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HINDUSTAN ZINC
Zinc & Silver of India

Taskforce on Nature-related Financial Disclosures (TNFD) Report

2023-24

SAFE SMART SUSTAINABLE

TNFD Report for Hindustan Zinc Ltd

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About the Report

Photo credit: IUCN/Mridul Vaibhav

Task Force on Nature Related Financial Disclosures (TNFD) report is for Hindustan Zinc Limited, a Vedanta Group Company. All data in this report is as of March 31, 2024.

The TNFD recommendations, launched in September 2023, is a globally endorsed initiative, combining market insights, scientific rigor, and governmental support to integrate nature considerations into decision-making processes for companies. Like Taskforce on Climate- related Financial Disclosures (TCFD), TNFD recommendations have four content pillars: (i) Governance; (ii) Strategy; (iii) Risk & Impact Management; and (iv) Metrics & Targets; encompassing 14 disclosures, addressing nature-related Dependencies, Impacts, Risks, and Opportunities (DIRO). These recommendations establish a robust risk management and disclosure framework applicable to entities of all sizes, facilitating the identification, assessment, and management of nature-related issues, with appropriate disclosure where applicable . Additionally, TNFD has also published sector specific guidance for metals and mining (draft).

This TNFD report provides the details of the Nature- related Dependencies, Impacts, Risks and Opportunities of Hindustan Zinc Limited. TNFD recommended Locate, Evaluate, Assess and Prepare (LEAP) framework is used by Hindustan Zinc Limited for assessment of their Direct Operations and Upstream Critical Supply chain. This report also provides the Nature related Risk (Physical and Transition) at both business level as well as operational sites level. Site level opportunities are identified and reported for enhancement of biodiversity and shall also be included in the site level Biodiversity Management Plans (BMPs).

At the end, this TNFD report provides the metrics and targets adopted by Hindustan Zinc Limited to measure the progress in coming years.

[1] Recommendations of the Taskforce on Nature-related Financial Disclosures (2023). *https://tnfd.global/wp-content/uploads/2023/08/Recommendations_of_the_Taskforce_on_Nature-related_Financial_Disclosures_September_2023.pdf?v=1695118661*

Message from Chairperson

Dear All,

At Hindustan Zinc, our work is deeply rooted in our commitment to sustainability. We understand that our operations are part of a larger ecosystem and we must make every effort to ensure that progress does not forsake sustainability. It is with this understanding that we have embarked upon a mission to embrace a Nature Positive future.

We are launching our first Taskforce on Nature-Related Financial Disclosures (TNFD) report a testament to our unwavering commitment to preserving and enhancing nature. It reflects our relentless efforts to assess, disclose, and mitigate nature-related risks, aligning seamlessly with global policy goals outlined in the Target 15 of Kunming-Montreal Global Biodiversity Framework.

As you go through this report, I encourage each one of you to recognize it as a call to action demanding our best efforts towards nature conservation. This report symbolizes the dedication, innovation, and resilience with which we undertake the ambitious goals that will lead us to our Net Zero Target by 2050 or sooner.

Let us pledge to protect and cherish our planet. Together, we can create a future where sustainability is not just a goal but a way of life. Let us once again renew our commitment towards leaving behind a world that is healthier, greener, and more vibrant for our future generations.

Best Wishes,
Priya Agarwal Hebbar
Chairperson – Hindustan Zinc Limited

TNFD Report for Hindustan Zinc Ltd

Message from CEO

Dear All,

I am thrilled to share a significant milestone in our journey towards sustainability with the launch of Hindustan Zinc Limited's first TNFD Report.

As we navigate the challenges posed by climate change, biodiversity loss, and the degradation of nature, it has become increasingly evident that these issues are not only environmental but also critical to the way we operate as an organization. At Hindustan Zinc Limited, we understand the profound impact our operations have on the environment and the communities around us. Therefore, it is imperative that every business decision we make considers its effects on biodiversity, nature, and the socio-economic development of the areas we operate in.

I am proud to announce that we are among the first in the metals & mining sector in India to adopt the TNFD framework. This decision underscores our commitment to integrate nature-related issues into our governance, strategic planning, risk management, and disclosures.

Our TNFD Report is a testament to our dedication to environmental stewardship. It highlights our achievements and outlines our roadmap for the future. It further represents a significant step forward in our efforts to embrace nature, empower our communities, and make a positive impact on the world around us.

I invite each one of you to join us in this transformative journey towards a safe, smart & sustainable future. We will continue to work together to ensure that Hindustan Zinc remains at the forefront of environmental stewardship.

Best Wishes,
Arun Misra
CEO- Hindustan Zinc Limited

Biodiversity and Nature Conservation at Hindustan Zinc Limited

Hindustan Zinc Limited is India's largest and the only integrated zinc, lead, and silver producer. It is the world's second-largest integrated zinc producer and the third largest producer of silver. The company is a subsidiary of Vedanta Limited, which holds 64.9%, and the Government of India holds 29.5%. The company has a market share of ~75% of the growing Zinc market in India with its headquarters at Zinc City, Udaipur, India along with Zinc-Lead mines and smelting complexes spread across the state of Rajasthan, India, and a refinery in the state of Uttarakhand, India.

Protecting and conserving nature is an integral part of Hindustan Zinc Limited's commitment to obtain resources sustainably. The company is committed to the integration of biodiversity conservation into its operations. Accordingly, the company has taken a strategic approach to mitigate any adverse impact of its operations on biodiversity by reviewing operational procedures and systems.

Hindustan Zinc Limited has a Biodiversity Policy which aims to avoid, minimize and offset the negative impacts on biodiversity at its operations and encourage value chain partners to align with the company's commitment and avoid deforestation and habitat loss in internationally recognized areas such as World Heritage Sites, International Union for Conservation of Nature (IUCN) category (I-VI) Protected Areas, legally designated protected areas, and Key Biodiversity Areas.

Hindustan Zinc Limited has adopted a commitment to achieve **No Net Loss (NNL)** on biodiversity and **Net Positive Impact (NPI)** for critical habitat at all our operations. The company is committed to:

1. Avoid operating/ exploring/ mining/ drilling in World Heritage Sites and IUCN Category I-IV protected areas.

2. Compensate with future reforestation (no net deforestation) by appropriate on or off-site habitat restoration. Plan to achieve No Gross Deforestation in protected areas and strive to achieve No Net Deforestation in operating sites by 2050 against the baseline of 2020.

3. Apply mitigation hierarchy [avoid, mitigate (reduce, regenerate, and restore), offset and transform] when operating in areas in close proximity to critical biodiversity. The company uses the mitigation hierarchy as a key framework to achieve their vision of NNL on biodiversity.

Avoid - Whenever possible, the company avoids negative biodiversity and Ecosystem Services impacts, even if it requires significant changes in their plan to protect critical areas.

Mitigate - Where impacts cannot be avoided, they should be mitigated as far as possible. Mitigation measures may include:

- **Reduce -** The company minimizes impacts that are unavoidable through the adoption of impact reduction technologies.

- **Regenerate and Restore -** On a progressive basis, the company rehabilitates and restores areas to re-create biodiversity values and reclaims areas with a view to closure. Such reclamation practices can help replace much or most of the biodiversity of the natural habitats that existed prior to the operational sites.

Offset - In cases where it may not be possible to avoid or mitigate biodiversity impact then the company would design and implement biodiversity offsets to move towards a net positive gain of biodiversity.

Transform - The company is alligned with global initiatives with aim at enhancing biodiversity in and around the areas of operation.

Photo credit: IUCN/Mridul Vaibhav

Hindustan Zinc Limited is currently piloting targets for nature with the Science Based Targets for Nature (SBTN) and working on Assess and Prioritize steps (Steps 1 & 2) to assess its impacts on nature and define where action is most needed. This would help the company in setting science-based targets to reduce pressures on Nature.

Hindustan Zinc Limited is amongst the 17 companies globally in Initial SBTN Target Validation Pilot participants. The company is also a member of India Business & Biodiversity Initiative (IBBI) by Confederation of Indian Industries (CII). The initiative serves as a national platform for businesses and its stakeholders for dialogue sharing and learning, ultimately leading to mainstreaming sustainable management of biological diversity into businesses. The company is also working with IUCN to develop comprehensive Biodiversity Management Plans for all the Rajasthan based operating sites.

With release of TNFD recommendations in September 2023, Hindustan Zinc Limited commenced a gap assessment to identify readiness to report against the TNFD recommendations and incorporated TNFD's LEAP approach into the risk assessment process in their Ecosystem Services Review (ESR) for each site. Through the International Council on Mining and Metals (ICMM), the company worked with peer companies to support the testing, iteration, and refinement of the TNFD through providing feedback on the framework based on the assessments/ pilot.

This report is the first TNFD report of Hindustan Zinc Limited prepared based on the nature risk assessment conducted by the company using LEAP approach. This report provides the response of Hindustan Zinc Limited against the 14 TNFD recommendations under Governance, Strategy, Risk & Impact Management and Metrices & Targets.

Figure 1:
Biodiversity Policy of Hindustan Zinc Limited

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HINDUSTAN ZINC
Biodiversity Policy

Purpose

Protecting and enhancing biodiversity is an integral part of Hindustan Zinc's commitment to sustainable development. We are conscious of the potential impacts and dependencies of our business on the environment in general and on biodiversity. Integrating the need for biodiversity conservation into operational decision-making processes and taking measures to minimize impacts is a commitment across the company with a vision of Nature Positive.

Biodiversity is a complex phenomenon that needs to be identified, understood, and valued from a biological and societal (i.e., in terms of ecosystem services) perspective and the Company is conscious of the potential impacts and dependencies of our business on the environment in general and on biodiversity in particular. This Biodiversity policy shall help us define, strategize, plan, and implement the essential roadmap, guidance, and measurement towards achieving sustainability goals.

This policy is forward looking and sets a vision for businesses across the Hindustan Zinc.

Scope

This policy is applicable to all Hindustan Zinc Limited business units, including subsidiaries, joint ventures, and acquisitions, managed sites, licensees, outsourcing partners, corporate offices, and research facilities. This policy is also applicable to all Hindustan Zinc Limited employees, contractor employees, business partners, suppliers, and others with whom Hindustan Zinc does business.

In addition, this policy is applicable throughout the operational lifecycle of the projects and mines, covering stages from exploration and planning to evaluation, operation, and closure. furthermore, it extends to activities in our upstream value chain.

Objectives of the Biodiversity Policy

Hindustan Zinc will strive to:

- Achieve nature positive impacts to biodiversity values by implementing intense management actions either on site or off site, to compensate for any project impacts to areas recognized nationally or internationally for their high values of threatened, endemic or migratory / congregatory species or unique and threatened ecosystems.
- Comply with, and exceed whenever feasible, the local, regional, and national legislative requirements concerning land management and biodiversity conservation, as well as relevant international agreements, in all jurisdictions where we operate.
- Avoid deforestation and habitat loss in internationally recognized areas such as World Heritage Sites, IUCN category (I-VI) Protected areas, legally designated protected areas, and Key Biodiversity Areas.
- Compensate with future reforestation (no net deforestation) by appropriate on or off-site habitat restoration. Plan to achieve No Gross Deforestation in protected areas and strive to achieve No Net Deforestation in operating sites by 2050 against the baseline of 2020.
- Achieve No-Net Loss (NNL) at our project operations and ensure that we will operate on the principles of Net Positive Impact (NPI) for critical habitat (when we operate in or near areas declared as biodiversity hotspot areas, ecologically sensitive zones, International Union for the Conservation of Nature IUCN Category I-IVprotected areas, nearby world heritage sites & areas having critical habitat and ecosystems), and at all mine sites by closure through applying mitigation hierarchy.
- Set targets and objectives to avoid, reduce or mitigate biodiversity and nature-based impacts on people and planet.
- Integrate biodiversity & nature considerations into our strategic approach, financial planning and analyzing the nature-related risks and opportunities throughout the project lifecycle, including decommissioning, closure, and rehabilitation.
- Conduct biodiversity risk assessment and apply the mitigation hierarchy to avoid or minimize biodiversity and nature-based risks.
- Ensure continuous improvements in biodiversity performance through effective management and implementation of action plans in alignment with the "Nature-Based Solutions" approach.
- Review the performance against the policy on a periodic basis to ensure management of biodiversity as per our objectives including the sharing of good practices throughout the organization and stakeholders.
- Engage with local, national, and global conservation initiatives, conservation experts and organizations. Support joint efforts by the private and public sectors, and foster knowledge, awareness, and participation among relevant stakeholders, including employees, to collectively address biodiversity and nature-related challenges.
- Engage and raise awareness amongst our employees, business partners, supply chain and other stakeholders to enhance their knowledge and understanding of biodiversity and ecosystem management practices.
- Actively encourage value chain partners and suppliers to align with this policy and avoid operational activities near sites containing globally or nationally important biodiversity.

Responsibility & Review

This policy is part of the Vedanta Sustainability Framework, and each Hindustan Zinc business shall implement this policy. Group CEO will be accountable for controlling and setting the policy, and the Group Executive Committee are responsible for the full implementation of the policy and associated standards. Board ESG will review this policy annually and recommend appropriate revisions to the Board as may deem necessary.

Arun Misra

Date: 05th June, 2024

Arun Misra
CEO & Whole Time Director, HZL

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TNFD General Requirements

As per TNFD recommendations, the general requirements to decide the boundaries of this report are described below:

Materiality Applications

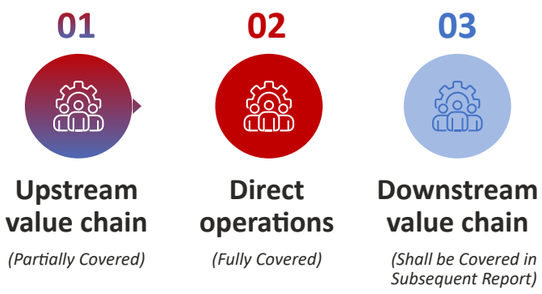
For this TNFD report, Hindustan Zinc Limited has adopted the materiality definition set out by Global Reporting Initiative (GRI) which states, ***"The organization priorities reporting on those topics that represent its most significant impacts on the economy, environment and people, including impacts on their human rights."*** Accordingly, the nature-related dependencies and impact, risks and opportunities arising from the company operations are assessed, evaluated and strategically managed.

