

Reframing Clean Beauty: Governance, Transparency, and Biodiversity-Related Practices in the Global Cosmetics Sector with Implications for Japan

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Abstract

The rapid global expansion of clean beauty, which relies extensively on natural capital, raises questions about its environmental impact, particularly in relation to biodiversity conservation. While the industrial demand for natural ingredients continues to rise, empirical assessments linking clean beauty practices and biodiversity outcomes remain limited. This study presents an exploratory, governance-oriented assessment of biodiversity-related practices among clean beauty brands, based on publicly available disclosures. This study develops a quantitative scoring framework for evaluating 10 major international and Japanese clean beauty brands using a small-10 pilot design across five domains: (1) sustainable sourcing, (2) biodiversity conservation initiatives, (3) supply-chain traceability, (4) ESG disclosure, and (5) environmental innovation. Japan's comparison is institutionally motivated. The results indicate that biodiversity performance is determined less by the use of natural ingredients or market scale and more by governance mechanisms, such as structured sourcing programs, third-party certifications, and transparent reporting systems. International brands consistently outperform Japanese brands, reflecting stronger institutional environments and higher biodiversity literacy abroad. In contrast, domestic brands showed lower disclosure levels and greater performance variance, partly due to weaker national standards and limited public awareness of biodiversity issues. The findings suggest that clean beauty should be reframed not as a category defined by naturalness, but as a governance model that enables coexistence with nature. In addition to standardisation by industry organisations, policy implications include the need for standardised biodiversity metrics in Japan and potential governmental support, such as subsidies to help small- and medium-sized enterprises obtain internationally recognised sustainability certifications. Future research should integrate and evaluate industry standards and life-cycle assessment to assess biodiversity impacts in the cosmetics sector.

Keywords Clean Beauty · Biodiversity Conservation · Biodiversity Governance · Sustainable Sourcing · Supply-chain Traceability · Cosmetics Industry

1. Introduction

1.1. Background and Research Gap

While early discourse on clean beauty emphasised safety and “naturalness,” recent sustainability debates have shifted toward more systemic concerns, particularly biodiversity loss and the ecological consequences of raw material extraction (Stern, 2023; Wirtu, 2024; Irie, 2025). As global ecosystems face accelerating degradation,

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a key question arises: Does the growth of clean beauty cause biodiversity pressure, or can it function as a nature-positive production model?

Despite the rapid expansion of the clean beauty market, empirical assessments linking brand-level sustainability practices to governance-based biodiversity performance proxies are limited. Most existing literature focuses either on consumer perceptions or general environmental performance indicators (Limbu et al., 2023; Greco et al., 2024; Rocca et al., 2022; Perret et al., 2025), with scarce attention paid to biodiversity governance, traceability systems, or conservation strategies integrated into supply chains. This gap prevents a clear understanding of whether the increased demand for natural ingredients necessarily translates into environmental harm.

Given the limited availability of standardised biodiversity metrics and ecological impact data at the brand level, this study adopts an exploratory design focused on governance structures, transparency, and sourcing practices as proxies for biodiversity-related performance.

1.2. Reframing Clean Beauty: From Naturalness to Governance

While early discourse on clean beauty primarily emphasised product safety, ingredient transparency, and the avoidance of potentially harmful chemicals, the concept has gradually expanded in response to broader sustainability challenges. In particular, growing concerns over biodiversity loss, land-use change, and resource depletion have shifted attention from product-level attributes to the systemic conditions under which cosmetic ingredients are sourced, processed, and governed.

In many markets, clean beauty has historically been associated with notions of “naturalness,” often operationalised through additive-free formulations, plant-derived ingredients, or the exclusion of synthetic substances. However, these attributes alone provide limited insight into environmental performance. Natural ingredients, when sourced without adequate governance, may exert equal or greater pressure on ecosystems through overharvesting, habitat degradation and opaque supply chains. Consequently, scholars and practitioners increasingly argue that the sustainability of clean beauty products cannot be assessed solely based on ingredient origin, but must instead be evaluated through the institutional arrangements that shape sourcing practices.

This shift reflects a broader transition in sustainability research from input-based claims to governance-oriented frameworks. Certifications such as UEBT, FairWild, COSMOS/ECOCERT, and B Corp exemplify this evolution by emphasising traceability, supplier engagement, biodiversity risk management, and third-party verification. From this perspective, clean beauty is better understood not as a static product category, but as a governance model that structures relationships between companies, ecosystems, and communities across the value chain.

Reframing clean beauty in this manner is particularly important for examining biodiversity-related risks. Biodiversity impacts are rarely visible at the product level and cannot be directly inferred from natural origin ratios or marketing claims. Instead, they are mediated by organisational systems, including sourcing standards, monitoring mechanisms, disclosure practices, and accountability structures. Consequently, governance quality is a critical proxy for assessing how effectively brands manage biodiversity-related risks within complex global supply chains.

1.3. Japan as a Strategic Context for Biodiversity Governance in Clean Beauty

Japan represents a strategically important context for examining the cosmetics sector’s biodiversity governance. Despite being a major market for clean and “additive-free” cosmetics, Japan lags behind the EU and North America in institutionalising biodiversity-related disclosure and regulatory frameworks. While international initiatives such as the EU Deforestation Regulation and TNFD are shaping corporate expectations elsewhere, biodiversity governance in Japan remains largely voluntary and weakly standardised.

This institutional gap is particularly consequential for the cosmetics industry, which relies heavily on natural capital, including plant-, mineral-, and marine-derived raw materials. Therefore, biodiversity degradation poses not only ecological risks but also long-term supply chain and resource security risks for the sector.

Moreover, in the Japanese market, clean beauty did not exist on its own; similar concepts, such as 'additive-free' and low-irritation cosmetics, were the ones through which consumers recognised safety as important. Since the concept of clean beauty was introduced, biodiversity considerations have remained peripheral in both corporate communication and consumer awareness.

This combination of high natural resource dependency, limited biodiversity governance, and consumer discourse centred on safety rather than ecological sustainability makes Japan a critical case for examining how clean beauty can be reframed as a governance-based model for coexistence with nature.

Conceptual reframing provides the foundation for the present study. Rather than attempting to measure direct ecological outcomes, which would require extensive ecological field data, this study evaluates the maturity of biodiversity-related governance among clean beauty brands. By comparing international and Japanese brands, this study seeks to clarify how differences in institutional environments, disclosure norms, and sustainability frameworks shape the capacity of clean beauty brands to align with biodiversity conservation objectives.

1.4. Research Objectives and Hypotheses

This study does not directly measure biodiversity outcomes; instead, it proposes a governance readiness assessment framework. This study reframes clean beauty not as “naturally derived” but as a governance system that enables coexistence with nature. It introduces a unique biodiversity governance evaluation framework that is applied to 10 domestic and international clean beauty brands. Through quantitative scoring of sourcing practices, transparency mechanisms, certifications, and biodiversity conservation initiatives, the study tests three hypotheses:

1. **H1:** Clean beauty brands demonstrate varying levels of biodiversity-related practices, as reflected by differences in governance structures, disclosure quality, third-party certification, and sourcing transparency.
2. **H2:** A higher market presence of clean beauty brands does not correlate with lower biodiversity governance performance when structured sourcing and transparency mechanisms are in place.
3. **H3:** Transparent and traceable sourcing processes mitigate biodiversity risks.

By repositioning clean beauty within a nature-positive paradigm, this study, through a small 10-pilot design, contributes a conceptual and empirical foundation for understanding how governance structures—rather than “naturally delivered”—shape environmental outcomes. The findings offer insights for industry stakeholders, policymakers, and international standard-setting bodies seeking to align cosmetic sector practices with global biodiversity goals.

