	
SLC	China	9	10	
SZC		9	9	
TS	Taiwan	7	7	
SVI	Vietnam	9	9	

11. Organizing the relationship between factors

The risk and opportunity factors related to climate and nature are not independent variables but are intricately interrelated. For example, climate change can be a direct business risk factor in that it increases the probability of weather disasters, such as large-scale typhoons, while rising temperatures can also increase supply chain vulnerability indirectly by destabilizing agricultural production through ecosystem impacts, such as the loss or displacement of habitat for temperature-sensitive organisms like honeybees. Conversely, the relationship of cause and effect can be reversed because deforestation with biodiversity loss leads to releasing the carbon stored in the soil, which accelerates climate change.

Therefore, focusing on the factors identified in the previous section, we organized the nexus among the physical and transitional factors related to climate change, biodiversity and ecosystems, water, and resources. Then, we classified the risks and opportunities in the short term (3–5 years), medium term (5–10 years), and long term (more than 10 years) based on the time scale in which each related event becomes apparent in the future. Understanding the relationships among these factors is essential for appropriate action, and we will continue to analyze these factors for a comprehensive understanding of risk and opportunity.

Table 8: List of climate- and nature-related risks and opportunities

Risk / Opportunity	Cause	Classification	Time scale: Short term	Time scale: Mid term	Time scale: Long term
Employee health damage	Temperature rising	Climate change (Physical)			+
Relocation of business site	Sea level rising	Climate change (Physical)			+
Declining real estate value	Sea level rising	Climate change (Physical)			+
Supply chain disruption	Floods	Climate change (Physical)			+
Increased procurement cost	Floods, droughts, agricultural production, resource depletion	Climate change (Physical), Water, Resource			+
Increased operating cost	Droughts, resource depletion	Climate change (Physical), Water, Resource			+
Suspension of production	Floods, droughts	Climate change (Physical), Water			++
Flood damage to facilities	Floods	Climate change (Physical)			++
Increased insurance costs	Floods, sea level rising	Climate change (Physical)			+
Disruption of logistics	Floods	Climate change (Physical)			+
Suspension of sales activities	Floods, geopolitics	Climate change (Physical)	++	++	++
Increased/decreased product sales	Temperature rising, market change	Climate change (Physical), Climate change (Transitional), Biodiversity		+	++
SCC burden	Carbon tax, adaptation costs	Climate change (Physical), Climate change (Transitional)	+	+	+
Renewal of energy equipment	Regulation, technology, market change	Climate change (Transitional)		+	+
Sustainable packaging	Regulation, technology, pollution	Climate change (Transitional), Biodiversity		+	+
Regulation for ingredient	Pollution	Climate change (Transitional), Biodiversity	+	+	++
Sustainable brand/product development	Market change	Climate change (Transitional), Biodiversity		+	++
Additional disclosure items	Land-based GHG emissions	Climate change (Transitional), Biodiversity	+	+	+
Loss of innovation opportunities	Loss of genetic resources	Biodiversity			+

12. Specifying the magnitude of impacts and the hotspots on the value chain

In the previous chapter, the relationship between risk and opportunity factors related to climate and nature was organized into four levels: impact drivers by Shiseido's activities, natural phenomena, social transition, and impacts on Shiseido. However, the magnitude of the impact and the dependency between factors are not uniform. In particular, the factors of biodiversity are related to land use and pollution in a complex manner, and their relationships are influenced by region-specific circumstances, such as weather condition or habitat, making it extremely difficult to determine the degree of impact from each factor.

In general, indirect GHG emissions upstream and downstream of the value chain account for most of the total emissions, and the importance of reducing these emissions has been recognized. On the other hand, the demand to assume responsibility for reducing emissions from fuel and electricity consumption within a company is strong regardless of the amount of emissions. Similarly, in the case of biodiversity, management responsibility for one's business sites and the surrounding environment is recognized as important regardless of the magnitude of the impact, while it is expected that indirect impacts in the value chain will be prioritized based on the severity of the impact and that efforts will be required for maintenance, management, conservation, and restoration. Therefore, it is important to logically estimate the magnitude of indirect impacts on biodiversity loss by factor in order to identify targets for protection and to set metrics and targets.

For the purpose of a comprehensive and quantitative understanding of the magnitude of environmental impacts related to climate and nature associated with business activities, an organizational life cycle assessment (LCA) by LIME 3[26-34] was carried out based on the activity data of the Shiseido Group for 2021. LIME 3, which uses vascular plants with a population parameter of 300,000 species as a model creature, provides the expected increase in the number of extinct species per 1000 species per 1000 years as an endpoint impact of biodiversity loss.