Additionally, Hindustan Zinc Limited is piloting the Science-Based Targets for Nature and currently working on the Assess and Prioritize steps (Steps 1 and 2). This process involves evaluating its impact on nature and identifying areas where action is most needed. In the initial pilot phase, the company is setting science-based targets to reduce pressures on freshwater and land. For all other significant impacts, the company plans to set science-based targets in the future as the Science-Based Targets for Nature expands its coverage of various pressures.

Scope of disclosures

For this TNFD report, Hindustan Zinc Limited has included its direct operations, comprising smelters, mines, power plants, and refinery units, with a total assessment of nine operational units. Additionally, critical suppliers are evaluated for physical risks and transition-reputational risks using the Biodiversity Risk Filter (BRF). Consequently, the report focuses exclusively on direct operations and specific upstream value chain components (critical suppliers). Downstream value chains are excluded from this report. Detailed information about these direct operations, including their locations and associated biome is presented in the table below.

Figure 2:
Scope of Business Value chain covered in the report



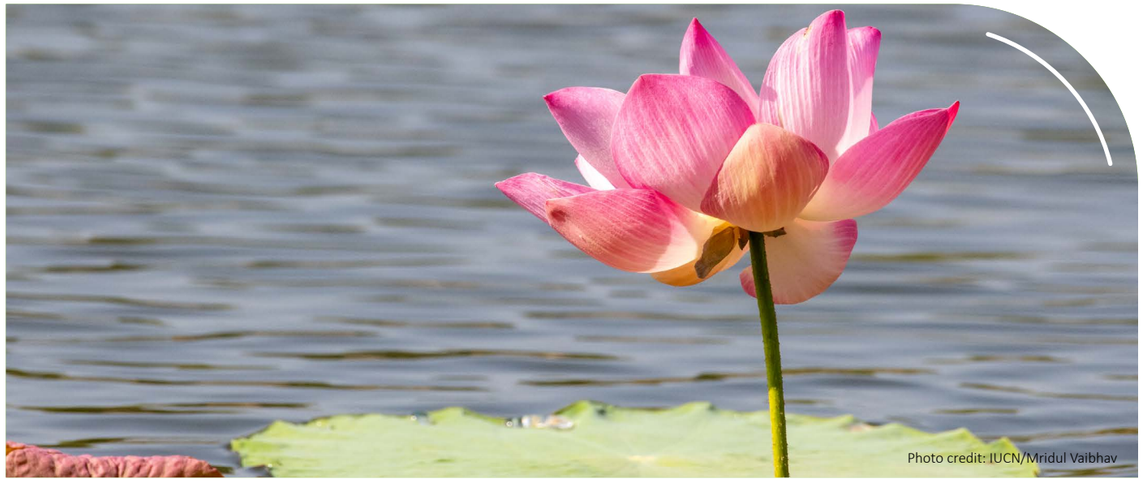


Photo credit: IUCN/Mridul Vaibhav

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The map below illustrates the locations of the plants covered in this TNFD report, with each plant positioned within its respective biogeographic zone. Among the nine operational units detailed in this report, eight are situated in the Semi-Arid Biogeographic Zone. In contrast, the Pantnagar Metal Plant (PMP) is uniquely located in the Gangetic Plain Biogeographic Zone, which features a distinctly different ecological and geographical landscape.

Table 1:

List of Hindustan Zinc Limited operational units along with locations and IUCN Biomes Typology

S. No.	Unit Names	Locations	IUCN Biomes Typology	Operations
1	Zawar Mines (ZM)	Udaipur District, Rajasthan	T5.1 Semi-desert steppes	Zinc- Lead Mining, Power Plant
2	Kayad Mines (KM)	Ajmer District, Rajasthan	T5.1 Semi-desert steppes	Zinc- Lead Mining
3	Rampura Agucha Mines (RAM)	Bhilwara District, Rajasthan	T5.1 Semi-desert steppes	Zinc- Lead Mining
4	Rajpura Dariba Mine (RDM)	Rajsamand District, Rajasthan	T5.1 Semi-desert steppes	Zinc- Lead Mining
5	Sindesar Khurd Mine (SKM)	Rajsamand District, Rajasthan	T5.1 Semi-desert steppes	Zinc- Lead Mining
6	Chanderia Lead Zinc Smelter (CLZS)	Chittaurgarh District, Rajasthan	T5.1 Semi-desert steppes	Smelter (Zinc and Lead), Power plant
7	Dariba Smelting Complex (DSC)	Rajsamand District, Rajasthan	T5.1 Semi-desert steppes	Smelter (Zinc and Lead), Power plant
8	Zinc Smelter Debari (ZSD)	Udaipur District, Rajasthan	T5.1 Semi-desert steppes	Smelter (Zinc)
9	Pantnagar Metal Plant (PMP)	Udham Singh Nagar District, Uttarakhand	T4.2 Pyric tussock savannas	Silver Refinery, Zinc melting and casting

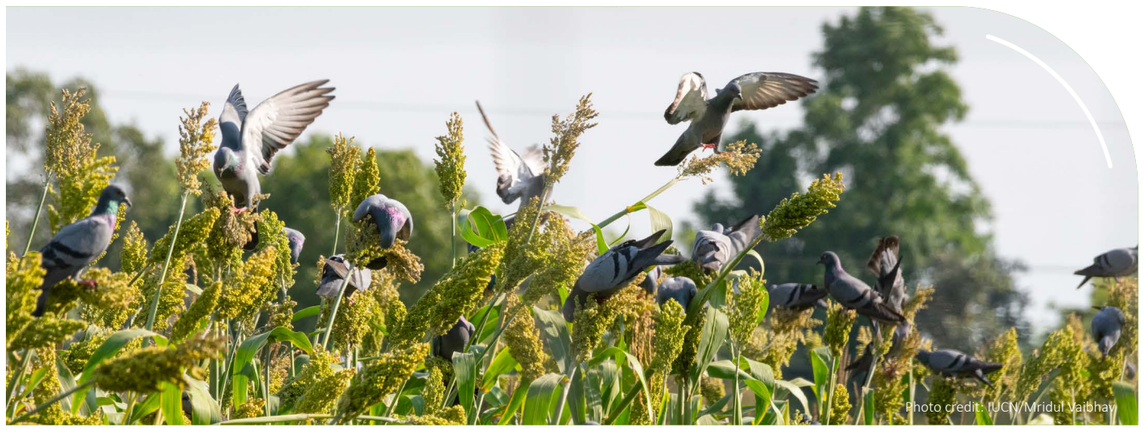
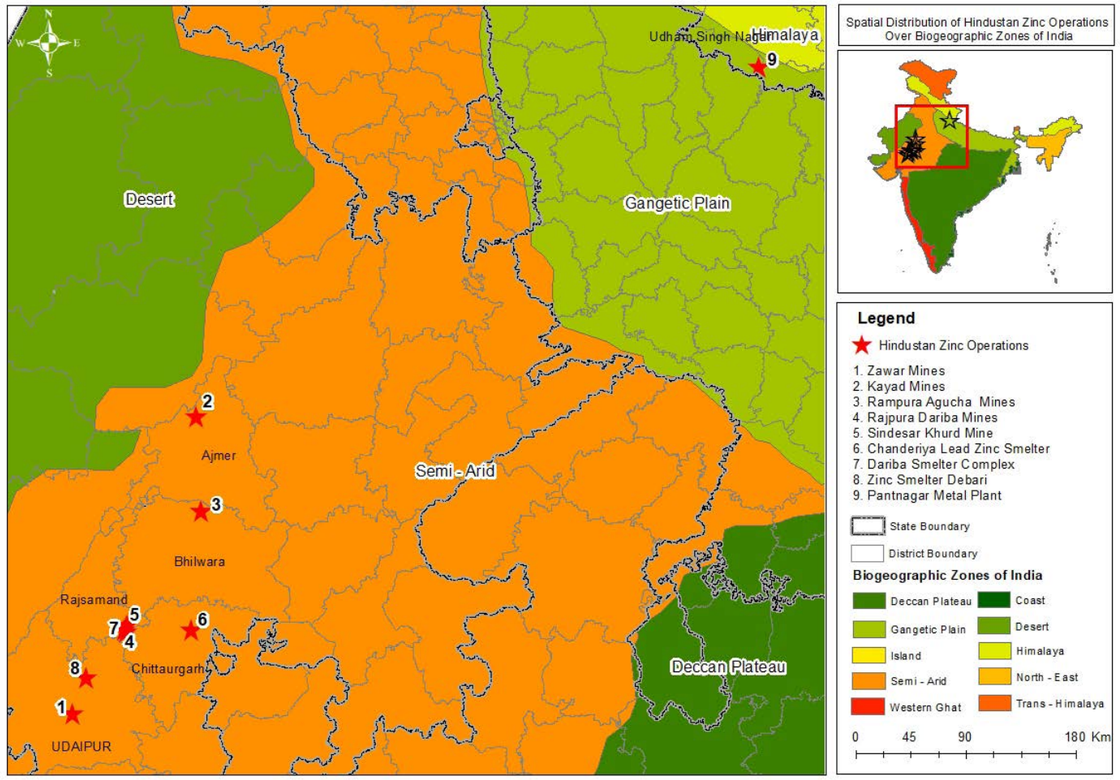


Photo credit: IUCN/Mridul Vaibhav

Figure 3:

Spatial Distribution of Hindustan Zinc Limited's Operations over Biogeographic Zones of India



The Time Horizons

This TNFD report considers three-time horizons (Short, Medium, and Long term) for planning, implementing, and reporting on nature related issues. The description of three-time horizons is provided below. In implementation of Biodiversity Policy, Hindustan Zinc Limited has developed site-specific Biodiversity Management Plans in 2014. Presently, all the Biodiversity Management Plans are under revision and shall be in place by end of 2024. These Biodiversity Management Plans shall identify the short term, medium term and long-term action plans for conservation of biodiversity and ecosystem services at their operational sites.

Time Horizons	Years	Description
Short	0-1 year	The nature related initiatives that can be started and completed within a span of 1 year are considered under this "Short" i.e. Undertaking the biodiversity sensitivity screening, Preparing site specific Biodiversity Management Plan.
Medium	5-10 year	The nature related initiatives that take time in planning and can be completed in span of 5-10 years are considered under this "Medium" i.e. Undertaking plantation on degraded lands, development of wetlands etc.
Long	10-15 year	The nature related initiatives that take time in planning and can be completed in span of more than 10 years are considered under this "Long" i.e. undertaking Ecosystem and Habitat Restoration, NbS based carbon offset projects etc.

Engagement with local communities, and affected stakeholders

Hindustan Zinc Limited has a robust institutional structure in place for engaging with local communities, and other stakeholders on nature-related issues. The company has adopted the below process to develop site specific biodiversity and ecosystem management plan for all operational sites.

Assess

Planning

Implement

IUCN was engaged by company to develop these site-specific Biodiversity Management Plans. Following is the mapping of community engagement process at each stage of Biodiversity Management Plan development.

Stages	Activity	Community Involvement
Assess	Biodiversity Assessment and Ecosystem Services Study	In this study, the extensive community survey was conducted at each site. Especially the survey was focussed on: • the condition of ecosystem services, • changes in the patterns of ecosystem services, • impact of these changes on the community and, • their suggestion on managing the ecosystems. These inputs were the part of the Biodiversity & Ecosystem Services (BES) inventory as Ecosystem Service Review report for each site.
Plan	Biodiversity Management Plan (BMP) development	The Biodiversity Management Plans are being developed for each site of Hindustan Zinc Limited with a specific component on socio-economic environment. This component shall deal with the initiatives related to local communities and relevant stakeholders for biodiversity management in the area.
Implement	BMP Implementation	The Biodiversity Management Plan implementation outside the boundaries of Hindustan Zinc Limited sites shall be done in collaboration with local communities. There will be a provision of engaging with biodiversity management committees (BMCs) for taking institutionalize actions.

Photo credit: IUCN/Mridul Vaibhav

Governance

Hindustan Zinc Limited upholds sustainability as a cornerstone of its business ethos. With a steadfast commitment to sustainable growth, the company has meticulously crafted a comprehensive three-tier governance framework. This framework intricately delineates the organizational structure, roles, responsibilities, and decision-making processes that underpin the company's endeavors in the realm of nature and climate.

At its core, this governance structure is designed to oversee the safety, health, environmental performance, and social impact of company's business operations, ensuring a holistic approach to sustainability management. Anchored in this framework are several key principles that define the company's approach to sustainable development. These include a well-defined governance structure and policy framework, the adoption of environmentally friendly technologies, rigorous environment impact assessments, conservation of natural resources, transparent engagement with stakeholders, independently verified reporting arrangements, and a commitment to social, economic, and institutional development in the communities where it operates.

Complementing this governance framework are a series of meticulously crafted policies tailored to address various sustainability challenges. These policies encompass Biodiversity Policy, Energy & Climate Change Policy, CSR Policy, Environmental Policy, Human Rights Policy and Water Management Policy. Together, these policies and governance mechanisms enables Hindustan Zinc Limited to effectively manage its nature-related Dependencies, Impacts, Risks, and Opportunities, thereby aligning company's operations with their sustainability objectives and fostering value creation for all stakeholders.

Board Oversight

At Hindustan Zinc Limited, the board plays a pivotal role in overseeing all aspects of sustainability as they relate to the company's long-term business strategy. The board also oversees the objectives mentioned in the Biodiversity Policy of the company, especially commitment to achieve No-Net Loss at operation level by implementation of the Mitigation Hierarchy.

