Welcome to your CDP Forests Questionnaire 2023

F0. Introduction

F0.1

(F0.1) Give a general description of and introduction to your organization.

Vale S.A. is one of the world's largest metals and mining companies, based on market capitalization. It is also one of the world's leading producers of iron ore and nickel, currently present in 18 countries and five continents. The company is headquartered in Rio de Janeiro, Brazil, with 215,000 employees (about 64,000 own and 151,000 outsourced). In addition to iron ore and nickel, Vale also produces iron ore pellets, copper, platinum group metals, gold, silver, and cobalt as by-products of nickel and copper. The company is engaged in greenfield mineral exploration in six countries.

In 2022, Vale divested fully from coal in April and manganese (ferroalloy operations) in July. It also operates large logistics systems in Brazil and other regions, including railroads, maritime terminals, and ports, which are integrated with its mining operations. The company has distribution centres to support the worldwide delivery of iron ore and also has investments in energy and steel businesses directly and through associates and joint ventures.

Vale is a private, publicly traded organization, whose purpose is “We exist to improve life and transform the future. Together.” The company aims to become a leader in sustainable mining and a benchmark for value creation and sharing with its shareholders, stakeholders, and society. It is committed to improving its performance and contributing to enhancing the lives of people in the areas where it operates. Vale’s Board of Directors (BD) oversees and supports the company’s journey towards a more sustainable and safer mining model.

Our strategic guidelines are to promote sustainable mining, foster low-carbon solutions, and maintain discipline. Our key values and behaviours have been updated to reflect the changes we are undergoing. We believe that mining is essential for the development of the world and that it only serves society by generating prosperity for all while taking care of the planet. This is reflected in our values, which are defined as putting life first, acting with integrity, valuing those who contribute to our company, making things happen, and respecting our planet and communities. In 2019, Vale updated its sustainability goals for the coming years, aligning with the Sustainable Development Goals (SDGs) of the United Nations' Agenda 2030. Regarding biodiversity, the Agenda includes the Forestry Goal – to recover and protect 500,000 hectares by 2030.

Vale has established a long-term goal to achieve No Net Loss, focused on managing impact and risks, and reducing significant biodiversity losses in new projects. This commitment is completely aligned with the commitments made in the Sustainability Policy and with the

company's sustainability strategy. To achieve this goal, we are working to implement and reinforce the entire risk, impact, attributes, and performance management process.
As a member of the International Council on Mining and Metals (ICMM), Vale is committed to the principles established by the Board, and in 2019 reinforced its commitment to Performance Expectation, focused on not operating in World Heritage Areas and on the implementation and strengthening of the impact mitigation hierarchy, with the objective of not having significant biodiversity losses. In 2021, we reinforced our commitment not to operate in UNESCO World Natural Heritage Site areas (see http://www.vale.com/esg/pt/Paginas/Biodiversidade.aspx - Reports and KPIs).
Since 2019, Vale's highest priority has been to respond to the impacts caused by dam break at the Córrego do Feijão mine in Brumadinho, Minas Gerais, and repairs continue. In Brumadinho, Vale advanced in the execution of the Integral Reparation Agreement, fulfilling 58% of its commitments according to established deadlines. In individual indemnities, Vale signed agreements that benefited 13,600 people and amounted to BRL 3.2 billion. Also, BRL 37.6 billion has been spent on reparations, with another BRL 7.9 billion expected in 2023.
Vale has made significant progress in containing, removing, and disposing of tailings while conducting dredging operations. Over half of the planned 12.41 million m³ removal from the Ferro-Carvão Stream and Paraopeba River has been completed. Vale is updating the volume of material to be removed based on improved models and operational considerations. Land restoration efforts cover 42 hectares, including planting of approximately 55,000 native species seedlings, equivalent to 42 soccer fields. As of December 2022, 58% of the agreed actions, totalling BRL 23.7 billion, had been implemented, including initiatives under the Judicial Comprehensive Reparation Agreement from 2019 and 2020. In addition, as of 5 August 2020, Vale and all ICMM members are committed to implement the GISTM (Global Industry Standard on Taillings Management). All tailings' facilities operated by Vale with "Extreme" or "Very high" potential consequences will be in conformance with the GISTM by 5 August 2023. All other tailings facilities operated by Vale not in a state of safe closure will be in conformance with the GISTM by 5 August 2025.
For additional details, access https://www.vale.com/pt/web/esg.

F0.2

(F0.2) State the start and end date of the year for which you are reporting data.

	Start Date	End Date
Reporting year	January 1, 2022	December 31, 2022

F0.3

(F0.3) Select the currency used for all financial information disclosed throughout your response.

USD

F-MM0.9/F-CO0.9

(F-MM0.9/F-CO0.9) Select the option that best describes the reporting boundary for which biodiversity-related issues are being reported?