1.5. Positioning This Study: Clean Beauty as Biodiversity Governance

Building on recent scholarly discussions of biodiversity governance, biodiversity risk, and nature-positive business models, this study approaches clean beauty not as a product category defined by “natural” ingredients but as an organisational and institutional system that shapes how cosmetic brands interact with natural capital. Prior research has emphasised consumer perceptions or broad environmental indicators. However, comparatively little attention has been paid to brand-level governance structures that mediate biodiversity-related risks within cosmetic supply chains, particularly in biodiversity-dependent consumer goods industries such as cosmetics.

Against this backdrop, the present study positions biodiversity outcomes not as directly measured ecological impacts but as governance-related capacities reflected in sourcing practices, transparency mechanisms, and third-party certifications. Focusing on a purposive sample of international and Japanese clean beauty brands, this exploratory analysis assesses differences in biodiversity-related governance readiness and examines how institutional contexts shape corporate practices. Therefore, the following section establishes the theoretical foundations of biodiversity governance and related practices, which inform the analytical framework applied in this study.

2. Theoretical Background and Biodiversity-Related Practices

2.1. Biodiversity Governance, Risk, and Nature-Positive Frameworks

Recent literature emphasises that biodiversity conservation increasingly depends on governance structures, institutional arrangements, and disclosure practices rather than product attributes or voluntary environmental claims. Biodiversity governance is broadly understood as a set of policies, standards, monitoring mechanisms, and accountability structures through which public and private actors manage the impacts on ecosystems and natural capital (Visseren-Hamakers et al., 2025; Hutchinson et al., 2026).

A growing body of literature highlights persistent “implementation gaps” between biodiversity commitments and measurable outcomes. Ferraro and Failler (2024) demonstrated that despite the proliferation of international frameworks and corporate sustainability strategies, biodiversity governance often remains fragmented, with weak enforcement and limited integration into operational decision-making. This gap is particularly pronounced in sectors such as cosmetics, which are reliant on biological resources, where supply chains are complex, and biodiversity impacts are indirect and spatially dispersed.

In response, recent studies increasingly frame biodiversity risk not solely as ecological degradation but as an organisational and governance challenge. Biodiversity risk is defined as the exposure of companies and supply chains to material, regulatory, reputational, and operational risks arising from ecosystem degradation, resource depletion, and the loss of ecosystem services (Anthropocene Science, 2022). From this perspective, biodiversity risk management relies heavily on transparency, traceability, and standardised reporting rather than on direct ecological impact measurement alone.

Parallel to this shift, the concept of “nature-positive” business practices has gained prominence in the literature. Nature-positive strategies are not limited to minimising harm but aim to embed ecosystem restoration, regenerative sourcing and long-term stewardship into corporate decision-making. Reviews of corporate biodiversity disclosure underscore the growing role of frameworks, such as the Task Force on Nature-related Financial Disclosures (TNFD), in encouraging firms to assess their dependencies, impacts, risks, and opportunities related to nature (Senanayake et al., 2024). However, the literature cautions that current disclosure practices largely rely on governance and process indicators rather than direct biodiversity outcomes, reflecting ongoing methodological and data limitations.

Several reviews have noted that biodiversity information disclosure remains uneven across regions and industries. Kawahara (2023) highlights challenges related to measurement complexity, lack of harmonised indicators, and limited third-party verification, which collectively constrain the comparability and reliability of biodiversity-related reporting. These constraints are particularly relevant in national contexts where regulatory guidance and disclosure norms are still evolving (e.g., in Japan).

Taken together, this literature supports an analytical approach that evaluates biodiversity performance through governance readiness, transparency, and institutional alignment, rather than through claims of direct ecological outcomes. Accordingly, this study positions biodiversity governance as a proxy for companies’ capacity to manage biodiversity risks and align with emerging nature-positive frameworks while explicitly acknowledging that such assessments do not constitute direct measurements of ecological impact.

2.2. Evolution of the Clean Beauty Concept

The notion of “clean beauty” has evolved substantially over the past two decades. Earlier definitions centred predominantly on natural or non-synthetic ingredients (i.e., no additives such as synthetic fragrances, synthetic colourants, preservatives, synthetic surfactants, and alcohol), reflecting consumer interest in botanical formulations and the avoidance of perceived chemical risks. Within the Japanese cosmetics sector, this product category is commonly referred to as “additive-free cosmetics,” a classification that has achieved notable market traction, particularly among individuals with sensitive skin and consumers seeking formulations with reduced irritancy. However, the recently expanded globally to encompass a broader sustainability paradigm that includes environmental footprint reduction, fair labour practices, circular packaging solutions, and biodiversity conservation. The clean beauty framework may be articulated across five principal domains: (1) ingredient transparency and toxicological safety, (2) regulatory and functional positioning of synthetic chemical inputs, (3) ecologically responsible raw-material procurement, (4) corporate responsiveness to social and ethical concerns, and (5) implementation of environmentally sustainable packaging systems (JCLA, 2025).

Alviri et al. (2025) noted that this evolution corresponds to a shift from product-level claims to systemic sustainability innovation within the cosmetics value chain. Consequently, clean beauty is increasingly positioned not as a promotional construct but as an emerging paradigm of sustainable beauty that integrates environmental responsibility, ethical sourcing, and transparent governance into the core brand strategy.

2.3. Biodiversity in the Global Cosmetics Industry

Biodiversity plays a foundational role in sourcing cosmetic ingredients, particularly given the industry's extensive reliance on plant-derived oils, extracts, waxes, and resins. The ecological implications of harvesting such materials vary widely depending on agricultural practices, wild collection methods, land-use intensity, and governance of local ecosystems. From a supply chain perspective, biodiversity considerations intersect with traceability, resilience, and equitable benefit-sharing issues. International conservation frameworks, such as the Convention on Biological Diversity (CBD) and the Nagoya Protocol, have increasingly emphasised sustainable use and fair access to genetic resources. In this context, cosmetic companies face both regulatory pressure and growing consumer expectations to demonstrate responsible stewardship of biodiversity.

International cosmetic brands identifying themselves as “natural” have historically incorporated sustainability-oriented certification schemes, such as organic farming, fair trade, and cruelty-free, in response to global environmental concerns and the imperative of ecosystem conservation. Such certification frameworks can be positioned as biodiversity-related accreditation mechanisms in the cosmetics industry (Takai and Nagai, 2023).

In recent years, the cosmetics industry has increasingly integrated biodiversity considerations into raw material sourcing, with one of the most recognised frameworks being certification by the Union for Ethical BioTrade (UEBT)². Since 2018, pioneering nature-focused brands such as Weleda and Natura have obtained UEBT certification (Weleda, 2025a; 2025b), marking a significant shift toward transparent and biodiversity-positive supply chain governance. This movement has since expanded beyond finished-goods brands to upstream ingredient suppliers, including Sederma (Smedley, 2022), Lucas Meyer Cosmetics (LMC, 2022), and BASF Beauty Care Solutions (BASF, 2025), indicating a broadening institutionalisation of biodiversity standards across the value chain. Premium brands, such as Guerlain, have begun applying UEBT processes to specific sourcing channels, positioning biodiversity governance as an emerging element of high-value brand strategy (Pentol, 2021). Collectively, these developments illustrate a transition from product-level claims, such as “natural” or “organic”, to system-level sustainability practices that encompass land-use management, community engagement, and ecosystem protection. The growing uptake of UEBT certification thus serves as a key indicator that biodiversity-aligned sourcing is becoming increasingly embedded in the global cosmetics sector.