To ensure robust governance for sustainability management including nature-related components, the company has established two board-level committees:

Audit and Risk Management Committee (ARC): The Audit and Risk Management Committee of the Board ensures an effective internal control environment by:

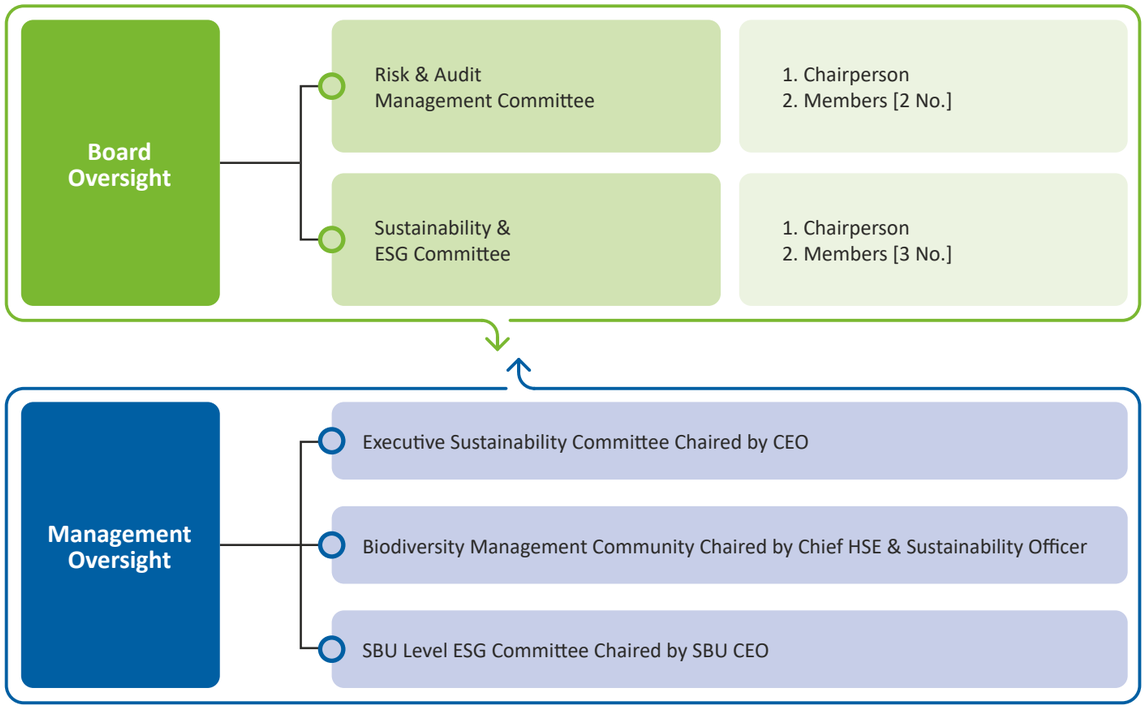
- Enhancing the efficiency and effectiveness of operations.
- Safeguarding assets and ensuring adequate provisions for all liabilities.
- Ensuring the reliability of financial and other management information, and the adequacy of disclosures.
- Ensuring compliance with all relevant statutes.

The committee also oversees climate-related risks and opportunities. It regularly reports on risk mitigation efforts to the Board. Additionally, the Audit and Risk Management Committee reviews potential impacts on production disruptions due to physical and transition risks that may affect the company's core business operations.

Sustainability and ESG Committee: This committee is responsible for overseeing strategy implementation, policy development, and the establishment and review of goals and targets aimed at enhancing stakeholder commitment, convenes semi-annually. The CEO, also a member of the Sustainability and ESG Committee, provides quarterly briefings to the board. The primary responsibilities of the Sustainability and ESG Committee include:

- Assisting the Board in meeting its ESG responsibilities and ensuring strong governance for sustainability.
- Providing guidance to ensure continual improvement in the company's sustainability performance and the implementation of appropriate processes and policies.
- Guiding and reviewing the company's sustainability strategy, goals, and targets.
- Playing a key strategic role in business decisions to ensure workplace safety, prevent environmental damage, enhance stakeholder commitment, and maintain the company's reputation as a leader in the sustainable metal and mining sector.

Figure 4:
Governance Structure of Hindustan Zinc Limited



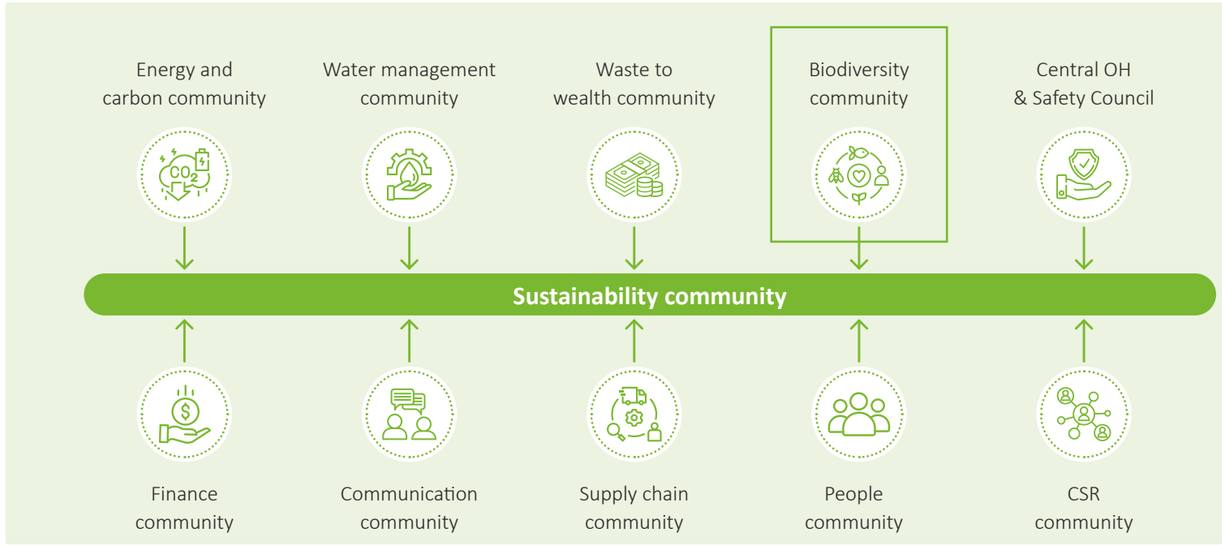
Management Oversight

Hindustan Zinc Limited has implemented a three-tier governance structure to efficiently manage and oversee sustainability initiatives.

To drive progress toward its 2025 sustainability targets, the company has established ten sustainability committees. These committees are composed of representatives from all business units, ensuring a comprehensive and integrated approach. Each committee is responsible for specific sustainability goals and consistently monitors and reports on the company's advancements toward achieving these goals. This structured approach allows for coordinated efforts and accountability across the organization. All these governing authorities are meeting on a monthly basis to review the progress against set targets.


Photo credit: IUCN/Mridul Vaibhav

Figure 5:
Sustainability Communities in Hindustan Zinc Limited



Executive Level Sustainability Committee: The Chief Executive Officer (CEO) chairs the Executive Sustainability Committee, comprising all Executive Committee members and chairpersons from ten sustainability communities. The Committee convenes monthly to assess progress towards the Sustainability Goals 2025. It plays a pivotal role in decision-making, ensuring workplace safety, environmental protection, stakeholder engagement, and safeguarding the company's reputation. Its responsibilities include:

- Developing the sustainability strategy and establishing goals and targets for the company.
- Continuously monitoring project status aimed at meeting sustainability goals, tracking progress against objectives, and guiding strategic resource allocation to achieve the Sustainability Goals 2025.

Biodiversity Management Community: This team, assigned with biodiversity conservation, risk assessment, and the development of mitigation strategies, functions within the purview of the Executive Sustainability Committee. It evaluates the nature-related Dependencies, Impacts, Risks, and Opportunities of operations. Moreover, it aims to boost resource efficiency and accountability by strategizing the creation and enforcement of standards for nature conservation and biodiversity protection.

At operational sites, environment heads and biodiversity managers, are members of this community and are responsible for implementing Biodiversity Plans.

Strategic Business Units (SBU) ESG Committees: At each of its SBUs, the company has instituted SBU ESG Committees. These committees ensure the adoption of sustainability practices related to ESG aspects, following the guidance provided by higher-level committees to meet the sustainability goals for 2025. Additionally, they oversee the ongoing identification and monitoring of dependencies, impacts, risks and opportunities at each location and initiate appropriate mitigation efforts to minimize or eradicate these risks.

Human Right and engagement with Local Communities and Stakeholders

Hindustan Zinc Limited upholds a steadfast commitment to human rights, extending to all stakeholders including employees, contractor workforce, business partners, suppliers, local communities, and other stakeholders.

Aligned with international standards, Hindustan Zinc Limited's Human Rights Policy adheres to the United Nations Declaration on Human Rights, UN Guiding Principles of Business and Human Rights (the "Ruggie Principles"), Universal Declaration of Human Rights (UDHR), and International Labour Organization (ILO) guidelines.

The company demonstrates its dedication to local communities where operations are situated through various objectives outlined in the Human Rights Policy, including:

- Minimizing risks and impacts on the health and safety of the local community throughout the project lifecycle.
- Respecting and preserving the cultural lifestyle and heritage of local communities.
- Seeking free, prior, informed consent (FPIC) from Indigenous Peoples (IP) or Vulnerable Tribal Groups (VTGs) when projects are located on traditional or customary lands.
- Engaging with the local community to understand their priorities and concerns and providing accurate, transparent, culturally appropriate, and timely information about operations.
- Minimizing physical and economic displacement of people through appropriate practices.

Hindustan Zinc Limited also maintains additional policies such as the CSR Policy, Anti-harassment & Discrimination Policy, Diversity & Inclusion Policy, Code of Conduct, Supplier Code of Conduct, and Health & Safety Policy. These policies facilitate engagement with indigenous peoples, local communities and socially marginalized groups.

Photo credit: IUCN/Mridul Vaibhav

Strategy

The LEAP Approach

TNFD recommends following LEAP approach to identify Dependency, Impact, Risk and Opportunities of business on nature. LEAP approach provides a systematic framework to understand business level as well as site level nature related issues. Following the TNFD recommendations, Hindustan Zinc Limited followed the LEAP framework to evaluate and assess the business level as well as site level nature related issues.

The key parameters to be covered under each phase of LEAP framework along with Hindustan Zinc Limited's approach is mentioned in the table below.

	LEAP indicators	Hindustan Zinc Limited's Approach
Locate	**L1. Span of the business model and value chain**	Direct operations- Company's operational units (9 units) Upstream- Critical Suppliers are considered for assessment.
	L2. Dependency and impact screening	ENCORE Tool ratings for Mining, Metal Processing and Diversified Metals are used for dependency and impact screening.
	L3. Interface with nature	The Biomes presence at all the operational sites are mapped as per IUCN Biomes Typology.
	L4. Interface with sensitive locations	None of the sites fall within proximity of areas of high biodiversity importance. 8 sites in Rajasthan falls under Water Stress. The company has considered all direct operational sites (9 Units) as priority units and is developing the Biodiversity Management Plans.
Evaluate	**E1. Identification of environmental assets and ecosystem services**	Ecosystems Services mapping and review is conducted at each direct operational site to identify the environmental assets and ecosystem services.
	E2. Identification of dependencies and impacts (Business Sectors)	Identification of dependency and impact of company's business sector are done using ENCORE tool and Biodiversity Risk Filter.
	E3. Dependency and Impact analysis (size and scale)	WRI's Ecosystem Services Review tool is used for dependency and Impact analysis for each sites on the ecosystem service. Both sizes and scale of dependency and impact are identified, and ranking is done.
	E4. Impact Materiality Assessment	The company has considered the impacts on company's operations, employees and local communities as material impacts for identifying risk and opportunities.
Assess	**A1. Risk and Opportunity identification**	The risk and opportunities corresponding to the impact and dependencies are identified for all the sites. Also, the risk assessment done for all the critical suppliers using WWF's Biodiversity Risk Filter.
	A2. Adjustment of existing risk mitigation and risk and opportunity management	The company has already existing biodiversity risk assessment and management framework. Accordingly, the site-specific Biodiversity Management Plans were developed in 2014. Presently these Biodiversity Management Plans are being revised. Additionally, Company has adopted WRI's Ecosystem Services Review tool for identifying site level impact, dependency, risk and opportunities.
	A3. Risk and opportunity measurement and prioritisation	The risk and opportunity identified by LEAP assessment are being integrated in the revised site-specific biodiversity management plans of all priority sites. The Biodiversity Management Plan shall have the prioritization of risks and corresponding actions.
	A4. Risk and opportunity materiality assessment	The company has considered all medium and high impact and dependency related risks as material risks and opportunities.
Prepare	**P1. Strategy and resource allocation**	The risks and opportunity management strategy and resources allocations shall be included in the Biodiversity Management Plans for each site.
	P2. Target setting and performance management	The company has adopted targets for 2025 and 2030 for 3 Nature Realms (Land, Water and Atmosphere). Also company has adopted the TNFD core global disclosure indicators and metrics for reporting and monitoring the company's performance.
	P3. Reporting	The company has reported the assessment results as part of "Strategy" and "Metrics & Targets" sections of the TNFD report.
	P4: Presentation	The company shall continue to present disclose nature related risks and opportunities using TNFD recommendation in coming years as well.

To comprehensively understand the interaction of its business operations with the surrounding environment, Hindustan Zinc Limited has conducted an assessment to map its Dependencies, Impacts, Risks, and Opportunities. As a leader in the mining and metal industry, the company is committed to environmental protection and has implemented various measures, including biodiversity screening and management planning for each business operation, to identify and address nature-related issues.

Hindustan Zinc Limited Business Sector level nature related issues - As prescribed by TNFD recommendations, the company has used the available tools and platforms such as the Biodiversity Risk Filter[2] and Exploring Nature Capital Opportunities, Risk and Exposure (ENCORE)[3] to screen the Dependencies and Impacts of the Metal and Mining Sector[4]. The Integrated Biodiversity Assessment Tool (IBAT)[5] is also used to understand the site sensitivity or proximity of business operations to biodiversity and nature. Furthermore, dependencies, impacts, and risks for each business operation were assessed using the Biodiversity Risk Filter. Business level opportunities will be included in the revised Biodiversity Management Plan.