Companies, entities, or groups over which operational control is exercised.

F-MM0.10/F-CO0.10

(F-MM0.10/F-CO0.10) Within your reporting boundary, are there any geographical areas, business units or mining projects excluded from your disclosure?

Yes

F-MM0.10a/F-CO0.10a

(F-MM0.10a/F-CO0.10a) Please report your exclusions and describe their potential for biodiversity-related risk.

Exclusion	Description of exclusion	Potential for biodiversity-related risk	Please explain
Mining project(s)	In this reporting year, seven complex sites were selected, covering the iron ore mines in Brazil that represent our largest production of this commodity and are located in the Atlantic Forest and Amazon biomes, as well as the PT Vale Indonesia (PTVI) nickel mine located in Indonesia, which represents the base metals site with significant impact on forests. These sites represent 100% of iron ore and 35,7% of nickel production in 2021. Each complex aggregates mines located in the same geographical region and are under the same management, which is why they are described here. This report excludes active mines that have less impact on forests (Canada) and mineral research areas (Peru, Chile, Serbia), as well as our logistics operations and industrial plants (Malawi, Japan, United Kingdom, Oma, Malaysia, China) and inoperative mines. Therefore, this report will not cover the Córrego do Feijão Mine (Brumadinho, Minas Gerais, Brazil - MG) as it is currently	Potential for biodiversity-related risks evaluated, but not disclosing to CDP	With operations in more than 20 countries on five continents, Vale S. A. is one of the leading mining companies in the global market in iron ore, iron ore pellets, and nickel. The company also produces manganese, ferroalloys, copper, metals of the platinum group metal gold, silver, cobalt, and metallurgical and thermal coals. Operating this variety of raw materials requires an infrastructure that includes mineral exploration, administrative offices, and operational units connected by modern integrated logistics systems, comprising railroads, maritime terminals, and ports. Our operations today occupy around 877 km², with the main risks and direct and indirect impacts on biodiversity being associated with changes in natural environments and changes in land use, which alter the components of the physical environment, which in turn instead, serve as support for the elements of the biotic environment (flora and fauna). In 2015 Vale carried out an assessment at a company-wide

	inactive with no other operational activities in progress. The project is focused on repairing the affected area by the dam failure and is currently under development.		level to map and classify the sensibility to biodiversity arising from site operations as a result of their location and interface with nature, updated in 2017. The analysis included nine categories of areas with relevant biodiversity value, according to global and national organizations (Key Biodiversity Areas - KBA, Protected Areas, Wilderness Areas, Hotspots, occurrence of Endangered Species IUCN, among others). We use a score to characterize the importance and sensibility of biodiversity, which generated the risk note. The areas with high and very high risks were considered priorities for managing impacts and risks, as well as for reporting. We use this classification to base our report here. In the last two years, we have reported on biodiversity-related impacts, risks, and opportunities for these priority areas under the CDP Forests (Brazil and PT Vale Indonesia operations). The sites will be approached to identify all the essential information related to biodiversity and forest management to be collected for reporting to our investors under CDP Forest. We aim to deepen our compilation of data each year to produce an increasingly complete and comprehensive report.

F9 Current state

F-MM9.1/F-CO9.1

(F-MM9.1/F-CO9.1) Provide details on the mining projects covered by this disclosure, by specifying your project(s) type, location and mining method(s) used.

Mining project ID
Project 1

Name
Carajás Complex

Share (%)
100

Country/Area
Brazil

Latitude
-6.411223

Longitude
-50.341333

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1985

Year of closure
2062

Description of project

The Carajás Complex is responsible for producing around 150 to 180 million tons of iron annually. The ore produced in Carajás is exported through a system that integrates mines, plants, railroads, and ports. After the mining and processing phase, the product is transported in wagons via the Carajás Railway to the Ponta da Madeira Maritime Terminal in São Luís, Maranhão, Brazil. In this unit, through five mines, the company produces three types of products derived from iron: sinter feed, pellet feed, and

granulate. This operation has established itself as one of Vale's most significant operations and consists of three divisions: Serra Norte, Serra Leste, and the S11D Complex.
The Carajás Complex boasts the world's most significant iron ore mining projects and is situated in the Carajás region, within the Amazon biome, known as the S11D Complex. This Complex has a production capacity of 90 Million tons per year of iron ore with a purity of 66,7% iron content. Over US$ 6,4 billion was invested in the construction of the mine and plant, demonstrating a substantial commitment to enhancing the competitiveness of Brazilian ore. This project introduces modern and sustainable solutions, reduces diesel consumption, and implements natural humidity processing, eliminating the need for tailings dams. Combining innovation investments with Vale's industry expertise enables a more efficient operation with minimized environmental impact.
As with any development project, there were impacts on the region's biodiversity. However, the project team took measures to avoid and minimize these impacts, recover impacted areas, and conserve important biodiversity areas.
In 2017 and 2018, we used the mitigation hierarchy framework to identify, prioritize, and map biodiversity risks for the mine complex. We developed a Biodiversity Action Plan (BAP) focused on mitigating and monitoring risks and impacts of future expansions. These actions are now part of the Carajás Biodiversity Management Plan.
The mines in the Carajás complex are greenfield projects; the entire complex follows Brazilian environmental legislation based on preparing of environmental impact studies and their respective environmental management programs.