In addition, FairWild³, a certification that can serve as a benchmark for biodiversity, serves as an international benchmark for biodiversity, and is designed to ensure the sustainable and ethical harvest of wild plant resources, including medicinal and aromatic plants. In the cosmetics sector, FairWild adoption has gradually expanded since the late 2000s, particularly among ingredient suppliers, fragrance manufacturers, and natural beauty brands. Recent cases, such as IFF-LMR's certification⁴ for Peru Balsam⁵ (IFF, 2019) and Expanscience's FairWild-certified Schisandra supply chain (Premium Beauty News, 2022), illustrate the increasing integration of wild-harvest sustainability standards into the cosmetics value chain.

² UEBT is non-profit organization dedicated to promoting the sustainable sourcing of natural resources, conserving biodiversity, and ensuring the fair distribution of benefits. UEBT emphasizes environmental conservation and respect for human rights while promoting sustainable business practices. In particular, it provides companies with a rigorous certification process to address ethical ingredient sourcing issues in the cosmetics industry.

³ The FairWild Standard is an international standard that certifies plants harvested in a sustainable manner. This standard promotes the use of natural ingredients found in medicines, fragrances, and food, while emphasizing the conservation of wild plants and fair trade.

⁴ Certification that proves compliance with specific technical or quality standards (IFF, 2019)

⁵ A resin native to Peru, mainly used for fragrances and medicinal purposes. It is found in Central and South America and has been used since ancient times to treat wounds, rheumatism, and colds. Balsam of Peru has a sweet scent and is widely used in perfumes and cosmetics. It also has antibacterial and anti-inflammatory properties, making it effective for skin care. (IFF, 2019).

The certification emphasises ecosystem protection, traceability, and fair compensation for wild collectors, thereby functioning as a biodiversity-focused assurance scheme that goes beyond conventional natural or organic labels. While the number of licensees is growing globally, certification remains limited by its focus on wild-harvested plants and the relatively high costs associated with compliance. Despite these constraints, FairWild represents a notable institutional mechanism for operationalising biodiversity conservation within cosmetic raw material sourcing and provides a relevant benchmark for evaluating nature-positive governance among international clean beauty brands.

2.4. Existing Frameworks and Certification Schemes

Several third-party standards have emerged as mechanisms for evaluating sustainability and biodiversity performance within the sector. Takai and Nagai (2023) showed that the cosmetics industry is closely connected to biodiversity, and certifications that support it are highly valued globally. ESG disclosure frameworks offer high-level indicators related to environmental and social governance, but often lack specificity for ingredient-level impacts. More targeted systems include the following:

- Union for Ethical BioTrade (UEBT): emphasising ethical sourcing, traceability, and biodiversity conservation,
- FairWild: focusing on the sustainable harvesting and trade of wild-collected plant materials,
- COSMOS/ECOCERT: providing criteria for organic and natural cosmetics, including restrictions on petrochemical inputs and requirements for ecological processing,
- B Corp Certification: assessing companies across governance, environmental performance, and community impact, with biodiversity included as a discrete criterion.

Although these frameworks vary in scope and rigour, they collectively contribute to raising baseline expectations for sustainable sourcing and corporate transparency. Although few empirical studies have quantitatively examined biodiversity-related practices across clean beauty brands, these frameworks can be examined.

2.5. Development of Hypotheses

Building on these theoretical and empirical insights, the present study formulates the following hypotheses for evaluation:

- H1: Clean beauty brands demonstrate measurable biodiversity-conscious practices, as reflected in transparent reporting, third-party certifications and traceability initiatives.
- H2: The expansion of clean beauty markets does not necessarily imply an increased biodiversity risk, as long as sustainable sourcing practices and governance mechanisms are in place to mitigate resource pressure.
- H3: Higher levels of transparency and traceable procurement processes are associated with lower biodiversity risk and function as safeguards against unsustainable extraction and supply chain opacity.

3. Methodology

Figure 1 summarises the conceptual structure of this study, illustrating how the clean beauty discourse is linked to international governance frameworks and operationalized through the proposed scoring methodology. Further details are provided in the following sections.

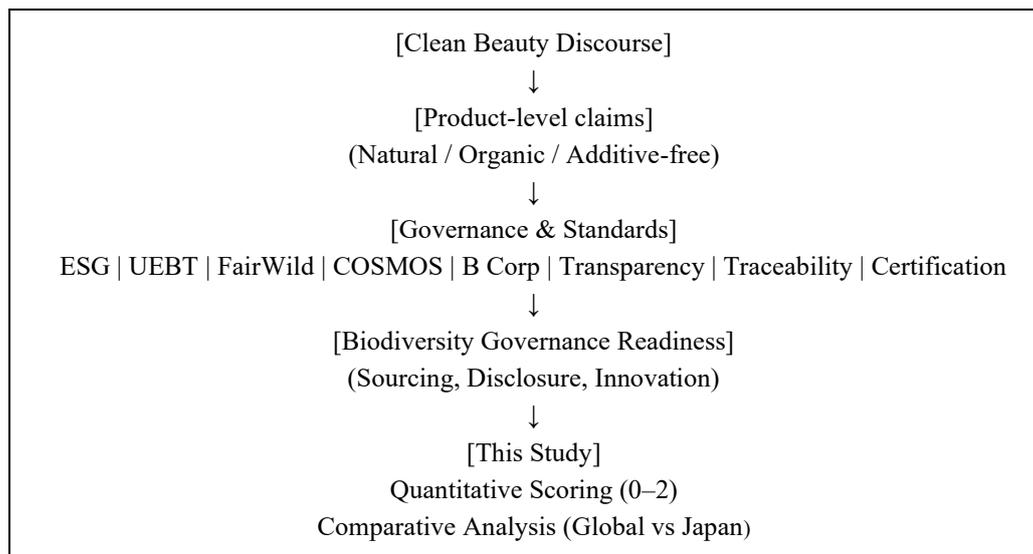


Figure 1. Conceptual Flow of Clean Beauty Governance Assessment

3.1. Research Design and Analytical Framework

Owing to the limited number of brands ($N = 10$) and reliance on publicly available disclosures, this study adopts an exploratory research design. The framework is intended as a pilot tool to assess governance readiness and transparency rather than to produce statistically generalizable conclusions. This study adopts a mixed-methods research design that integrates qualitative content analysis with a quantitative scoring framework. This approach is grounded in sustainability assessment theory and draws on established indicators from the biodiversity governance and responsible sourcing literature (Gibson, 2012). The analysis focuses on publicly available corporate documents, including sustainability reports, impact statements, certification disclosures, and official website information, to evaluate the extent to which selected clean beauty brands implement biodiversity-conscious practices.

This research is designed as an exploratory study intended to assess governance readiness rather than measure direct biodiversity outcomes.

3.2. Brand Selection Criteria

Brand selection was based on a prior exploratory assessment conducted by the author as part of a preliminary academic report. Building on this pilot phase, 10 clean beauty brands were purposively selected to represent both the international and Japanese markets, ensuring variation in geographic context, disclosure maturity, and engagement with sustainability and biodiversity-related practices.

A sample size of 10 brands was chosen to balance analytical depth and cross-case comparability within the constraints of an exploratory, document-based study. A limited number of cases allowed for a detailed qualitative review of sustainability disclosures while enabling preliminary quantitative comparisons across governance dimensions. The sample was equally divided between international and Japanese brands (5–each) to facilitate a contextual comparison across different institutional, regulatory, and disclosure environments, rather than to achieve statistical representativeness.