The LCA results indicated that the hotspot for biodiversity impacts is at the procurement stage, and that most of the impacts are caused by land transformation associated with the cultivation of material crops, such as oilseeds and grains used for raw material production. It suggests the importance of collecting and analyzing more detailed information on the agricultural impacts in raw material procurement in order to understand the impacts of biodiversity loss. An integrated analysis using the G20 population-weighted average willingness-to-pay showed that the externalized costs due to environmental impacts generated from annual business activities were valued at *US$227 million of which *US$58 million was related to GHG emissions, *US$109 million was for water resources, and *US$3.0 million was for biodiversity. The TNFD requires companies to address both perspectives of the *dependencies* and the *impacts* on natural capital. In addition, environmental taxes, including the carbon tax described below, are schemes that aim to internalize the externalized social costs caused by environmental impacts to the parties that generated the impacts. The integrated score presented by LIME 3 can be interpreted as reference values to verify the relevancy of the nature-related financial impact and of the expected burden from environmental taxes since it can be considered a proxy of the socially implicitly agreed-upon cost to avoid damage from the environmental impacts.

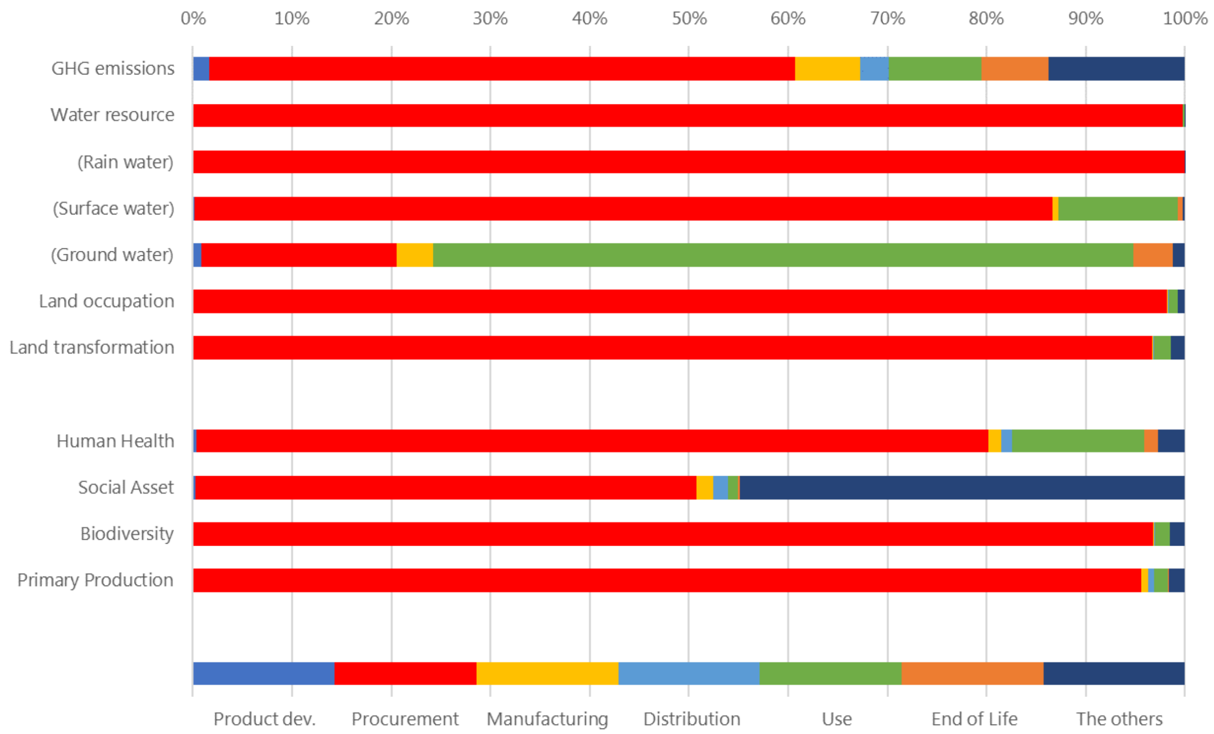

Figure 4: Environmental impacts through Shiseido's value chain

The role of pollinators, such as honeybees, and weevils in the production of agricultural products is well known as one of the most important dependencies on nature. The Food and Agriculture Organization of the United Nations (FAO) has proposed some methods for calculating the value of pollinators[35)]: one is an evaluation method based on the additional cost when pollinators are replaced by other pollinators or labor, and the other is based on the amount of loss resulting from changes in supply and demand when the work of pollinators is lost. This can be interpreted as the impacts of the business risk by biodiversity loss and inadequate functioning of ecosystem services by pollinators. Therefore, for the purpose of quantifying biodiversity-related risks, we estimated the number of crops required to produce raw materials based on the actual procurement volume in 2021, and the dependence on pollinators was calculated using the FAO methodology. As a result, the dependence on pollinators was estimated to be about ¥5 billion per year.