Hindustan Zinc Limited Site level nature related issues - To understand site level sizes and scale of impact and dependencies, company has followed the WRI's Corporate Ecosystem Services Review guidelines. This approach aims to identify and evaluate the dependencies and impacts of the company's activities across various categories of ecosystem services, including Provisioning (such as food, water, and raw materials), Regulating (such as climate regulation and water purification) and Cultural (such as recreation and spiritual enrichment). These guidelines also aided the company in filtering out potential risks and opportunities arising from ecosystem changes.

Nature-related Risk Identification for Critical Suppliers - In addition to its direct operations, Hindustan Zinc Limited is striving to assess the nature-related Dependencies, Impacts, Risks, and Opportunities of its upstream value chain. In the initial phase, the company has identified 67 critical suppliers. Additionally, it has conducted a risk mapping exercise (both physical and transition-reputational) using the Biodiversity Risk Filter.

Nature related Dependencies and Impacts of Hindustan Zinc Limited

Hindustan Zinc Limited Business Sector Level

ENCORE Tool: ENCORE delineates the direct potential dependencies and impacts of production processes on ecosystem services and natural capital assets, focusing solely on those occurring within the operational realm and excluding those stemming from the supply chain. In the present analysis, the company has employed this tool to discern the potential Metal and Mining Sector dependency and impact on ecosystem services. The ensuing findings are succinctly summarized and presented below:

Table 2:

Metal and Mining Sector Dependency on Selected Ecosystem Services (A screening result of ENCORE tool)

Source	Business Operations	Climate Regulation	Ground Water	Mass Stabilization & Erosion Control	Surface Water	Water Flow Maintenance	Water Quality
ENCORE	Metal Processing	Very Low	Medium	Very Low	Medium	Medium	Low
	Mining	High	High	Medium	High	High	Low

[2] *https://riskfilter.org/*
[3] *https://www.encorenature.org/en*
[4] *https://tnfd.global/publication/additional-guidance-on-assessment-of-nature-related-issues-the-leap-approach/*
[5] *https://www.ibat-alliance.org/*

Table 3:

Metal and Mining Sector Impact on Selected Ecosystem Services (A screening result of ENCORE tool)

Source	Impacts of Operations	Water Use	Terrestrial Ecosystem Use	Freshwater Ecosystem Use	GHG Emission	Non GHG Emissions	Water Pollutants	Soil Pollutants
ENCORE	Diversified Metals (Zinc)	Very High	Very High	High	High	High	High	High

Biodiversity Risk Filter: The Biodiversity Risk Filter of World Wildlife Fund (WWF) provides platform to Inform, Explore, Assess and Respond to nature related issues. It furnishes information on direct Dependencies and Impacts of various industrial sectors, categorized by different dependency and impact indicators. The 'Explore Module' and 'Assess Module' enables to understand the Physical and Transition risk including its sub risk [category wise] and indicators.
In the present study, the company has employed the 'Inform module' to analyse core Dependencies and Impacts of Metal and Mining Sector. The subsequent Dependencies and Impacts have been collated and outlined below for elucidation.

Table 4:

Dependency of Metal and Mining Sector (A screening result of Biodiversity Risk Filter)

Dependency Category	Biodiversity Risk Filter Indicators	Dependency Level
Provisioning Services	Water Scarcity	Very High
	Forest Productivity and Distance to Markets	High
	Limited Wild Flora & Fauna Availability	Not Applicable
	Limited Marine Fish Availability	Not Applicable
Regulating & Supporting Services- Enabling	Soil Condition	Not Applicable
	Water Condition	Low
	Air Condition	Medium
	Ecosystem Condition	Not Applicable
	Pollination	Not Applicable
Regulating Services- Mitigating	Landslides	High
	Wildfire Hazard	Medium
	Plant/Forest/Aquatic Pests and Diseases	Not Applicable
	Herbicide Resistance	Not Applicable
	Extreme Heat	High
	Tropical Cyclones	High
Cultural Services	Tourism Attractiveness	Not Applicable
Additional Reputational Factors	Media Scrutiny	Very High
	Political Situation	Medium
	Sites of International Interest	Medium
	Risk Preparation	Low

Table 5:

Impact of Metal and Mining Sector (A screening result of Biodiversity Risk Filter)

Impact Category	Biodiversity Risk Filter Indicators	Impact Level
Pressures on Biodiversity	Land, Freshwater and Sea Use Change	Very high
	Tree Cover Loss	Very high
	Invasives	Low
	Pollution	Very high
Environmental Factors	Protected/Conserved Areas	Very high
	Key Biodiversity Areas	High
	Other Important Delineated Areas	High
	Ecosystem Condition	High
	Range Rarity	Medium
Socioeconomic Factors	Resource Scarcity: Food- Water- Air	Low
	Labor/Human Rights	High
	Financial Inequality	Low

The sectoral assessments conducted through ENCORE and Biodiversity Risk Filter reveal the following:

ENCORE Assessment:

1. Mining exhibits a high dependency on Climate regulation, Groundwater, Surface Water, and Water Flow Maintenance.
2. Metal processing demonstrates very low to medium dependency across all six indicators.
3. There is Very High impact on water use and terrestrial ecosystem utilization, with remaining indicators showing high levels of impact.

Biodiversity Risk Filter Assessment:

1. Dependency is Very High on indicators such as water scarcity, media scrutiny, and pollution.
2. High dependency is observed on indicators namely- forest productivity & distance to market, landslides, extreme heat, and tropical cyclones.
3. The impact is Very High on indicators such as land use, tree cover loss, pollution and protected areas.
4. Additionally, impacts are High on indicators like key biodiversity areas, other important delineated areas, ecosystem condition, and labour/human rights.

Comparison of business level impact & dependency with site level

When the business level impact and dependencies of Hindustan Zinc Limited (mapped using ENCORE Tool and Biodiversity Risk Filter) are compared with the site level impact and dependencies at company's direct operational sites (mapped using Ecosystem Services Review Tool), it is observed that most of the indicators at business level fall under high and medium category (i.e. water scarcity, Ecosystem conditions etc.) but same indicators are falling under low category at site level. This is primarily due to early adoption of Biodiversity Risk Framework by the company and implementation of site-specific Biodiversity Management Plan since 2014. Presently these Biodiversity Management Plans are being revised by IUCN.

Photo credit: IUCN/Mridul Vaibhav

Hindustan Zinc Limited Site Level

Through Ecosystem Services Review: Dependencies and impacts mapped via ENCORE and Biodiversity Risk Filter provided a sectoral overview exclusively. However, achieving a clear delineation of dependencies and impacts necessitates a primary or site-level study. Recognizing this gap, Hindustan Zinc Limited undertook an Ecosystem Services Review (ESR) for all its business operations.

The Ecosystem Services Review process conducted typically involved gathering data on the specific ecosystem services utilized or impacted by company's operations within a buffer of 10 km. This included identifying the provisioning, regulating, and cultural services that play a role in supporting company's activities. Furthermore, the Ecosystem Services Review provided insight into the potential risks and opportunities associated with these dependencies and impacts.

Additionally, to facilitate analysis and decision-making processes, Hindustan Zinc Limited categorized dependencies into three levels: Low, Medium, and High, based on the extent of reliance on ecosystem services. Similarly, impacts were classified as Low, Medium and High indicating the magnitude of the effects of the company's operations on ecosystem services. These categorizations help prioritize areas for action and mitigation, ensuring that Hindustan Zinc Limited can effectively manage its environmental risks while promoting sustainability and responsible resource management.

The results of these categorizations are presented in table below:

Table 6:

Dependencies of Hindustan Zinc Limited Business Operations on Provisioning Ecosystem Services (Assessed through Ecosystem Services Review)

Hindustan Zinc Limited Business Operations	Provisioning Ecosystem Services													
	Crops	Livestock	Capture fisheries	Aquaculture	Wild foods	Timber & other wood fibres	Fibers & resins	Animal skins	Sand	Ornamental resources	Biomass fuel	Freshwater	Genetic resources	Biochemicals, natural medicines, pharmaceuticals
Zawar Mines (ZM)	M	L	L	L	L	L	L	L	L	L	L	M	L	L
Kayad Mines (KM)	M	L	L	L	L	L	L	L	L	L	L	L	L	L
Rampura Agucha Mines (RAM)	L	L	L	L	L	L	L	L	L	L	L	M	L	L
Rajpura Dariba Mines (RDM)	M	L	L	L	L	L	L	L	L	L	L	L	L	L
Sindesar Khurd Mine (SKM)	M	L	L	L	L	L	L	L	L	L	L	L	L	L
Chanderia Lead Zinc Smelter (CLZS)	L	L	L	L	L	L	L	L	L	L	L	M	L	L
Dariba Smelting Complex (DSC)	M	L	L	L	L	L	L	L	L	L	L	L	L	L
Zinc Smelter Debari (ZSD)	M	L	L	L	L	L	L	L	L	L	L	L	L	L
Pantnagar Metal Plant [PMP]	M	L	L	L	L	L	L	L	L	L	L	L	L	L

L: Low, M: Medium, H: High

Table 7:

Dependencies of Hindustan Zinc Limited Business Operations on Regulating & Cultural Ecosystem Services (Assessed through Ecosystem Services Review)

Hindustan Zinc Limited Business Operations	Regulating Ecosystem Services											Cultural Ecosystem Services		
	Maintenance of air quality	Global climate regulation	Regional/local climate regulation	Regulation of water timing and flows	Erosion control	Water purification and waste treatment	Disease mitigation	Maintenance of soil quality	Pest mitigation	Pollination	Natural hazard mitigation	Recreation & ecotourism	Ethical & spiritual values	Educational and inspirational values
Zawar Mines (ZM)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Kayad Mines (KM)	L	L	L	L	L	L	L	L	L	L	L	L	M	L
Rampura Agucha Mines (RAM)	L	L	L	L	H	L	L	L	L	L	L	L	L	L
Rajpura Dariba Mines (RDM)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Sindesar Khurd Mine (SKM)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Chanderia Lead Zinc Smelter (CLZS)	L	L	L	L	H	L	L	L	L	L	L	M	M	L
Dariba Smelting Complex (DSC)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Zinc Smelter Debari (ZSD)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Pantnagar Metal Plant [PMP]	L	L	L	L	L	L	L	L	L	L	L	L	L	L

L: Low, M: Medium, H: High

Table 8:

Impacts of Hindustan Zinc Limited Business Operations on Provisioning Ecosystem Services (Assessed through Ecosystem Services Review)

Hindustan Zinc Limited Business Operations	Provisioning Ecosystem Services													
	Crops	Livestock	Capture fisheries	Aquaculture	Wild foods	Timber & other wood fibres	Fibers and resins	Animal skins	Sand	Ornamental resources	Biomass fuel	Freshwater	Genetic resources	Biochemicals, natural medicines, pharmaceuticals
Zawar Mines (ZM)	H+	H+	L	L	L	L	L	L	L	L	L	M+	L	L
Kayad Mines (KM)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Rampura Agucha Mines (RAM)	H+	H+	L	L	L	L	H+	L	L	L	L	M+	L	L
Rajpura Dariba Mines (RDM)	H+	H+	L	L	L	L	L	L	L	L	L	L	L	L
Sindesar Khurd Mine (SKM)	H+	H+	L	L	L	L	L	L	L	L	L	L	L	L
Chanderia Lead Zinc Smelter (CLZS)	H+	H+	L	L	L	L	L	L	L	L	L	M-	L	L
Dariba Smelting Complex (DSC)	H+	H+	L	L	L	L	L	L	L	L	L	L	L	L
Zinc Smelter Debari (ZSD)	H+	H+	L	L	L	L	L	L	L	L	L	L	L	L
Pantnagar Metal Plant [PMP]	L	L	H+	L	L	L	L	L	L	L	L	L	L	L

L: Low, M: Medium, H: High, Plus Sign [+]: Positive Impact, Minus Sign [-]: Negative Impact

Table 9:

Impacts of Hindustan Zinc Limited Business Operations on Regulating & Cultural Ecosystem Services (Assessed through Ecosystem Services Review)

Hindustan Zinc Limited Business Operations	Regulating Ecosystem Services											Cultural Ecosystem Services		
	Maintenance of air quality	Global climate regulation	Regional/local climate regulation	Regulation of water timing and flows	Erosion control	Water purification and waste treatment	Disease mitigation	Maintenance of soil quality	Pest mitigation	Pollination	Natural hazard mitigation	Recreation & ecotourism	Ethical & spiritual values	Educational and inspirational values
Zawar Mines (ZM)	L	L	L	M-	L	L	L	L	L	L	L	H+	L	L
Kayad Mines (KM)	L	L	L	M-	L	L	L	L	L	L	L	L	H+	L
Rampura Agucha Mines (RAM)	L	L	L	M-	L	L	L	L	L	L	L	L	L	L
Rajpura Dariba Mines (RDM)	L	L	L	M-	L	L	L	L	L	L	L	H+	L	L
Sindesar Khurd Mine (SKM)	L	L	L	M-	L	L	L	L	L	L	L	H+	L	L
Chanderia Lead Zinc Smelter (CLZS)	L	L	L	L	L	L	L	L	L	L	L	L	H+	L
Dariba Smelting Complex (DSC)	L	L	L	L	L	L	L	L	L	L	L	H+	L	L
Zinc Smelter Debari (ZSD)	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Pantnagar Metal Plant [PMP]	L	L	L	L	L	L	L	L	L	L	L	L	L	L

L: Low, M: Medium, H: High, Plus Sign [+]: Positive Impact, Minus Sign [-]: Negative Impact

Dependencies and Impacts at the operation level are mapped through the Ecosystem Services Review. The compiled site-wise Dependency-Impact (DI) assessments for each site are presented below, highlighting areas of high dependency and significant impacts.