The selection of brands follows a purposive sampling strategy designed to ensure representation across their promoted themselves as clean beauty brands, geographic contexts, corporate ownership structures, and certification profiles. 10 brands—five international and five Japanese-based—were chosen based on the following criteria:

- **Market relevance:** Recognised position within the clean beauty segment, or brands that publicly claim to be a clean beauty brand.
- **Ingredient focus:** Use of plant-derived or naturally sourced materials is central to the brand identity.
- **Availability of sustainability disclosures:** Presence of reports or official statements enabling empirical evaluation.

- **Variation in sustainability governance:** Inclusion of brands with differing levels of third-party certification, supply chain transparency, and biodiversity commitments.

The final brand (e.g., Figure A1) set includes:

WELEDA, LUSH, The Body Shop, Melvita (L'Occitane Group), Aveda, THREE, SABON Japan, MiMC, OSAJI, and ETVOS (See Appendix A).

This composition reflects diversity in scale, sourcing practices, and disclosure maturity, enabling meaningful cross-brand comparison.

3.3. Evaluation Metrics

To assess biodiversity-related sustainability performance, five key indicators were developed based on established frameworks such as UEBT, FairWild, COSMOS, and the CBD's sustainable-use principles. Each indicator captures a distinct dimension of environmental responsibility within the cosmetics supply chain:

1. **Sustainable Ingredient Sourcing:** Evidence of responsible cultivation or wild collection, organic or biodynamic agriculture, and adherence to ethical sourcing standards.
2. **Biodiversity Conservation Initiatives:** Direct programs aimed at ecosystem restoration, conservation of endangered species, soil health, agroecology, or habitat protection, including partnerships with NGOs or local communities.
3. **Supply Chain Traceability:** Disclosure of traceable sourcing pathways, supplier-level transparency, and tools such as blockchain or origin-mapping systems.
4. **ESG Disclosure and Governance:** Availability, specificity, and rigour of environmental and governance reporting, including third-party audits and certifications.
5. **Environmental Innovation (Packaging and Formulation):** Innovations that reduce ecological impacts, such as refill systems, material recycling, bio-based packaging, low-impact extraction processes, or circular product design.

Each metric is scored on a 0–2 scale according to the following criteria, yielding a total possible score of 10 per brand (e.g., Figure B). To enhance transparency and replicability, indicator-specific scoring criteria were explicitly defined before evaluation. Each score (0–2) was assigned based on predefined decision rules regarding the presence, clarity, and third-party verification of disclosed practices.

This scoring procedure is designed to convert qualitative sustainability disclosures into semi-quantitative indicators that allow for cross-brand comparisons, while maintaining transparency and replicability for future studies.

3.4. Data Sources

Data for the preliminary assessment were collected exclusively from publicly accessible and verifiable sources, including:

- Corporate sustainability reports and annual reports
- Official brand and corporate group websites
- Certification databases (e.g., UEBT, B Corp, COSMOS/ECOCERT listings)
- Publicly released environmental or supply chain policy documents
- NGO, industry association, and regulatory databases where applicable

Relying on formal disclosures ensures consistency across the sampled brands and aligns with the methodological standards of corporate sustainability research. This is also suitable for revealing transparency in the field of clean beauty. All documents used in the analysis were accessed between October and December 2025 to ensure temporal comparability.

This study adopts an exploratory scoring framework, designed to assess relative levels of biodiversity-related governance and disclosure rather than to measure direct ecological outcomes.

3.5. Scoring Procedure and Reliability

The scoring was conducted by the author based on publicly available documents using a pre-defined indicator framework. To reduce subjectivity, detailed scoring criteria were established ex ante, and all indicators were applied consistently across brands. Ambiguous cases were revisited multiple times to ensure internal consistency. The structured scoring protocol enhances procedural transparency.

3.6. Limitations of Self-Reported Data

A key methodological challenge in sustainability assessment is the reliance on self-reported corporate disclosures, which can be subject to selective reporting, narrative bias, and variations in reporting standards across companies and countries. This suggests that a unified metric will be necessary in the future.

The study will incorporate additional validation through comparative analysis and, where possible, alignment with emerging biodiversity impact metrics.

4. Results

4.1. Overview of Quantitative Scores Across 10 Brands

The preliminary scoring (e.g., Figure B1) results reveal clear heterogeneity in biodiversity-related sustainability practices among the 10 evaluated clean beauty brands. Global brands, particularly those with long-standing commitments to organic agriculture, ethical sourcing, or third-party certification, tend to achieve higher composite scores. Several brands score near the upper end of the 9-point out of 10-point scale, reflecting well-developed governance systems, transparent disclosures, and established biodiversity programs.

In contrast, many Japanese brands demonstrate emerging but less formalised efforts, resulting in mid-range or lower scores due to limited disclosure specificity and fewer internationally recognised certifications.

In comparison between global and domestic brands, a systematic comparison shows that international brands outperform domestic brands on most indicators, particularly in the areas of:

- Traceability mechanisms (e.g., origin mapping, supplier verification)
- Third-party certifications (UEBT, ECOCERT/COSMOS, B Corp, FairWild)
- Explicit biodiversity conservation initiatives

However, Japanese brands frequently present strong commitments to natural ingredient use and local sourcing, suggesting potential alignment with biodiversity objectives despite the absence of formalised reporting structures. This indicates a divergence between actual practice and public disclosure, a well-noted issue in sustainability reporting literature.

4.2. Correlation Between Natural Ingredient Use and Biodiversity Performance

Contrary to common assumptions, the preliminary results suggest no simple positive correlation between the proportion of natural or plant-derived ingredients and strong biodiversity governance readiness. Mainly, domestic brands have a lack of traceability, an absence of reporting on impacts at the ecosystem level, and limited verification of wildlife harvesting practices.

Conversely, all international brands with diverse formulation strategies scored higher because they demonstrated robust governance, certification, and transparent sourcing systems. These findings lend early support to the hypothesis that biodiversity performance is more strongly associated with governance quality than with volume of natural raw material use.

4.3. Visualisation: Rankings, Radar Charts, and Score Distributions

Preliminary visualisation using ranking tables, radar charts, and score distribution plots highlights three key patterns:

- Clustering of high-scoring international brands, indicating similar levels of disclosure maturity and certification engagement.
- Wide variance among Japanese brands, reflecting diverse business sizes, reporting capacities, and sustainability priorities.
- Distinctive indicator signatures, where some brands excel in innovation or sourcing while lagging in traceability or conservation programs.

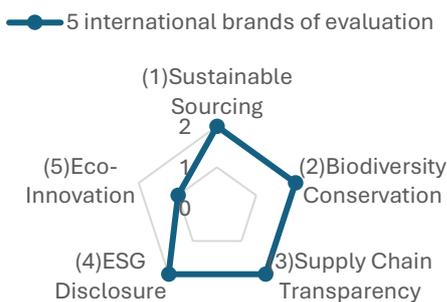
These visual patterns reinforce the need for unified biodiversity metrics across the clean beauty sector.