On the other hand, these services provided by pollinators are only part of the dependence on biodiversity. If plant seeds attempt to germinate under sterile conditions with a significant lack of biodiversity, they can easily be killed by fungi if they are inadvertently introduced. The fact that plants can germinate and grow in soil inhabited by many different varieties of bacteria and fungi is a benefit of biodiversity that has created a well-balanced state of competition among different organisms. Most of our products contain plant-derived ingredients, and in a broad sense, all of our sales depend on biodiversity. It is important to develop a more comprehensive understanding of both *dependence* and the *impact* on biodiversity, as well as to promote quantitative assessments.

*Because LIME3 adopts the US$ as the unit of endpoint assessment, the results are shown in US$.

Risk management

We assessed and identified the impactful risks holistically from a mid-to-long-term perspective. “Environment and Climate Change” and “Natural and Human-made Disasters” are listed as the categories related to sustainability.

Climate-related risks are analyzed based on scientific and socioeconomic evidence and integrated into the enterprise risk management system as one of the elements related to climate change or natural disasters. Based on the significance of the evidence, the Shiseido Group’s risk assessment and countermeasures are reviewed by the Global Risk Management & Compliance Committee, the Global Strategy Committee, and the Board of Directors.

Metrics and Targets

In 2021, the IPCC declared in its *6th Assessment Report* that it was unequivocal that human influence had warmed the atmosphere, oceans, and land and announced its prediction that the temperature increase would exceed 1.5° C around 2030. In response, the Glasgow Climate Pact, which agreed to limit the increase in global average temperature to 1.5° C or less compared to pre-industrial levels, was adopted at COP26. The Pact can be interpreted as countries all over the world recognize “the toward net-zero emissions” as a common goal. As society moves toward decarbonization, there is no doubt that our business environment will also be greatly affected. Shiseido has continuously promoted initiatives to reduce GHG emissions as a pillar of our environmental activities since the publication of our first *Environmental Report '97* in 1998.

In this chapter, our transition plan for decarbonization and biodiversity conservation is described along with the metrics and the targets for risk and opportunity management and confirmation of the effectiveness of the activities. The plan will be added or modified when longer or more concrete action will be planned, and we will ensure transparent disclosure. For other climate- and nature-related factors not shown below, we will consider setting appropriate metrics and targets depending on the magnitude of the impact from a long-term risk management perspective.

1. GHG emissions and renewable energy

About 60% of the energy-derived GHG emissions come from production at our factories. We use the latest IT technologies, such as energy management systems, to reduce unnecessary energy consumption and visualize GHG emissions from our production processes. This allows us to educate and motivate employees to save energy at our sites. At the same time, we aim to switch 100% to renewable energy-derived electricity by 2030. Regarding GHG emissions, we set the science-based target of 46.2% reduction for Scope 1 and Scope 2 GHG emissions, and 55% reduction by 2030 in terms of economic intensity along the 1.5° C trajectory.

Shiseido aims to reduce GHG emissions throughout the value chain by working with our suppliers and other stakeholders on introducing renewable energy into our supply chain, preventing deforestation related to raw material production, and developing and implementing new social models for the efficient collection and recycling of a wider range of materials, as well as our own efforts for selecting raw materials based on green chemistry principles, replacing with plant-derived materials, reducing packaging weight by expanding refilling and design optimization, making packaging recyclable, reducing energy consumption, and expanding renewable energy at our sites.