Table 10:

Summary of Sites With High/Medium Dependencies and Impacts (Assessed through Ecosystem Services Review)

Business Operations	Indicators	Dependency	Impact
Zawar Mines (ZM)	Crops	M	H+
	Freshwater	M	M+
	Regulation of water timing and flows	L	M-
Kayad Mines (KM)	Crops	M	L
	Regulation of water timing and flows	L	M-
	Ethical & spiritual values	M	H+
Rampura Agucha Mines (RAM)	Freshwater	M	M+
	Regulation of water timing and flows	L	M-
	Erosion Control	H	L
Rajpura Dariba Mines (RDM)	Crops	M	H+
	Regulation of water timing and flows	L	M-
Sindesar Khurd Mine (SKM)	Crops	M	H+
	Regulation of water timing and flows	L	M-
Chanderia Lead Zinc Smelter (CLZS)	Freshwater	M	M-
	Erosion Control	H	L
	Recreation & ecotourism	M	L
	Ethical & spiritual values	M	H+
Dariba Smelting Complex (DSC)	Crops	M	H+
Zinc Smelter Debari (ZSD)	Crops	M	H+
Pantnagar Metal Plant [PMP]	Crops	M	L

Table 11:

Site specific Physical and Transition Risk based on the Ecosystem Services Review

HZL Location	Ecosystem Service	Dependency	Impact	Physical Risk	Transition Risk
Zawar Mines (ZM)	Crops	M	H+	Vegetables and agricultural produce are sourced from the local market. This makes the company reliant on crops production within 10 km. Under Corporate Social Responsibility (CSR) initiatives, the company has initiated sustainable agricultural practices including the use of improved seeds and new technologies. This initiative is creating a positive impact on the provisioning ecosystem services related to crops. Thus, the acute and chronic risks for this indicator are negligible. **Acute Risk:** NIL **Chronic Risk:** NIL	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supplies. However, the implementation of sustainable agricultural practices under the CSR initiative aligns well with current and emerging agricultural policies focused on sustainability, reducing potential policy risks.
	Freshwater	M	M+	Being in the location categorised as "over-exploited" by CGWA, there is a concern about declining groundwater levels in the area. Although the company is sourcing freshwater from the Tidi Dam (a water reservoir maintained by HZL) Additionally, the company is planning to reduce its dependency on the dam by shifting to recycled water. The company has taken rainwater water harvesting measures in the area. Also, company supplies water from the Tidi Dam to local communities. With such situation, following risks area identified: **Acute Risk:** NIL **Chronic Risk:** The operation relies on surface water from the Tidi Dam. The prolonged drought conditions and depletion of water availability pose a threat, potentially disrupting water supply to the operation.	**Policy Risk:** There is a policy risk if regulatory requirements changes or restrictions imposed on water usage from the Tidi Dam. It may pose risk of meeting water requirements for operations. **Reputational:** Reputational risks could manifest if the operation is perceived as consuming more water in a water scares area. This may lead to negative publicity and damage the brand. Company is already taking initiatives i.e. rainwater harvesting, recycling and dry tailing plant to address this risk.
	Regulation of water timing and flows	L	M-	The mining operation at Zawar is underground. There is a possibility that underground mining operations may cuts into groundwater aquifers. This is why the potential impact is considered Medium and risk is evaluated accordingly. **Acute Risk:** Nil **Chronic Risk:** Gradual depletion of groundwater resources over time.	**Policy Risk:** Policy risks may arise from potential changes in environmental regulations governing groundwater extraction and management. This may be required in future course to implement costly remediation measures or obtain additional permits to address environmental concerns. [Ref CGWA, Guidelines] **Reputation Risk:** Reputational risks may arise from negative publicity and loss of trust among stakeholders due to perceived environmental irresponsibility or failure to address groundwater-related concerns.
Kayad Mines (KM)	Crops	M	L	Vegetables and agricultural produce are sourced from the local market. This makes the company mildly reliant on crops production within 10 km. **Acute Risk:** NIL **Chronic Risk:** NIL	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supplies.
	Regulation of water timing and flows	L	M-	The mining operation at Kayad Mine is conducted underground, which means there is a possibility that the mining activities could intersect with groundwater aquifers. This interaction poses a medium-level risk because it could potentially affect the quantity or quality of groundwater in the area. **Acute Risk:** Nil **Chronic Risk:** Gradual depletion of groundwater resources over time.	**Policy Risk:** Policy risks may arise from potential changes in environmental regulations governing groundwater extraction and management. This may be required in future course to implement costly remediation measures or obtain additional permits to address environmental concerns. [Ref CGWA, Guidelines] **Reputation Risk:** Reputational risks may arise from negative publicity and loss of trust among stakeholders due to perceived environmental irresponsibility or failure to address groundwater-related concerns.
	Ethical & spiritual values	M	H+	Every year, over 10,000+ people stay in permanent or temporary structures for the Urs mela at Ajmer Dargah during January-February (25 days). During this period, Hindustan Zinc Limited have to divert its road transportation routes. This dependency on cultural ecosystem services poses a physical risk for the company. **Acute Risk:** During the 25-day period of the Urs mela, the company may face immediate operational disruptions and route diversion, potentially leading to delays and increased costs. **Chronic Risk:** Over the long term, the annual need to alter transportation routes can lead to sustained operational inefficiencies and increased logistical costs, affecting the company's overall productivity and profitability.	**Reputational Risk:** There could be reputational risk if transportation diversions not managed effectively during the Urs mela. Delays and inefficiencies may lead to customer dissatisfaction and negative publicity. Moreover, if the company's actions during the event are perceived as disruptive to the cultural festivities or the local community, it may harm its standing and relationships with stakeholders, including residents and authorities.

Photo credit: IUCN/Mridul Vaibhav

Rampura Agucha Mines (RAM)	Freshwater	M	M+	Freshwater is sourced from a radial well located in the Banas riverbed hence company relies on groundwater for operations. Additionally, the company has established a 63-kilometer pipeline infrastructure. In response to the potential environmental impact of groundwater extraction, the company has implemented proactive measures. Specifically, company have installed water harvesting structures designed to capture rainwater. These structures facilitate the infiltration of rainwater into the groundwater system, thereby replenishing aquifers and alleviating pressure on local groundwater resources. Since the area is categorized as "Over-Exploited," freshwater availability remains a risk for the company. **Acute Risk:** During periods of drought or unexpected water scarcity events, the company may face immediate disruptions in water supply from the radial well. This could impact daily operations, leading to production delays until ternative water sources are secured. **Chronic Risk:** Over the long term, continued reliance on groundwater from the Banas riverbed may lead to depletion of aquifers. This chronic risk could result in reduced water availability, increased costs associated with deeper well drilling.	**Policy Risk:** Changes in environmental regulations or water management policies could affect the company's ability to extract and use groundwater from the Banas riverbed. Stricter regulations aimed at conserving groundwater resources or promoting water sustainability may require the company to invest in additional water conservation technologies or face penalties for non-compliance. **Reputational Risk:** Reputational risks may arise from public perception and stakeholder expectations regarding sustainable water management practices. Negative publicity related to water scarcity issues or environmental impacts could damage the company's reputation, affecting customer loyalty, employee morale, and investor confidence.
	Regulation of water timing and flows	L	M-	The mining operation at Rampura Agucha (RAM) is underground. During the initial years, underground mining activities intersected with the groundwater aquifer. Subsequently, dewatering was required, and the extracted water was used for operational purposes. This may arise certain risks. **Acute Risk:** No acute risks are anticipated since the mining operation has already intersected the aquifer in the past. **Chronic Risk:** There is a long-term risk of gradual depletion of groundwater resources over time, potentially leading to increased operational costs.	**Policy Risk:** Policy risks may arise from potential changes in environmental regulations governing groundwater extraction and management. This may be required in future course to implement costly remediation measures or obtain additional permits to address environmental concerns. [Ref CGWA, Guidelines] **Reputation Risk:** Reputational risks may arise from negative publicity and loss of trust among stakeholders due to perceived environmental irresponsibility or failure to address groundwater-related concerns.

Rampura Agucha Mines (RAM)	Erosion Control	H	L	For dump stabilization, the company has implemented a strategy involving mixed plantations of local species. Specifically, plant species with fibrous roots were chosen and planted to serve as soil binders. These measures effectively manage surface runoff within the lease area, highlighting the company's reliance on Erosion Control – a vital Regulating Ecosystem Service. The impact of these measures is assessed as low, primarily because there are alternative erosion control options available that can supplement or enhance the effectiveness of the current practices. This proactive approach ensures sustainable land management and minimizes environmental impacts associated with erosion. **Acute Risk:** No immediate acute risks are anticipated given the effective erosion control measures in place through plantation and soil binding techniques. **Chronic Risk:** Over time, there may be a chronic risk of vegetation degradation or loss, potentially compromising the effectiveness of erosion control measures. This may result in increased erosion rates and the need for continuous maintenance and replanting efforts.	**Reputational Risk**: Negative perceptions or publicity about erosion control practices may damage the company's reputation. Maintaining trust among stakeholders, including local communities and environmental organizations, requires transparent communication, proactive environmental efforts, and adherence to best practices. **Technology Risk**: Erosion control technologies may become outdated, requiring continuous updates and investment. New methods can be costly and need specialized training. Integrating new technologies with existing systems can be challenging and may require additional resources. Additionally, reliance on external experts can pose risks related to availability and cost.
Rajpura Dariba Mines (RDM)	Crops	M	H+	Approximately 20% of the company's food supply, including wheat and vegetables, is sourced from the local market. It shows the dependency of company on crops – Provisioning Ecosystem Services. To support this ecosystem service the company is promoting sustainable agricultural practices under its Corporate Social Responsibility. The sustainable agriculture practices positively impacting the agriscape, mitigating both acute and chronic risks. **Acute Risk:** Nil **Chronic Risk:** Nil	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supplies.
	Regulation of water timing and flows	L	M-	The mining operation at Rajpura Dariba Mines is underground. There is a possibility that underground mining operations may cut groundwater aquifers. This is why the potential impact is considered Medium and risk is evaluated accordingly. **Acute Risk:** No acute risks is envisaged as the area is already water scares. **Chronic Risk:** Long-term risks is the gradual depletion of groundwater resources over time, which could result in increased operational costs.	**Policy Risk:** Policy risks may arise from potential changes in environmental regulations governing groundwater extraction and management. This may be required in future course to implement costly remediation measures or obtain additional permits to address environmental concerns. [Ref CGWA, Guidelines] **Reputation Risk:** Reputational risks may arise from negative publicity and loss of trust among stakeholders due to perceived environmental irresponsibility or failure to address groundwater-related concerns.

Sindesar Khurd Mine (SKM)	Crops	M	H+	Vegetables and agricultural products for consumption are sourced from the local market, making the company reliant on these crops. To support the crop production, the company has initiated sustainable agricultural practices, including the use of improved seeds and new technologies, under its Corporate Social Responsibility (CSR) program. This initiative is creating a positive impact on the provisioning ecosystem services related to crops. Thus, the acute and chronic risks for this indicator are negligible. **Acute Risk:** NIL **Chronic Risk:** NIL	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supplies.
	Regulation of water timing and flows	L	M-	The underground mining operations at Sindesar Khurd Mine carry a significant risk of intersecting groundwater aquifers. This potential impact is considered Medium, highlighting the importance of thorough evaluation and proactive management of associated risks. **Acute Risk:** No acute risks is envisaged as the area is already water scare. **Chronic Risk:** Gradual depletion of groundwater resources may arise over time.	**Policy Risk:** Policy risks may arise from potential changes in environmental regulations governing groundwater extraction and management. This may be required in future course to implement costly remediation measures or obtain additional permits to address environmental concerns. [Ref CGWA, Guidelines] **Reputation Risk:** Reputational risks may arise from negative publicity and loss of trust among stakeholders due to perceived environmental irresponsibility or failure to address groundwater-related concerns.
Chanderia Lead Zinc Smelter (CLZS)	Freshwater	M	M-	The Chanderia Plant relies on its captive Gosunda Dam for its water requirements, including operational, drinking, and domestic purposes. **Acute Risk:** NIL **Chronic Risk:** NIL	**Policy Risk:** There is a policy risk if regulatory requirements changes or restrictions imposed on water usage from the Gosunda Dam. This may pose risk of meeting water requirements for operations. **Reputational Risk:** As Berach River is in close proximity of Chanderia Plant Boundary. There may be a reputational risk due to the perception of people that plant may impact the water body. However, so far no impact has bee observed in the studies commissioned by Hindustan Zinc Limited.

Chanderia Lead Zinc Smelter (CLZS)	Erosion Control	H	L	The company has implemented green caping of its waste disposal yard through plantation and the creation of an ecosystem for erosion control. This strategy involves mixed plantations of local species, specifically selecting plant species with fibrous roots to act as soil binders. These measures effectively manage surface runoff within the lease area, emphasizing the company's reliance on Erosion Control – a crucial Regulating Ecosystem Service. The impact of these measures is considered low, primarily due to the availability of alternative erosion control options that can complement or enhance current practices. This proactive approach ensures sustainable land management and minimizes environmental impacts associated with erosion. **Acute Risk:** No immediate acute risks are anticipated given the effective erosion control measures in place through plantation and soil binding techniques. **Chronic Risk:** Over time, there may be a chronic risk of vegetation degradation or loss, potentially compromising the effectiveness of erosion control measures. This could result in increased erosion rates and the need for continuous maintenance and replanting efforts.	**Reputational Risk:** Negative perceptions or publicity about erosion control practices can damage the company's reputation. Maintaining trust among stakeholders, including local communities and environmental organizations, requires transparent communication, proactive environmental efforts, and adherence to best practices. **Technology Risk:** Erosion control technologies may become outdated, requiring continuous updates and investment. New methods can be costly and need specialized training. Integrating new technologies with existing systems can be challenging and may require additional resources. Additionally, reliance on external experts can pose risks related to availability and cost.
	Recreation & ecotourism	M	L	The company is situated within 10 kilometres of Chittorgarh fort, a significant cultural site regularly visited by its employees. Additionally, there is a temple located nearby, further emphasizing the company's reliance on Cultural Ecosystem Services. **Acute Risk:** NIL **Chronic Risk:** NIL	**Reputational Risk:** The company's image maybe impacted if its activities are perceived as not respecting or contributing positively to the cultural heritage and sites in the area. Maintaining respectful engagement with local cultural assets, supporting conservation efforts, and fostering positive relationships with the community are essential to mitigate reputational risks and uphold a positive corporate image.
	Ethical & spiritual values	M	H+	Temples are situated both within and outside the boundaries of the Chanderia lead zinc Smelter Plant, attracting regular visits from people. This underscores the company's dependence on Cultural Ecosystem Services. **Acute Risk:** NIL **Chronic Risk:** NIL	**Reputational Risk:** The company's reputation maybe at risk if there are concerns or criticisms about its impact on the temples and the surrounding cultural environment. Maintaining respectful stewardship of the cultural sites, supporting community initiatives for their preservation, and transparent communication about conservation efforts are crucial to mitigate reputational risks and uphold a positive corporate image.