Table 1. Ranking of 10 Brands of Evaluation^a with Five Key Dimensions, Identified from Prior Frameworks (Exploratory Framework)

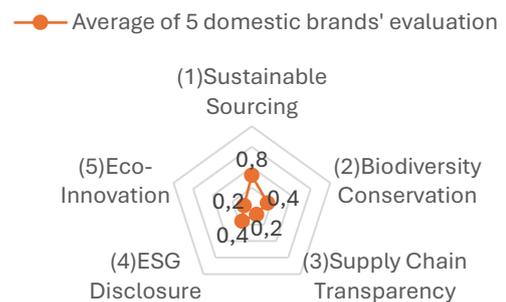
Ranking	Company	Score
1	Weleda	9
1	Lush	9
1	The Body Shop	9
1	Melvita (L'OCCITANE Group)	9
1	Aveda (The ESTEE LAUDER Group)	9
6	THREE (POLA ORBIS Group)	5
7	MiMC	2
8	SABON Japan	1
8	OSAJI	1
8	ETVOS	1

^a e.g., Figure B: Evaluation Scores of 10 Clean Beauty Brands

Five International Brands of Evaluation



Average of Five Domestic Brands' Evaluation



(a) Five International Brands (Weleda, Lush, The Body Shop, Melvita, Aveda)

(b) Average of Five Domestic Brands' evaluation (²The THREE, SABON Japan, MiMC, OSAJI, ETVOS)

Figure 2. Average Scores of International and Japanese Clean Beauty Brands Across Five Biodiversity-Related Governance Indicators. (Note: Scores range from 0 to 2 per indicator (e.g., Figure B) and reflect disclosure and governance practices rather than direct ecological outcomes.)

The five international brands advocate for clean beauty, and their corporate strategies and product development take biodiversity into account, clearly disclosing these efforts. In contrast, companies with Japanese capital generally engage in sustainable sourcing, but other efforts are still lacking.

Next is the examination of the relationship between the natural origin rate and the biodiversity score as proxy indicators of demand for products from leading clean beauty companies, Weleda and Lush, The THREE and SABON Japan, respectively, only whose disclose ISO16128 or the natural origin rate. Since each company publishes a few details regarding the natural origin rate, the author uses the ISO 16128⁶ standard as an indicator. The ISO16128 index measures naturalness, and while it is not necessarily an indicator of environmental improvement or biodiversity conservation, it can serve to gauge the extent of natural capital usage. Additionally, since the ingredient ratios vary by product, comparisons will be made on a product-by-product basis.

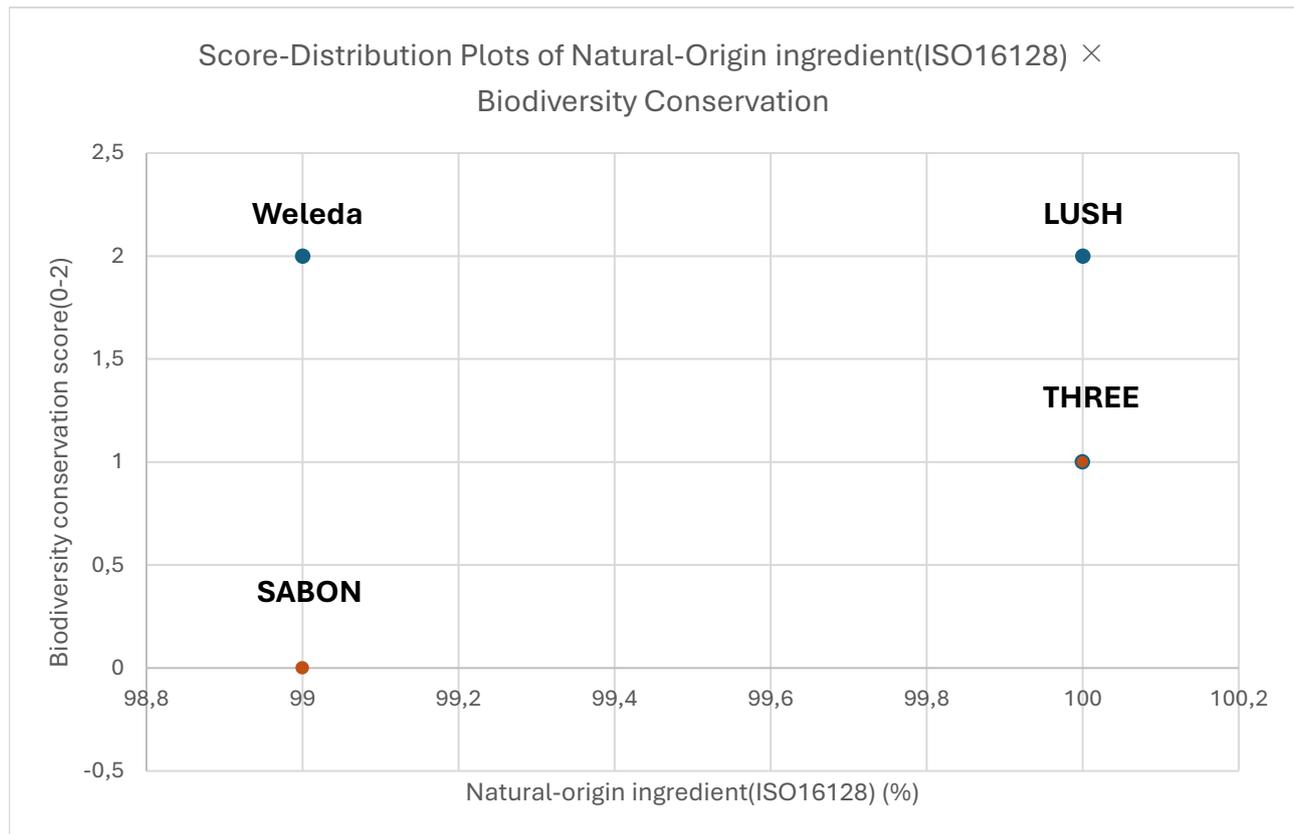


Figure 3. Score-Distribution Plots of Natural-Origin Ingredient (ISO16128) × Biodiversity Conservation

1 Weleda, ISO16128 is not disclosed, so used as their national ingredient ratio. All products diverted by 100% natural ingredients, https://www.weleda.jp/html/user_data/assets/catalog/general_catalog/index.html#target/page_no=11

2 Lush, Body Yoghurt, <Body Cream> https://alchemy-cms.files.svdcn.com/production/files/Body-Yoghurt.pdf?dm=1667829311&utm_source=chatgpt.com

3 THREE, THREE Essential Scents R, <Eau de Toilette> https://www.threecosmetics.com/onlineshop/g/gt3b468/?srsltid=AfmBOoqQrstZF4fgvVvZh1eupjnen1gOd_2Hnuzj9scS44FMLLgx5VuU&utm_source=chatgpt.com