Table 9: GHG emissions of Shiseido

(t-CO_2e)

			2019 (Base year)	2022
Scope 1			27,036	23,912
Scope 2	Market-based		51,714	22,527
Scope 3	1	Purchased products and services Land use change related to raw material procurement*1	644,000 (563,000) *2	473,000 458,000
	2	Capital goods	231,000	150,000
	3	Fuel- and energy-related activities	15,600	9,500
	4	Upstream transportation	110,000	67,500
	5	Waste treatment generated from business	20,700	15,500
	6	Business travel	14,600	2,440
	7	Employee commuting	5,390	7,520
	8	Upstream leased assets	0	0
	9	Downstream transportation	(252,000) *2	87,000
	10	Processing of sold products	0	0
	11	Use of sold products	1,580,000	143,000
	12	Waste treatment of sold products	148,000	94,600
	13	Downstream leased assets	0	0
	14	Franchises	0	0
	15	Investments	(4,250) *2	2,770

*1 Indirect emissions related to land transformation were added after 2021 assessment.

*2 Retroactive calculation results for 2019 are shown in brackets.

2. Raw material procurement

Raw material procurement is the largest contributor to our carbon footprint. We recognize the importance of reducing GHG emissions related to raw material procurement through collaboration with our suppliers. Some raw materials generate significant indirect emissions upstream of the supply chain. Palm oil and palm kernel oil, which are one of the most important oilseed crops for food and daily necessities, as well as cosmetics, are derived from oil palms grown in Southeast Asia. Oil palm plantations are often developed and cause deforestation and significant loss of biodiversity. According to a report by Germer *et al.*[36], when 1 hectare of tropical rainforest is developed to create a plantation, 777 to 1,443 t-CO_2e of GHG will be released from the ground over the next 25 years. In order to prevent GHG emissions associated with such land use changes and to conserve the precious rainforest ecosystem, Shiseido aims to switch all cosmetic ingredients directly purchased to RSPO-certified ingredients by 2026. The GHG emissions that can be reduced by this initiative are estimated as approximately 70,000 t-CO_2e per year for oil palm-derived cosmetic raw materials. In 2022, we switched 36%(w/w) of oil palm-related raw materials to the mass balance-based RSPO-certified raw materials.

In the future, as with oil palms, we will continue to investigate the environmental impact of raw materials due to land use changes for other bio-based ones. Also, we will make efforts to minimize our impact on the climate and ecosystems by switching to sustainable procurement.

3. Saving water

Water is an essential resource in all aspects of cosmetics, including the cultivation of crops used as raw material ingredients, heat transfer medium during production, cleaning, and product use, as well as an important raw material for cosmetics. Climate change is expected to affect atmospheric circulation on a global scale, resulting in significant changes in rainfall conditions. In addition, glaciers in the Himalayas and the European Alps, which are water sources for Asia and the European region, are expected to recede due to rising temperatures. Because of the effects of climate change, there are regions that currently have abundant water resources but will face the threat of droughts in the future. Therefore, in order to make effective use of water resources and mitigate water risks caused by climate change, we are promoting water saving activities, especially at production plants with high water consumption, with the goal of reducing the amount of water consumption at our sites by 40% per sales by 2026 compared to 2014 levels. In addition to saving water by optimizing equipment cleaning and reviewing manufacturing processes, our factories in France, which are particularly interested in water issues, have set their own targets and are working on initiatives to reuse water once used and switch from water to alcohol cleaning for fragrance product manufacturing equipment. As a result, the factories achieved water savings of more than 60% per unit of bulk production compared to 2009.

4. Product development

As the transition to a decarbonized society, consumer awareness of climate and environmental issues is expected to increase more than ever. Responding flexibly to these changes in consumer awareness is critical to the sustainability of our business. We aim to replace all plastic cosmetics packaging with reusable, recyclable, or biodegradable materials by 2025. Shiseido developed and provided a variety of solutions for packaging since the launch of the first refillable face powder in 1926. Shiseido declares that it will optimize packaging design, select appropriate materials, and implement the concept of global reuse by refillable and replaceable products for consumers. In addition to these efforts, we will also work to reduce GHG emissions through innovation for a sustainable future by developing new materials using algae and new chemical recycling methods that can regenerate various types of plastic.

5. Disclosure

Shiseido supported the TCFD and disclosed the result of climate-related risk analysis based on the TCFD framework. In preparation for a decarbonized society, we compiled our climate-related goals, scope, and initiatives into a transition plan. We are disclosing climate-related information through our responses to the CDP, as well as our website, *Integrated Report*, and *Sustainability Report*. Our disclosure on Scope 1, Scope 2, and Scope 3 GHG emissions are verified by the independent third party verification organization, SGS Japan, to ensure transparent disclosure. In addition, our target on mitigating climate change is certified as the science-based target along the 1.5° C trajectory by SBTi. Regarding renewable electricity, we have joined RE100 to promote the introduction proactively.

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