Dariba Smelting Complex (DSC)	Crops	M	H+	Approximately 20% of the company's food supply, including wheat and vegetables, is sourced from the local market. It shows the dependency of company on crops – Provisioning Ecosystem Services. To support this ecosystem service the company is promoting sustainable agricultural practices under its Corporate Social Responsibility. These sustainable agriculture practices positively impact the agriscape, mitigating both acute and chronic risks. **Acute Risk:** Nil **Chronic Risk:** Nil	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supplies.
Zinc Smelter Debari (ZSD)	Crops	M	H+	Vegetables and agricultural products for consumption are sourced from the local market, making the company reliant on these crops. To enhance crop production, the company has initiated sustainable agricultural practices, including the use of improved seeds and new technologies, under its Corporate Social Responsibility (CSR) program. This initiative is creating a positive impact on the provisioning ecosystem services related to crops. Thus, the acute and chronic risks for this indicator are negligible. **Acute Risk:** NIL **Chronic Risk:** NIL	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supply chain. However, the implementation of sustainable agricultural practices under the CSR initiative aligns well with current and emerging agricultural policies focused on sustainability, reducing potential policy risks.
Pantnagar Metal Plant (PMP)	Crops	M	L	Vegetables and agricultural produce are sourced from the local market. This makes the company reliant on crops production within 10 km. Under Corporate Social Responsibility (CSR) initiatives, the company has initiated sustainable agricultural practices including the use of improved seeds and new technologies. This initiative is creating a positive impact on the provisioning ecosystem services related to crops. Thus, the acute and chronic risks for this indicator are negligible. **Acute Risk:** NIL **Chronic Risk:** NIL	**Policy Risk:** The company's reliance on local markets for vegetables and agricultural products means that any changes in agricultural policies could impact its supplies. However, the implementation of sustainable agricultural practices under the CSR initiative aligns well with current and emerging agricultural policies focused on sustainability, reducing potential policy risks.

Nature-related Opportunities:

Hindustan Zinc Limited is committed to leveraging nature-related opportunities to enhance its sustainability performance. The Ecosystem Services Review has identified dependencies and impacts those present significant opportunities for the company's operations, thereby improving its overall sustainability. By focusing on site-specific initiatives, the company aims to address ecological risks while supporting local biodiversity and communities. These initiatives include rejuvenating water bodies, developing riparian habitats and enhancing groundwater resources. Each site, from the Chanderia Lead Zinc Smelter to the Dariba Smelting Complex (DSC), offers unique opportunities to implement sustainable practices that benefit both the environment and the surrounding communities.

[6] Consolidated Guidelines to regulate and control water extraction in India [2023]. Central Ground Water Authority. CGWA. *https://cgwa-noc.gov.in/LandingPage/Guidlines/ConsolidateGuidline.pdf#ZOOM=100]*

Table 12:

Site specific Opportunities for Sustainability Performance based on the Ecosystem Services Review

Business Operations	Ecosystem Services as Risk Indicators	Opportunities – Sustainability Performance
Zawar Mines (ZM)	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.
	Freshwater	**Water:** Develop and rejuvenate dried water bodies/ wetlands in and around the site boundary with mix of riparian species to support local flora and fauna. **Groundwater:** Support local communities to maintain and develop dug wells. Dried dug wells to be used for groundwater recharge.
Kayad Mines (KM)	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.
	Ethical & spiritual values	**Enhance Visitor Experience**: Develop visitor centres or interpretation facilities near the cultural sites to provide educational resources on local history, biodiversity, and sustainable mining practices. **Support Local Economies**: Partner with local businesses and artisans to promote locally sourced goods and services, enhancing economic opportunities for nearby communities. By supporting local livelihoods through ecotourism, the company can contribute to economic diversification and resilience in the region.
Rampura Agucha Mines (RAM)	Freshwater	**Water**: Develop and rejuvenate dried water bodies/ wetlands in and around the site boundary with mix of riparian species to support local flora and fauna. **Groundwater:** Support local communities to maintain existing dug wells. Dried dug wells to be used for groundwater recharge.
Rajpura Dariba Mines (RDM)	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.

Sindesar Khurd Mine (SKM)	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.
	Freshwater	**Water**: Develop and rejuvenate dried water bodies/ wetlands in and around the site boundary with mix of riparian species to support local flora and fauna. **Groundwater**: Support local communities to maintain existing dug wells. Dried dug wells to be used for groundwater recharge.
Chanderia Lead Zinc Smelter (CLZS)	Recreation & ecotourism	**Explore Ecotourism Partnerships**: Collaborate with local tourism authorities and cultural heritage organizations to develop sustainable ecotourism initiatives cantered around nearby cultural sites. This will help to showcase the companys effort to conserving the local cultural heritage. **Enhance Visitor Experience**: Develop visitor centres or interpretation facilities near the cultural sites to provide educational resources on local history, biodiversity, and sustainable mining practices. **Support Local Economies**: Partner with local businesses and artisans to promote locally sourced goods and services, enhancing economic opportunities for nearby communities. By supporting local livelihoods through ecotourism, the company can contribute to economic diversification and resilience in the region.
	Ethical & spiritual values	**Enhance Visitor Experience**: Develop visitor centres or interpretation facilities near the cultural sites to provide educational resources on local history, biodiversity, and sustainable mining practices. **Support Local Economies**: Partner with local businesses and artisans to promote locally sourced goods and services, enhancing economic opportunities for nearby communities. By supporting local livelihoods through ecotourism, the company can contribute to economic diversification and resilience in the region.
Dariba Smelting Complex (DSC)	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.
Zinc Smelter Debari (ZSD)	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.

Pantnagar Metal Plant [PMP]	Crops	The company's initiative to adopt sustainable agricultural practices, such as utilizing improved seeds and new technologies through its CSR program, presents a strategic opportunity to enhance its sustainability performance. By focusing on these practices, the company not only improves crop production and quality but also contributes positively to the provisioning ecosystem services related to crops. These are some initiatives which further help in improving the sustainability performance of the company. **Expand CSR Initiatives**: Extend the CSR initiative to multiple panchayats, with special consideration for marginal farmers. **Collaborate for Innovation**: Partner with research institutions or agricultural technology firms to continuously innovate and adopt cutting-edge practices in sustainable agriculture, benefiting local communities.

Nature-related Risk Identification for Critical Suppliers:

Hindustan Zinc, being a responsible producer went ahead to assess the risks of critical suppliers. 67 suppliers were identified as critical to business through a robust screening process. Three types of risks were assessed: Climate, Water and Biodiversity risks. The company used the WWF's Water and Biodiversity risk filter to identify the high-risk areas. Parameters involved exact location of the supplier (Lat. Long), Business Importance and Type of Industry.

These suppliers' associated risks have been assessed using the 'Assess Module' of the Biodiversity Risk filter. The risks are evaluated across various categories:

- **Provisioning Services**
- **Pressures on Biodiversity**
- **Regulating & Maintenance Services – Enabling**
- **Environmental Factors**
- **Regulating Services – Mitigating**
- **Socioeconomic Factors**
- **Cultural Services**
- **Additional Reputational Factors**

Photo credit: IUCN/Mridul Vaibhav

The assessment results are presented below are showcasing the number of critical suppliers categorized under different risk levels:

Table 13:

Number of Critical Suppliers Under Different Risk Level

Risk Level	Physical Risk						Transition - Reputational-Risk	
	Provisioning Services	Regulating & Supporting Services - Enabling	Regulating Services - Mitigating	Cultural Services	Pressures on Biodiversity	Environmental Factors	Socioeconomic Factors	Additional Reputational Factors
Very Low	1	0	0	2	0	2	1	0
Low	9	3	1	0	3	54	0	1
Medium	13	30	5	0	57	7	58	59
High	44	34	60	0	2	4	8	7
Very High	0	0	1	0	5	0	0	0
No Risk/ Not Applicable	0	0	0	65	0	0	0	0

Using the filter, the suppliers were sorted based on overall Very High Risk, High Risk, Medium Risk, Low Risk & Very Low Risk. As a starting step, the suppliers in the Very High Risk zones were contacted to identify their Operational Risks as well. The company identifies risk to the organization as percentage sourced from the suppliers in the high-risk regions and is working on steps to reduce such risks.

Hindustan Zinc Limited's Actions in accordance with the Mitigation Hierarchy

To efficiently manage its leased areas, Hindustan Zinc Limited aims to achieve No Net Loss of biodiversity across all its operational sites and Net Positive Impact in critical habitats. To support this objective, company has implemented a dedicated Biodiversity Policy and Management Standard to guide its biodiversity conservation programs.

Hindustan Zinc Limited has conducted a comprehensive biodiversity risk assessment in collaboration with the IUCN. These programs are designed to holistically address biodiversity conservation, focusing on avoiding and minimizing disruptions to flora and fauna from the initial project scoping phase through site closure and beyond.

In addition to biodiversity conservation, the company has instituted a Water Management Policy to optimize water resource utilization. This policy outlines objectives to measure water withdrawal and consumption across all operations and to continuously improve water efficiency with water risk assessments conducted every five years.

The objective of the water risk assessment was to perform a sensitivity analysis and stress testing for water-related risks and to calculate an appropriate water pricing structure for the company. Considering the various quantitative and qualitative tools available for such an assessment, the company has used WBCSD's India Water Tool, WRI Aqueduct, and GEMI Local Water Tools, among others. These tools have helped the company identify and assess risks and develop a management strategy.

An analysis of future scenarios by the Aqueduct Water Risk Atlas showed that water-stress indicators are high in most of the company's locations. Regardless of the level of stress, the company applies rigorous standards and processes to manage risks.

The company has strategically assessed site-level impacts, dependencies, risks, and opportunities through its comprehensive Biodiversity Risk Assessment. As stated above, the policy is integral to it's approach to sustainability and emphasizes the following objectives:

- Achieving No-Net Loss at project operations.
- Conducting thorough biodiversity risk assessments.
- Setting clear targets and objectives to avoid, reduce, or mitigate biodiversity and nature-based impacts on people and the planet.

To effectively implement these objectives, the company has devised a mitigation hierarchy plan and integrated the Science Based Target for Nature AR3T framework. The company has taken concrete steps to mitigate risks and capitalize on opportunities. Also, company has almost completed the process of revising the site-specific Biodiversity Management Plans. The nature-related risks and opportunities shall be comprehensively addressed within these Biodiversity Management Plans, focusing on short, medium, and long-term perspectives for each site. The current endeavour highlights actions undertaken so far against nature-related challenges. The actions detailed in the mitigation plan are summarized below:

Table 14:

Hindustan Zinc Limited's Actions in accordance to the mitigation hierarchy

Mitigation Level	Actions Taken	Potential Impacts of Actions
Avoid	The company strictly avoids operations, exploration, mining, or drilling in World Heritage Sites and Protected Areas classified under IUCN Categories I-IV. This proactive measure ensures that the most sensitive ecological zones are preserved.	By refraining from operations in sensitive areas, Hindustan Zinc Limited immediately reduces the risk of significant biodiversity loss and legal repercussions, ensuring compliance with international standards.
Reduce	To mitigate impacts on freshwater ecosystems and minimize associated risks, the company has installed Zero Liquid Discharge systems at its plant locations. This initiative significantly reduces freshwater withdrawal from natural sources, promoting sustainable water management and reducing environmental stress on freshwater ecosystems. In 2014, the company commissioned a 20 MLD Sewage Treatment Plant (STP) in Udaipur under a public-private partnership. The STP is the first of its kind in Rajasthan. Furthermore, Hindustan Zinc Limited and Udaipur Smart City Limited signed an agreement in June 2017 to extend the sewage treatment capacity by another 40 MLD. A capacity of 25 MLD was commissioned in January 2019, and another 15 MLD was commissioned in FY 2020-21, bringing the total to 60 MLD. The replacement of fresh water for operations with STP-treated water has increased the availability of fresh water for the community. Nearly 36% of the total water withdrawal was satisfied with treated sewage.	Decrease in reliance on freshwater ecosystem will reduce the physical risk (acute water shortage). Continued use of Zero Liquid Discharge systems will stabilize water resource availability and will help in managing chronic physical risk. Also, the transition risk to the company will be managed properly. For example- risk of regulatory penalties (Liability risk) and community backlash due to water pollution (Reputational risk).
Regenerate	To regenerate the degraded landscape the company has taken certain steps: • Extensive plantation drives have been conducted across all nine operational sites, focusing on native species to restore local biodiversity. • A notable initiative includes the planting of 32,500 saplings from 65 diverse species using the Miyawaki method, which promotes rapid forest regeneration through natural, chemical-free processes. • At its Rampur Agucha Mine (RAM), the company has planted native species developed in its own nursery. Additionally, the company has spread seeds on waste dump slopes during the rainy season to stabilize the edges and enhance the local biota.	The planting of native species will start to show ecological benefits, including improved soil quality and increased biodiversity, mitigating medium-term risks associated with land degradation and habitat loss.
Restore	The company is transforming wasteland into productive land by increasing green cover and enhancing biodiversity. At its Chanderia Lead Zinc Smelter, the company, in collaboration with the Energy and Resources Institute (TERI), has converted the Jarofix Yard into a greenbelt area. This initiative addresses industrial waste management while setting a benchmark for sustainable development and ecological restoration. As part of this project, approximately 11,000 native plant species were planted, covering 6.25 hectares of the Jarofix dump.	Long-term adherence to biodiversity policies and consistent improvement in sustainability practices will solidify Hindustan Zinc Limited's reputation as an environmentally responsible company, reducing risks associated with stakeholder opposition and regulatory changes.
Transform	Looking towards the future, Hindustan Zinc Limited aims to transform the landscape further by targeting the plantation of 1 million trees by 2025. This ambitious goal underscores the company's long-term commitment to enhancing biodiversity and ecological resilience.	The goal of planting 1 million trees by 2025 will create substantial long-term ecological benefits, including carbon sequestration, improved air quality, and enhanced resilience against climate change impacts.