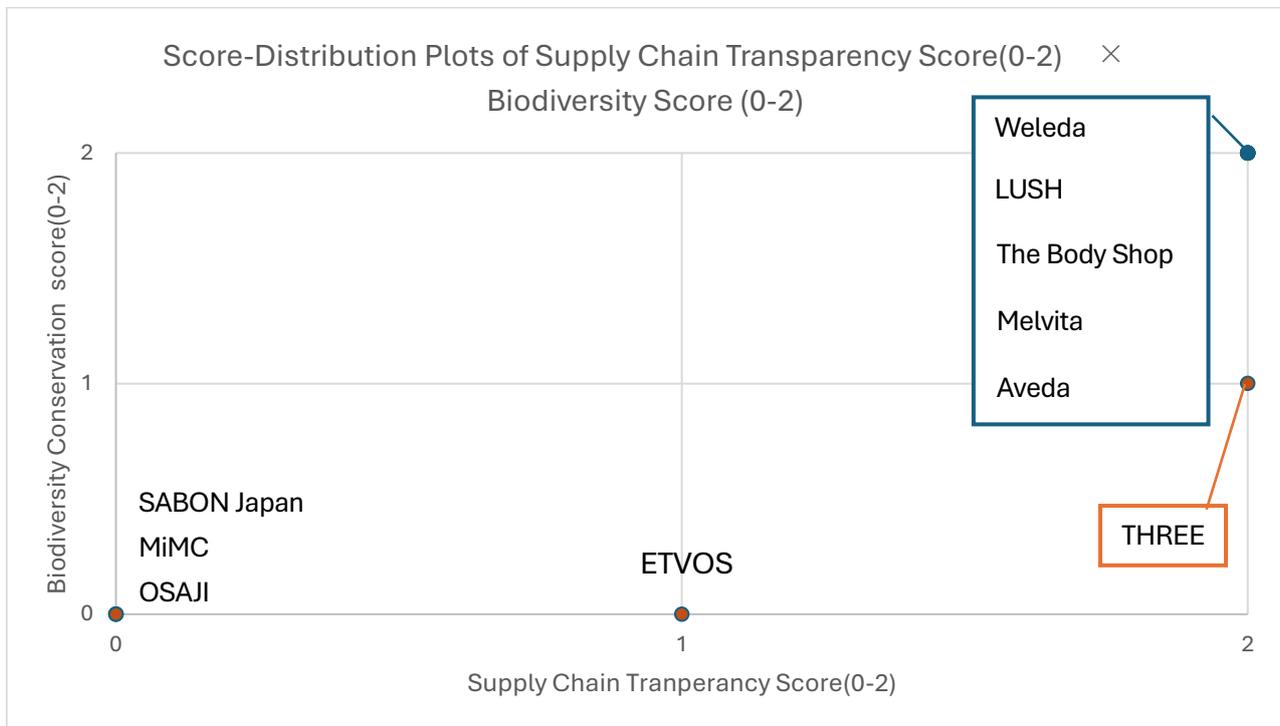
4 Sabon Japan, CICA Cream Olive Bliss <Cream> https://www.sabon.co.jp/ecproduct/CICACream_OliveBliss?utm_source=chatgpt.com

The distribution of points is scattered, but no consistent correlation is observed. It can be interpreted that high demand for natural ingredients does not directly correspond to biodiversity risk. By presenting

⁶ International standards for defining and calculating the proportion of natural/naturally derived/organic/organically derived ingredients in cosmetics

biodiversity policies and implementing initiatives, even the Japanese brand is likely to move upward to the top right.

Figure 4. Score-Distribution Plots of Supply Chain Transparency Score × Biodiversity Conservation Score



Overall, the clusters trend upwards to the right, indicating that brands with higher transparency tend to maintain greater biodiversity.

4.4. Key Findings: Well-Governed Brands Maintain Biodiversity Despite High Demand for Natural Ingredients

One of the central findings is that strong governance systems appear to mitigate biodiversity risks, even among brands experiencing substantial demand for natural ingredients. Brands with clear sustainability policies, third-party verification, and transparent supply chains consistently demonstrate stronger biodiversity-aligned practices.

This suggests that increased industrial demand does not inherently lead to environmental degradation—a key hypothesis of this study. Instead, the determining factor is the quality of corporate governance, including:

- Supplier management
- Certification adoption
- Active ecosystem conservation investments

These results emphasise that demand growth can coexist with biodiversity protection when supported by rigorous governance structures and transparent reporting.

5. Discussion

A central insight emerging from the findings analysis is that the value of clean beauty does not lie merely in the use of “natural” ingredients, but rather in how effectively brands design systems that enable coexistence with nature. In other words, the critical distinction is not naturalness itself, but the governance structures, sourcing practices, and transparency mechanisms that ensure biodiversity is protected throughout the product

lifecycle. This systemic perspective reframes clean beauty as a model of ecological stewardship rather than a marketing category, and provides the conceptual foundation for interpreting the empirical findings that follow.

5.1. Interpretation of Findings: Reframing the Relationship Between “Natural” and Environmental Impact

The empirical results challenge the common assumption that the use of natural ingredients necessarily increases ecological pressure. Rather than ingredient origin itself, the decisive factors affecting biodiversity performance were found to be the governance of sourcing practices, the degree of supply chain transparency, and the existence of third-party certifications. High-scoring brands consistently demonstrated structured sourcing programs, detailed sustainability reporting, and continuous monitoring mechanisms, which are largely absent in lower-scoring brands. These findings suggest that the value of clean beauty lies not simply in the use of natural materials but in designing systems that enable coexistence with nature.

5.2. Industrial Demand Does Not Necessarily Translate into Biodiversity Risk

Contrary to the hypothesis that rising industrial demand inevitably increases ecological burden, the analysis revealed no negative correlation between market scale and biodiversity-related performance. Several international brands position themselves in the upper-right quadrant of the score–demand matrix, indicating that high demand can coexist with strong biodiversity governance. This reinforces a more nuanced understanding that biodiversity impact is mediated less by consumption volume and more by the institutionalised practices embedded within the supply chain.

5.3. Institutional Drivers Behind the Gap Between International and Japanese Brands

The study identified a pronounced divergence between international and Japanese brands, rooted primarily in differences in institutional and regulatory environments.

International brands operate within regulatory ecosystems, such as those in the EU and North America, characterised by strong environmental disclosure requirements and mature certification frameworks, including UEBT, FairWild, COSMOS, and B Corp. Alignment with these mechanisms promotes structured reporting, traceability, and biodiversity-positive sourcing.

By contrast, many Japanese brands showed limited disclosure, inconsistent reporting practices, and low adoption of biodiversity-related certifications. This appears to reflect broader structural factors within Japan, including slower development of national sustainability standards and a generally low level of biodiversity awareness among both firms and consumers. A culturally embedded perception that “natural equals safe” may further contribute to the under-recognition of biodiversity as a distinct sustainability dimension. These institutional and cultural factors likely explain the wider variance and overall lower scores observed among domestic brands.

In addition, a pronounced gap was observed in the level of transparency between international and Japanese brands. While global brands routinely disclose key sustainability metrics, including natural-origin content, traceability indicators, and biodiversity-related performance, very few Japanese companies make such information publicly available. During this study, inquiries were made to several brands whose sustainability reports or websites did not disclose natural-origin rates or comparable indices. Some companies responded that these figures were “not calculated” or “not for public release” (e.g., OSAJI), while others stated that such information was considered “confidential” and therefore could not be disclosed (e.g., MiMC).

This lack of transparency represents a fundamental barrier to the domestic advancement of clean beauty, as transparency constitutes a core principle of the clean beauty framework. Without clear disclosure practices, Japanese brands remain unable to demonstrate accountability, align with international standards, or participate meaningfully in biodiversity-positive governance. Therefore, addressing this transparency deficit is an urgent requirement for the maturation of Japan’s clean beauty sector.

Furthermore, many Japanese cosmetics companies tend to other countries for ingredients and products, qualitative statements such as “considering biodiversity” or “protecting nature,” without specifying measurable objectives or implementation pathways. These abstract commitments lack clear KPIs, timelines, or evidence of ecosystem impact assessment, making it difficult to evaluate actual performance. The limited adoption of third-party certifications and insufficient supply-chain traceability further contribute to the structural gap between Japanese and international brands. In contrast, global frameworks such as UEBT, FairWild, TNFD, and SBTN increasingly require quantified and verifiable targets, underscoring the extent to which Japanese biodiversity governance remains underdeveloped.

5.4. Designing Systems for Coexistence with Nature: Beyond Natural Ingredients

The findings underscore the importance of shifting the clean beauty discourse from ingredient origin (e.g., natural vs. synthetic) to systemic sustainability. International brands provide illustrative examples: comprehensive biodiversity strategies (L’OCCITANE), community-based fair-trade sourcing (The Body Shop), and long-term UEBT membership with mechanism-based ecological monitoring (Weleda). These approaches demonstrate that the most impactful biodiversity protections arise from governance structures rather than ingredient labels. For Japanese brands, this suggests the need to move beyond “natural-derived” claims to verifiable sustainability systems.