Material Locations

Hindustan Zinc Limited has conducted a thorough study using the IBAT to evaluate how sensitive its business operations are to biodiversity. IBAT provides a user-friendly online platform that allows for the assessment of material locations concerning Protected Areas and Key Biodiversity Areas. In this study, the company examined each business operation within a buffer zone of 10 Km to assess its sensitivity to biodiversity concerns.

Furthermore, to enhance the understanding of biodiversity impact, the company utilized Biodiversity Assessment Reports and Environmental Impact Assessment Reports to map and compile data on species listed in the IUCN Red List.

Table 15:
Sensitivity of Hindustan Zinc Limited Business Operations

Hindustan Zinc Limited Business Operations	Protected Areas	Key Biodiversity Areas	IUCN Red List Species	High Integrity Ecosystems	Areas of rapid decline in ecosystem integrity	Areas of water stress*
Zawar Mines (ZM)	0	0	10	0	Yes	Critical
Kayad Mines (KM)	0	0	1	0	Yes	Over-Exploited
Rampura Agucha Mines (RAM)	0	0	6	0	Yes	Over-Exploited
Rajpura Dariba Mines (RDM)	0	0	5	0	Yes	Over-Exploited
Sindesar Khurd Mine (SKM)	0	0	0	0	Yes	Over-Exploited
Chanderia Lead Zinc Smelter (CLZS)	0	0	21	0	Yes	Over-Exploited
Dariba Smelting Complex (DSC)	0	0	5	0	Yes	Over-Exploited
Zinc Smelter Debari (ZSD)	0	0	26	0	Yes	Critical
Pantnagar Metal Plant (PMP)	0	0	29	0	No	Safe

*Area of water stress is obtained from the Dynamic Ground Water Resource Assessment Report of CGWB [2022]. https://cgwb.gov.in/sites/default/files/2023-06/categorization_of_asssessment_units-gwra2022.pdf

Risk and Impact Management

Business of all kinds are either impacting or dependent on the various ecosystem services provided by nature. With declining ecosystem health and loss of ecosystem services, the business can get a hit back very hard. Hence, understanding nature related issues becomes crucial for a company's continued operations thereby making it a material issue for investors and other relevant stakeholders. The risk and impact management section of this TNFD report aims at disclosing how Hindustan Zinc Limited has identified, assessed, and managed nature related risk and how these are integrated into the enterprises risk management frameworks.

Vedanta Limited understood the linkages between nature and business early and launched the group wide Corporate Biodiversity Policy, Technical Standard and Guidance Note on Biodiversity Management as a part of Vedanta's Sustainability Vedanta Sustainability Framework (VSF) in year 2012. Building upon the Vedanta's Biodiversity Policy, Hindustan Zinc Limited developed its own Biodiversity Policy for understanding biodiversity risks and developing Biodiversity Management Plans.

Hindustan Zinc Limited leverages Enterprise Risk Management (ERM) framework to identify, assess, monitor, and respond to nature-related risks. The risk management framework is built on Vedanta Risk Management Standard, Securities and Exchange Board of India (SEBI), ISO 31000 & COSO guidelines that delineates process of risk assessment, compilation of risk registers and associated action plans, mapping of events and its mitigation. The company's risk management framework is well-structured and allows to identify, assess, categorise, address, and mitigate both positive opportunities and negative consequences associated with the business. These are regularly monitored, tracked, and reviewed through a robust governance and process architecture, with roles and responsibilities clearly defined for each stage. **Hindustan Zinc Limited's risk management system is certified as per ISO 31000:2018.**

Hindustan Zinc Limited's Biodiversity and Nature Risk Identification and Management Process

Hindustan Zinc Limited builds upon the Vedanta's Technical Standard and Guidance Note on Biodiversity Management to understand Biodiversity Risk and develop site specific Biodiversity Management Plan. The stage wise process of biodiversity and ecosystem services looks like as follows:

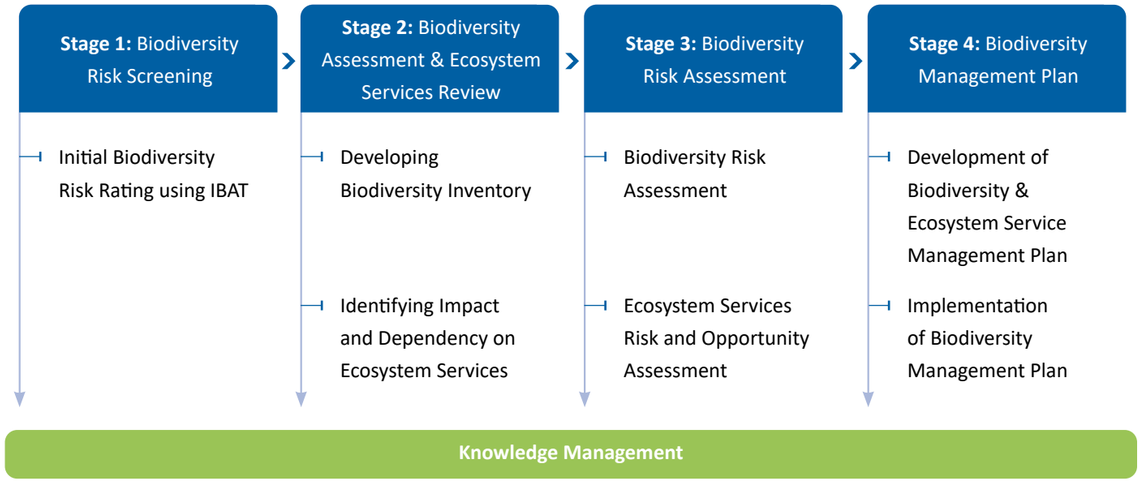
Stage 1: Biodiversity Risk Screening - Biodiversity risk screening is undertaken for each site by the company, using IBAT. IBAT is a central database of globally recognized biodiversity information that can be used to map out the locations of important biodiversity areas, protected areas, and areas categorized by IUCN as significant for species of plants or animals. IBAT uses global-level data sets that cannot always take into account the detail of local conditions at a specific site. However, in general, the IBAT information provides a good indication of where Critical Habitats are located.

Using the IBAT maps, Hindustan Zinc Limited can determine if a site is located in or near an area of biodiversity importance. Based on the results, the company determines biodiversity risk category for their sites, which are as below:

- **Low Risk:** The site is located outside the 15 km radius of any important biodiversity area.
- **Medium Risk:** The site is located within the 5-15 km radius of any important biodiversity area.
- **High Risk:** The site is located within the 5 km radius of any important biodiversity area or critical habitat.

Stage 2: Biodiversity Assessment and Ecosystem Services Review - Based on the results of stage 1, the comprehensive biodiversity and ecosystem services studies were carried out at all the sites. The brief about both studies is provided below:

- **Biodiversity Assessment:** The Biodiversity Assessment is a study to develop a qualitative and quantitative description of flora and fauna presence in the area as well as an understanding of trends and drivers.
- **Ecosystem Services Review:** Ecosystem Services Review is a study to identify priority ecosystem service dependencies and impacts of the company operations. This study included Ecosystem Services status, trends, drivers, risks, opportunities, and actions that will minimize risks/ impacts and maximize ecosystem service benefits.



Stage 3: Biodiversity Risk assessment - In Stage 3, experts conduct a biodiversity risk assessment, based on the biodiversity and ecosystem services data collected in Stage 2. This assessment process provides more detailed and site-specific biodiversity risk information. The purpose of the assessment is to verify that the site has been assigned the most appropriate biodiversity risk. The comprehensive three season biodiversity assessment was conducted at all the operating sites of Hindustan Zinc Limited by IUCN.

Stage 4: Development of Biodiversity Management Plan - This Stage 4 involves the identification of level of biodiversity management required based on the risk assessment completed in previous stages. The principles of mitigation hierarchy are applied to identify the course of action against each impact. The severity of impacts and risk to biodiversity shall help in defining the level of biodiversity management required for a given site. Based on the level of biodiversity management required the Biodiversity Management plan is under revision.

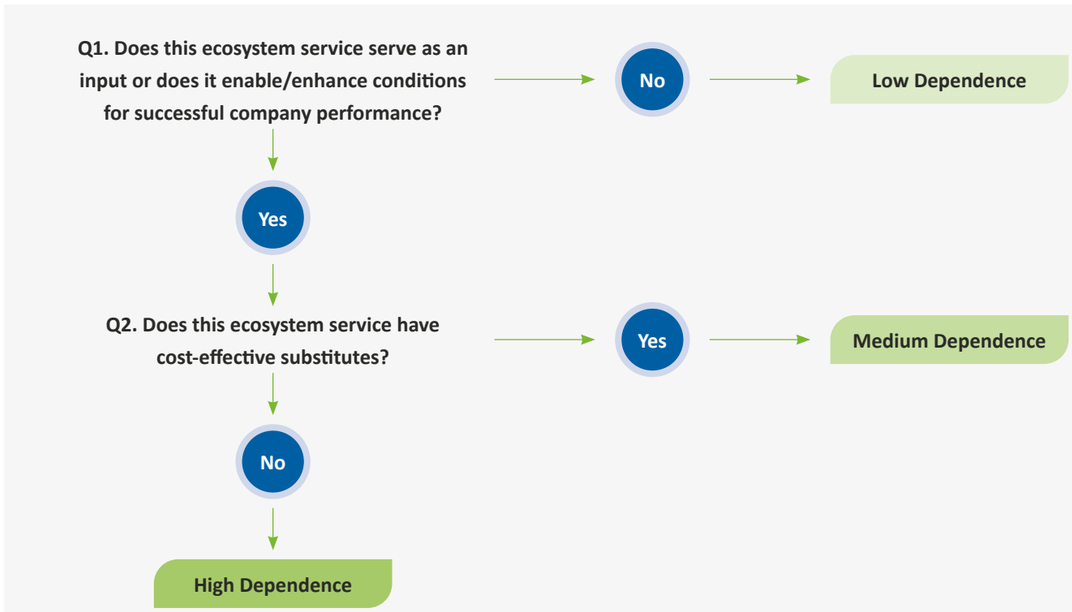
Nature-Related Dependencies, Impact, Risk and Opportunity Assessment Process

The Ecosystem Services Review under stage 2 of company's biodiversity risk assessment and management process is specifically focused on identifying nature related dependencies, impacts, risk and opportunities. Hindustan Zinc Limited recognizes the methodology developed by the World Resource Institute (WRI) to carry out corporate ecosystem services review. WRI's Ecosystem Services Review methodology provide a structure approach to evaluate the company's dependence and impact on more than 20 ecosystem services. This evaluation helps in identifying which of these are priority ecosystem services—the ones most likely to be a source of risk or opportunity for the company. The priority ecosystem services are the once which are having medium/high dependency or medium/high impact from the company.

Evaluating company's dependence: The company's dependency on the ecosystem services is calculated by answering following two questions:

Q1. Does this ecosystem service serve as an input or does it enable/enhance conditions for successful company performance?

Q2. If "yes" to question 1, then does this ecosystem service have cost-effective substitutes?

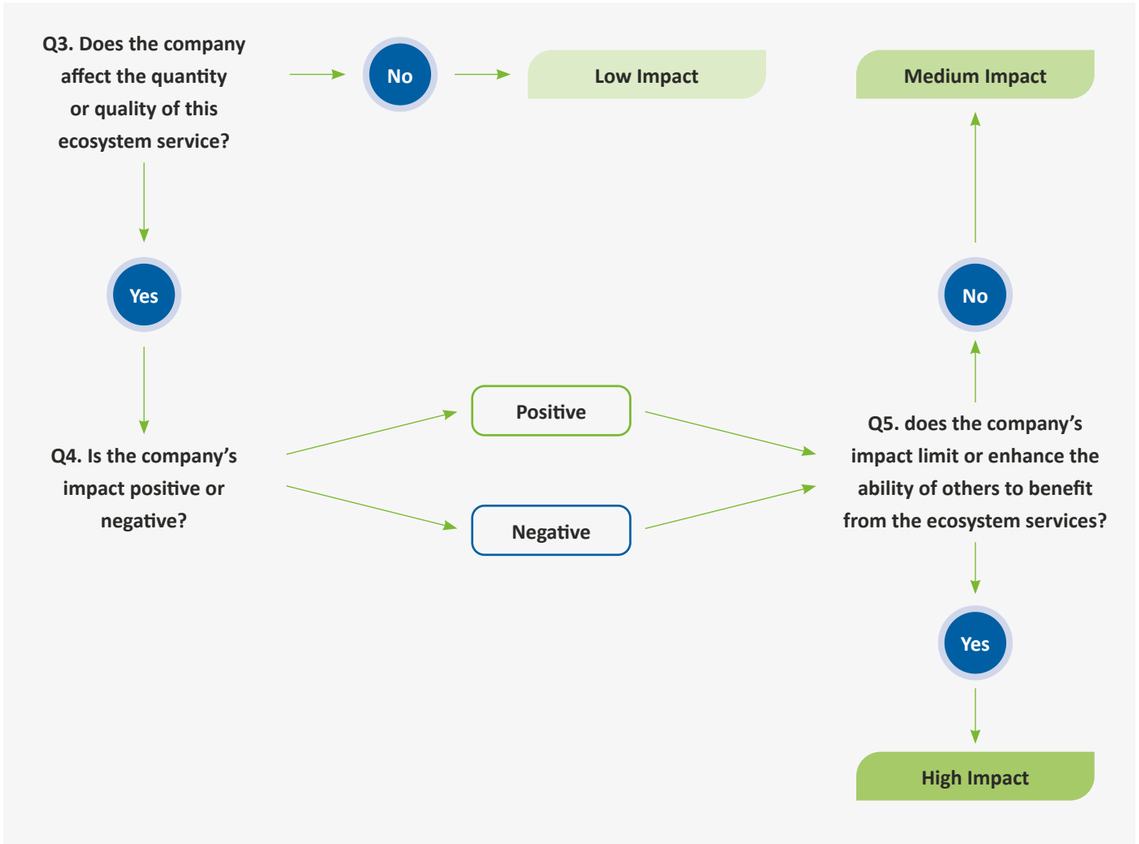


Evaluating company's impact: The company's dependency on the ecosystem services are calculated by answering following three questions:

Q3. Does the company affect the quantity or quality of this ecosystem service?

Q4. If "yes" to question 3, then is the company's impact positive or negative?

Q5. If "yes" to question 3, then does the company's impact limit or enhance the ability of others to benefit from the ecosystem services?



Identifying Company's Nature-related risks: The Nature related risks are evaluated based on the potential threats posed to Hindustan Zinc Limited that arise from its dependencies and impacts on nature. The risks are categorized into physical risks and transition risks. The description is provided below.

Table 16:

Physical Risks and Transition Risk Assessment

Category		Description
Physical Risk	Acute	Occurrence of short term, specific events that change the state of nature.
	Chronic	Gradual changes to the state of nature. For example, pollution stemming from pesticide use or climate change.
Transition Risks	Policy	Changes in the policy context due to new (or enforcement of existing) policies to create positive impacts on nature or mitigate negative impacts on nature.
	Market	Changing dynamics in overall markets, including changes in consumer preferences, which arise from changing physical, regulatory, technological and reputational conditions and stakeholder dynamics.
	Technology	Substitution of products or services with a reduced impact on nature and/or reduced dependency on nature.
	Reputational	Changes in perception concerning an organisation's actual or perceived nature impacts, including at the local, economic and societal level. This can result from direct company impacts, industry impacts and/ or impacts of activities upstream and/ or downstream in a value chain.
	Liability	Liability risks that arise directly or indirectly from legal claims. As laws, regulations and case law related to an organisation's preparedness for nature action evolves, the incident or probability of contingent liabilities arising from an organisation may increase.

Identifying Company's Nature-related opportunities: The Nature related opportunities are identified based on activities that Hindustan Zinc Limited can undertake to create positive outcomes for nature or mitigation of negative impacts on nature. He opportunities related to improving sustainability performance of the company are identified. The description is provided below.

Table 17:

Nature related Opportunities Assessment

Category		Description
Sustainability performance	Sustainable use of natural resources	Substitution of natural resources by recycled, regenerative, renewable and /or ethically responsibly sourced organic inputs
	Ecosystem protection, restoration and regeneration	Activities that support the protection, regeneration or restoration of habitats and ecosystems, including areas both within and outside the organization's direct control

Metrics and Targets

Hindustan Zinc Limited has been a front runner company in adopting initiative to make its operations more and more sustainable. To reinforce the sustainability at the core, the company has adopted Sustainability targets with species focus on nature realms Atmosphere, Freshwater, and Land.

These ambitious targets provide the fuel to the company initiative to not only reduce its impact on the nature but also work on the enhancement of the nature around its operations.

Photo credit: IUCN/Mridul Vaibhav

Table 18:

Hindustan Zinc Limited's Sustainability Targets for Nature Realms

Nature Realms		
Atmosphere	**Freshwater**	**Land**
Goals 2025		
Climate Change 0.5 mn tCO_2e greenhouse gas (GHG) emission savings in our operations from base year 2017	**Water Stewardship** Become 5x water positive company and achieve 25% reduction in freshwater consumption	**Circular Economy** 3x Increase in gainful utilisation of smelting process waste **Biodiversity Conservation** Protect and enhance biodiversity throughout the lifecycle
Goals 2030		
Climate Change • Accelerate mitigation and adaptation measures and reduction of scope 1 and 2 emissions by 50% and Scope 3 emissions by 25%. • 100% active business partner evaluation on ESG & Risk Management and transition to greener fuels for advancing in scope 3 emission reduction.	**Water Stewardship** Achieve water neutrality at water shed level for our operations by reducing freshwater consumption in water scarce areas by 50%.	**Circular Economy** Achieve near to zero waste to landfill by diverting all smelting process waste away from landfill through reuse, recycling and recovery. **Biodiversity Conservation** • Achieve no net loss of biodiversity at all mine sites by closure through applying mitigation hierarchy against a 2020 baseline. • No gross deforestation in protected areas and strive to achieve no net deforestation in operating sites by 2050 against the baseline of 2020.

In addition to above targets, Hindustan Zinc Limited has also adopted the applicable TNFD's Core global disclosure metrics and started reporting against these metrics from this report. The progress made by the company shall be reported against these metrics annually from 2024 onwards.

Table 19:

Hindustan Zinc Limited's disclosure data against TNFD core global disclosure indicators and metrics

Metric no.	Driver of nature change	Indicator	Metric	Status [2023-2024]	Connection to GBF Targets
	Climate change	GHG emissions	Refer to ISSB's IFRS-S2 Climate related Disclosures Standard	Scope 1: 4.25 million tCO_2e Scope 2: 0.562 million tCO_2e	Target 7
C1.0	**Land/ freshwater/ ocean-use change**	Total spatial Footprint (km^2)	Total surface area controlled/ managed by the company, where the company has control (km^2) A. Total disturbed area (km^2) B. Total rehabilitated/ restored area (km^2)	Total Mine Lease Area – 66.42 Km^2 (6,642 Ha), Out of which Acquired Area (where operation is being done) is **30.7229 km^2 (3,054.8 Ha)** A. Total Disturbed area – **26.12 Km^2 (1929.9 Ha)**	(A.2 Extent of natural ecosystems), Target 2, Target 5, Target 11 (B.1 Services provided by ecosystems)
C1.1		Extent of land/ freshwater/ ocean-use change	Extent of land/ freshwater/ ocean ecosystem use change (km^2) by: A. Type of ecosystem B. Type of business activity	**30.548 km^2 (3,054.8 Ha)**	Target 1 (A.2 Extent of natural ecosystems), Target 2, Target 5, Target 11 (B.1 Services provided by ecosystems)
			Extent of land/ freshwater/ocean ecosystem conserved or restored (km^2), split into:	**0.67 million trees** planted as part of commitment to plant 1 million trees by 2025, **122,755 planted during the year 2023**	Target 1 (A.2 Extent of natural ecosystems), Target 2, Target 5, Target 11 (B.1 Services provided by ecosystems)

Metric no.	Driver of nature change	Indicator	Metric	Status [2023-2024]	Connection to GBF Targets
C2.1	**Pollution/ pollution removal**	Wastewater discharged	Volume of water discharged (m^3), A. Total B. Freshwater C. Other D. Concentrations of key pollutants in the wastewater discharged [by type of pollutant, referring to sector-specific guidance for types of pollutants]	**Zero Liquid Discharge**	Target 7 (7.1 Index of coastal eutrophication potential), Target 11 (B.1 Services provided by ecosystems)
C2.2	**Pollution/ pollution removal**	Waste generation and disposal	Weight of hazardous and nonhazardous waste generated by type (tonnes), referring to sector-specific guidance for types of waste. A. Hazardous Waste B. Non-Hazardous Waste	Total = **20.24 million MT** Hazardous Waste- **0.103 million MT** Non-Hazardous Waste- **20.14 million MT**	Target 7, Target 11 (B.1 Services provided by ecosystems)
			Weight of hazardous and non-hazardous waste (tonnes) disposed of, split into: A. Waste incinerated (with and without energy recovery); B. Waste sent to landfill; and C. Other disposal methods	A. Waste incinerated (with and without energy recovery)- **0.000019 million MT** B. Waste sent to landfill- **13.92 million MT** C. Other disposal methods- **0.000024 million MT**	Target 7, Target 11 (B.1 Services provided by ecosystems)
			Weight of hazardous and non-hazardous waste (tonnes) diverted from landfill, split into waste: A. Recycled/Reused B. Other recovery operations	A. Recycled/Reused- **6.32 million MT** B. Other recovery operations- Nil	Target 7, Target 11 (B.1 Services provided by ecosystems)
C2.4	**Pollution/ pollution removal**	Non-GHG air pollutants	Non-GHG air pollutants (tonnes) by type: A. Particulate matter (PM2.5 and/ or PM10) B. Nitrogen oxides (NO_x) C. Volatile organic compounds (VOC or NMVOC) D. Sulphur oxides (SO_x) E. Ammonia (NH_3)	A. Particulate matter- **1,261 MT** B. Nitrogen oxides (NO_2, NO and NO_3)- **7,033 MT** C. VOC – NA D. Sulphur oxides- **25,199 MT** E. Ammonia- NA	Target 7, Target 11 (B.1 Services provided by ecosystems)
C3.0	**Resource use/ replenishment**	Water withdrawal and consumption from areas of water scarcity	Water withdrawal and consumption (m3) from areas of water scarcity, including identification of water source: A. Surface Water B. Ground Water C. Rainwater D. Mine Intersection/ Produced Water E. Third Party Water (Water Supply including treated water) F. Sea Water	Total Water – **27583043 m^3** Surface Water – **13678499 m^3** Ground Water – **2809328 m^3** Rainwater – **14950 m^3** Mine Intersection/ Produced Water – **1736625 m^3** Third Party Water – **9,343,641 m^3** Sea Water- NA	Target 11 (B.1 Services provided by ecosystems)

Way Forward

Nature and Biodiversity have been part of Hindustan Zinc's Environment Management System Since its inception. Recognizing the importance of the subject Company adopted the comprehensive Biodiversity Policy in 2012. when the parent company Vedanta Limited adopted Corporate Biodiversity Policy. Since then, the company has been on the path of integrating nature conservation into its commercial processes. This is the first TNFD report of Hindustan Zinc Limited disclosing nature related dependencies, impact, risk and opportunities.

In coming years, the company shall be taking its nature conservation initiative to next level with integrating risk management actions at site level initiatives. In the Financial Year 2024-25, all the direct operation sites of Hindustan Zinc Limited shall have a site-specific Biodiversity Management Plan. The key activities planned in coming years are listed below:

- Planning for No Net Loss on Biodiversity at all the direct operations sites
- Targeted initiatives towards developing freshwater ecosystems (i.e. wetlands) at the sites where freshwater is a risk.
- Targeted initiatives towards development of Grassland and thorn forest in and around the direct operation sites.
- Targeted initiatives to eradication of invasive species from inside the lease boundary as well as in the buffer zone.
- Development of Biodiversity Offsets based on the No Net Loss requirements at each of the direct operation sites.
- Undertake the location specific nature risk assessment for critical suppliers identified under high risk and take actions in subsequent years.

Hindustan Zinc Limited shall continue to accelerate its efforts to protect, conserve and enhance Biodiversity and Nature in and around its business operations. With this strategy, the company intends to contribute meaningfully in global goal of Nature Positive outcomes.

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	TNFD recommended indicators	Page No
Governance	A. Describe the board's oversight of nature-related dependencies, impacts, risks and opportunities.	15-16
	B. Describe management's role in assessing and managing nature-related dependencies, impacts, risks and opportunities.	16-17
	C. Describe the organisation's human rights policies and engagement activities, and oversight by the board and management, with respect to Indigenous Peoples, Local Communities, affected and other stakeholders, in the organisation's assessment of, and response to, nature-related dependencies, impacts, risks and opportunities.	18
Strategy	A. Describe the nature-related dependencies, impacts, risks, and opportunities the organisation has identified over the short, medium and long term.	19-35
	B. Describe the effect nature-related dependencies, impacts, risks and opportunities have had on the organisation's business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place.	19-35
	C. Describe the resilience of the organisation's strategy to nature-related risks and opportunities, taking into consideration different scenarios.	36-37
	D. Disclose the locations of assets and/or activities in the organisation's direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations.	12-13
Risk and Impact Management	A(i). Describe the organisation's processes for identifying, assessing and prioritising nature-related dependencies, impacts, risks and opportunities in its direct operations.	38-42
	A(ii). Describe the organisation's processes for identifying, assessing, and prioritising nature-related dependencies, impacts, risks and opportunities in its upstream and downstream value chain(s).	38-42
	B. Describe the organisation's processes for managing nature-related dependencies, impacts, risks and opportunities.	38-42
	C. Describe how processes for identifying, assessing, prioritising and monitoring nature related risks are integrated into and inform the organisation's overall risk management processes.	38-42
Matrices and Targets	A. Disclose the metrics used by the Company to assess and manage material nature-related risks and opportunities in line with its strategy and risk management process.	42-45
	B. Disclose the metrics used by the Company to assess and manage dependencies and impacts on nature.	42-45
	C. Describe the targets and goals used by the Company to manage nature-related dependencies, impacts, risks and opportunities and its performance against these.	42-45

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HINDUSTAN ZINC
Zinc & Silver of India

HINDUSTAN ZINC LIMITED
Yashad Bhawan, Udaipur- 313 004, Rajasthan
T: +91 294 6604000-02
www.hzlindia.com