5.5. Policy Implications: Toward Standardised Biodiversity Metrics in the Beauty Sector

One major challenge identified in this study is the absence of standardised biodiversity indicators across the industry. Current reporting varies substantially across brands, complicating comparison and limiting transparency. The results highlight the need for unified frameworks analogous to emerging global initiatives such as the EU Deforestation Regulation and the Taskforce on Nature-related Financial Disclosures (TNFD). The scoring methodology developed in this study provides an initial model that could support future guideline formation, especially for the Japanese market.

Furthermore, to align Japan’s cosmetics sector with emerging global norms, national policy frameworks must move to greater international standardisation. However, obtaining internationally recognised sustainability certifications such as UEBT, FairWild, and COSMOS can impose substantial financial and administrative burdens, particularly on small- and medium-sized enterprises.

To accelerate industry-wide adoption of biodiversity-positive practices, the Japanese government could consider targeted subsidies or financial incentives to support certification costs, capacity building, and the development of traceability systems. Such policy interventions would help lower structural barriers, enhance transparency, and enable domestic brands to participate more fully in globally recognised sustainability frameworks.

5.6. Limited Biodiversity Awareness in Japan and the Need for Strategic Conservation Frameworks

While most companies included in the analysis engage in some form of sustainable raw material procurement, biodiversity-focused initiatives and particularly their public disclosure, remain comparatively uncommon among domestic brands. This stands in contrast to international brands, which tend to articulate explicit biodiversity strategies supported by third-party certifications, supplier programs, and transparent reporting structures.

A contributing factor appears to be the generally lower level of biodiversity awareness within the Japanese market, both among consumers and within the corporate sector. The absence of strong societal or institutional expectations may reduce incentives among companies to develop, operationalise, and publicise biodiversity-related policies (Takai and Nagai 2023). As a result, domestic firms often lag behind their international counterparts in demonstrating concrete conservation actions or in communicating them through standardised ESG frameworks.

Strengthening biodiversity literacy in Japan through industry guidelines, academic–industry collaboration, and regulatory signals could provide the foundation for more systematic conservation strategies. If domestic companies were encouraged or required to develop explicit biodiversity action plans and enhance disclosure practices, they would likely be better positioned to advance within the global clean beauty landscape. Such progress would not only improve corporate accountability but also contribute to aligning Japan’s cosmetics sector with emerging international norms for biodiversity-positive business models.

5.7. Limitations and Future Research Directions

This study relies primarily on self-reported data, which may introduce disclosure biases and reflect differences in reporting capacities rather than actual performance. Moreover, the 10-brand samples, although representative, remain preliminary. Future research should integrate industry standard and life cycle assessment (LCA) approaches to more precisely quantify biodiversity governance readiness. Expanding the dataset to include additional markets and longitudinal analysis will also enhance the robustness of the findings.

6. Conclusion

This study demonstrates that the value of clean beauty lies not in the mere use of natural ingredients but in the design of governance structures, sourcing systems, and transparency mechanisms that ensure coexistence with nature. Through an original scoring framework applied to 10 major beauty brands, the analysis reveals that biodiversity performance is determined primarily by institutionalised sustainability practices, such as traceability programs, third-party certifications, and continuous monitoring, rather than by ingredient origin or market size. The findings should be interpreted as an assessment of biodiversity governance readiness, not as direct evidence of ecological impact or conservation effectiveness.

The findings challenge the prevailing assumption that increased industrial demand inherently generates greater ecological burden. Several high-demand international brands achieved strong biodiversity scores, indicating that ecological impact can be mitigated through well-designed supply chain governance. Conversely, Japanese brands exhibited greater variance and generally lower levels of disclosure, reflecting gaps in national standards, weak institutional incentives, and comparatively low biodiversity awareness within the domestic market. Given the exploratory and pilot nature of the study, the findings should be interpreted as illustrative rather than generalizable across the entire cosmetics industry.

These results highlight the need to shift the discourse on clean beauty from material naturalness to systemic ecological stewardship. International cases, such as UEBT-aligned sourcing programs, fair-trade community partnerships, and robust biodiversity reporting, illustrate that effective conservation is rooted in long-term governance rather than marketing-oriented “natural” claims. For Japan, aligning with emerging global standards and strengthening biodiversity literacy will be essential for accelerating the progress of clean beauty. Given the financial burden associated with acquiring international certifications, policy measures, including subsidies or targeted support for small and medium-sized enterprises, could play a critical role in enabling broader industry achievement of clean beauty.

Methodologically, this study contributes an initial framework for evaluating biodiversity-related practices in the cosmetics sector, offering a foundation for future industry guidelines and potential standardisation efforts, particularly within the Japanese market. Nonetheless, the analysis is limited by its reliance on self-reported corporate data and the scope of the sample. Future research should incorporate new evaluations based on industry guidelines to be provided in the future, LCA-based assessments, and expanded datasets across regions and time periods to more precisely quantify biodiversity governance readiness.

In sum, clean beauty should be understood as a governance model that operationalises coexistence with nature. Advancing this paradigm requires coordinated efforts across industry, consumers, and policymakers to establish transparent, standardised, and ecologically grounded sustainability practices. Such a shift will be essential for positioning the beauty sector as a meaningful contributor to global biodiversity conservation.

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Data Availability The data used in this study were derived from publicly available sources, including corporate websites, sustainability reports, and certification disclosures. The processed data supporting the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Competing Interests The authors declare no competing interests.

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Appendices

- Appendix A: Summary of Key Characteristics of the 10 Evaluated Clean Beauty Brands
- Appendix B: Evaluation Scores of 10 Clean Beauty Brands/Score Criteria
- Appendix C: ISO16128 × Total Sustainability Score/ Supply Chain Transparency × ESG Disclosure

The scoring criteria presented in this Appendix are based exclusively on data compiled in the preliminary research materials prepared for Showa Women's University. All scores were derived from publicly available information, including official corporate websites, sustainability or CSR reports, and, where necessary, direct inquiries to brands. No additional or proprietary datasets were introduced beyond those documented in the original research materials.

Appendix A

Appendix A. Overview of the Ten Clean Beauty Brands Evaluated in This Study
Appendix A provides a descriptive overview of the ten domestic and international clean beauty brands included in the empirical analysis. The table summarises each brand's main sustainability features, sourcing practices, and biodiversity-related initiatives, based on publicly available reports, certification records, and corporate disclosures. These qualitative characteristics formed the basis for the scoring process described in Section 3.

Table A1. Summary of Key Characteristics of the 10 Evaluated Clean Beauty Brands

No.	Name of brand	Country	Main Features and Evaluation Points
1	WELEDA	Switzerland	Adopts biodynamic farming methods. All products are derived by 100% natural ingredients ⁷ . Certified by UEBT (Ethical BioTrade), has a clear policy on biodiversity. Certified B Corp company.
2	LUSH	The U.K.	Rejecting palm oil and promoting refills. Sourcing raw materials through fair trade. Opposing animal testing. Highly transparent. Certified B Corp company.
3	The Body Shop	The U.K.	Coexisting with local ecosystems through the Community Fair Trade program. Uses RSPO-certified palm oil. Certified B Corp company.
4	Melvita (L'Occitane Group)	France	Adopts biodynamic farming methods and organic certification (ECOCERT/COSMOS). Emphasis on biodiversity, including activities to protect bees.
5	Aveda (The ESTEE LAUDER Group)	The U.S.	Over 95% plant-derived ingredients. Practising regenerative agriculture at partner farms. Certified B Corp company.
6	THREE (POLA ORBIS Group)	Japan	Utilising domestically sourced plant materials. A sustainable production system in collaboration with the local community. Environmentally-friendly manufacturing lines.
7	SABON Japan	Originating from Israel / Expanding in Japan	Focusing on natural ingredients and reusable containers. Improving the traceability of raw material sourcing and fragrances.
8	MiMC	Japan	Focuses on natural minerals and plant-derived ingredients. Explicitly promotes clean beauty. Contains minimal synthetic components.
9	OSAJI	Japan	A highly biocompatible formulation. Focuses on domestic plant ingredients and traceability.
10	ETVOS	Japan	A representative brand of mineral cosmetics. Uses recycled containers and environmentally friendly materials. Remove the relevant harmful chemicals for coral conservation.

⁷ Weleda Products catalog, P9, https://www.weleda.jp/html/user_data/assets/catalog/general_catalog/index.html#target/page_no=11

Appendix B

Appendix B. Comparative Scoring of Leading Clean Beauty Brands

This appendix presents a comparative scoring table of 10 global and Japanese clean beauty brands.

Each brand was evaluated across 5 criteria central to clean beauty governance: (1) sustainable sourcing, (2) biodiversity conservation, (3) supply chain transparency, (4) ESG disclosure, and (5) eco-innovation.

Scores are assigned on a 0–2 scale: 2 = advanced practice, 1 = emerging/partial practice, 0 = limited or no evidence of practice

A total score (0–10) indicates the overall maturity of each brand’s sustainability performance.

Table B1. Evaluation Scores of 10 Clean Beauty Brands

No.	Brand	(1) Sustainable Sourcing	(2) Biodiversity Conservation	(3) Supply Chain Transparency	(4) ESG Disclosure	(5) Eco-Innovation	Total
1	Weleda	2	2	2	2	1	9
2	Lush	2	2	2	2	1	9
3	The Body Shop	2	2	2	2	1	9
4	Melvita (L'OCCITANE Group)	2	2	2	2	1	9
5	Aveda (The ESTEE LAUDER Group)	2	2	2	2	1	9
6	THREE (POLA ORBIS Group)	1	1	1	1	1	5
7	SABON Japan	1	0	0	0	0	1
8	MiMC	1	0	0	1	0	2
9	OSAJI	1	0	0	0	0	1
10	ETVOS	0	1	0	0	0	1

Source:

L'Occitane Group Website, L'OCCITANE Group's new Biodiversity Strategy: Leading the way towards a Nature-Positive future, <https://group.loccitane.com/group/news/loccitane-groups-new-biodiversity-strategy-leading-way-towards-nature-positive-future>, Published on Oct. 24th 2024, Last Viewed on Jan. 4th 2025

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AVEDA Web site. B-Corp Certification. <https://www.aveda.jp/b-corp-certification>, Last viewed on Dec. 2025

Table B2. Scoring Criteria and Decision Rules

5 Scoring Criteria	Decision Rules
(1) Sustainable Sourcing	Use of responsibly sourced or certified natural ingredients.
(2) Biodiversity Conservation	Direct involvement in biodiversity protection or habitat restoration initiatives, and in the conservation of endangered species
(3) Supply Chain Transparency	Degree of traceability in ingredient origin and supplier disclosure.
(4) ESG Disclosure (Environmental Governance)	Quality and depth of environmental data in sustainability reporting.
(5) Eco-Innovation	Development of low-impact formulations, circular packaging, or biodiversity-positive design.

Table B3. Evaluation Items and Scoring Criteria

Score	Item	Definition
0	Absent	No explicit disclosure regarding sustainable sourcing practices.
1	Partial Evidence	General statements on sustainable or ethical sourcing without specific standards, metrics, or verification.
2	Robust Implementation	Clearly defined sourcing policies supported by measurable criteria and/or third-party certification (e.g., UEBT, FairWild, COSMOS).

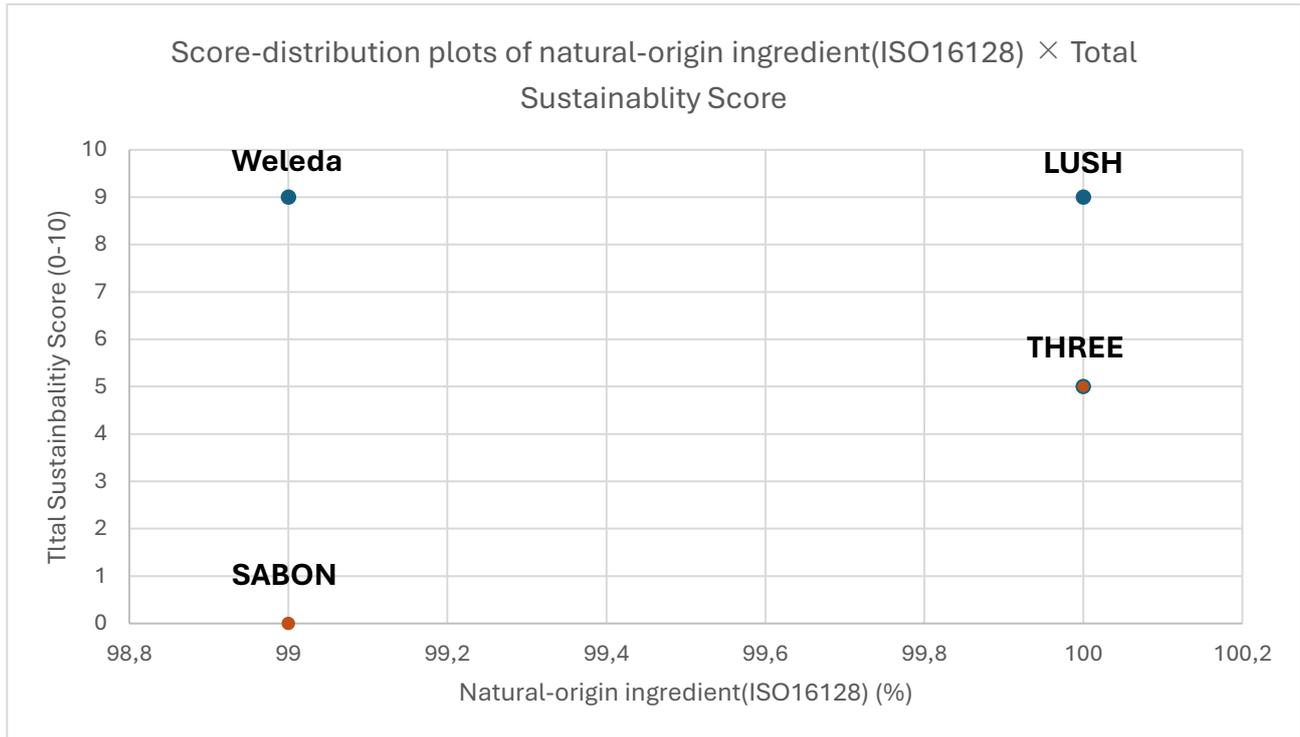
Appendix C

Appendix C. Findings Analysis for robustness and illustrative purposes

Appendix C shows the scatter plots of ISO 16128 and the total sustainability score, as well as the scatter plots of traceability and governance, and this observation supports the view that sustainability performance is shaped primarily by organisational governance and sourcing systems rather than by ingredient composition labels alone.

In this study, “Governance” refers not to general corporate governance structures, but to biodiversity-related governance capacity, operationalised through ESG disclosure practices, formal sourcing policies, and third-party certification commitments.

Table C1. ISO16128 × Total Sustainability Score



Natural origin does not equal sustainable, but international brands score high not only for being of natural origin, but also for their scientific integration and institutional governance.

Table C2. Supply Chain Transparency × ESG Disclosure