Mining project ID

Project 2

Name

Itabira Complex

Share (%)

100

Country/Area

Brazil

Latitude

-19.593314

Longitude

-43.221605

Project stage

Production

Mining method

Open-cut

Raw material(s)

Iron ore

Year extraction started/is planned to start

1957

Year of closure

2041

Description of project

The Itabira complex comprises two large mines, Conceição and Cauê, with the latter currently undergoing environmental recovery. The Minas do Meio pits, including Periquito, Dois Córregos, Onça, Camarinha, and Chacrinha, are also part of the complex. Operating since 1957, all mines in the Itabira Complex are currently in production.
The Itabira Mining Complex currently has two ore processing plants, the Cauê and Conceição Ore Treatment Facilities. This process generates four products: NBCA (granulated), sinter feed, pellet feed, and PCCA (super thin), which are sent to storage silos and then loaded, through three silos, onto the railway cars.
Over the years, the Itabira Mining Complex has undergone technological advancements and investments to increase mine capacity and extend its useful life while maintaining a commitment to environmental sustainability. All operations not only strictly adhere to all applicable Brazilian environmental legislation at the federal, state, and municipal levels, but we also continuously seek to enhance practices by adopting industry-leading standards and good practices.
Environmental management studies have been conducted to mitigate and offset the impact of mining operations on biodiversity.
There is proximity to urban centres, and to avoid a visual impact and dust, green curtains with extensive forest cover, similar to a barrier, were implemented.
One of the main progresses in 2021 was the execution of the Experimental landfills at Itabira and Brucutu; these enabled the implementation of the filtered tailings pile projects.
In addition, in 2022, Vale produced 26,4 million tons of iron ore in the Itabira Complex.

Mining project ID

Project 3

Name

Mariana Complex

Share (%)

100

Country/Area

Brazil

Latitude

-20.257595

Longitude

-43.524328

Project stage

Production

Mining method

Open-cut

Raw material(s)

Iron ore

Year extraction started/is planned to start

1969

Year of closure

2038

Description of project

The Mariana Complex, which comprises the Alegria, Fábrica Nova, Fazendão, and Timbopeba mines, is located in Ouro Preto, Mariana, and Catas Altas in Minas Gerais, Brazil. This region is known for its rich historical, cultural, and natural assets. All production is transported by the Vitória-Minas Railway (in Portuguese, Estrada de Ferro Vitória a Minas, EFVM), and part of it is destined for the foreign market, being transported through the Port of Tubarão (Espírito Santo, Brazil).
The Mariana complex is part of the Quadrilátero Ferrífero, Minas Gerais (Brazil), covered by the Cerrado (tropical savanna in eastern Brazil) and Atlantic Forest biome. This region has the most significant iron ore production at the national level.
The mines in the Mariana Complex are brownfield projects; the entire complex follows Brazilian environmental legislation based on preparing of environmental impact studies and their respective environmental management programs.
In addition, in 2022, Vale produced 24,662 thousand metric tons of iron ore in the Mariana Complex.

Mining project ID

Project 4

Name

Vargem Grande Complex

Share (%)

100

Country/Area

Brazil

Latitude

-20.091264

Longitude

-43.945276

Project stage

Production

Mining method

Open-cut

Raw material(s)

Iron ore

Year extraction started/is planned to start

1996

Year of closure

2089

Description of project

The Vargem Grande Complex comprises several operational units, including Abóboras, Capitão do Mato, Tamanduá, Vargem Grande, Pico, Galinheiro, and Sapecado, along with the Andaime Railway Terminal (TFA, in the Portuguese acronym for Terminal Ferroviário de Andaime). The primary function of the Terminal is to transport the ore produced in these units to the port. Additionally, the Complex houses eight ore beneficiation plants and a pelletizing plant that converts iron ore into high-value ore pellets for the steel market. The annual production capacity of the complex is 58 million tons of iron ore.
Like all of Vale's complexes, the Vargem Grande complex has environmental protection as a fundamental priority, besides investing in technology and research to improve your environmental controls.
The mines within the Vargem Grande Complex are classified as brownfield projects; the entire complex follows Brazilian environmental legislation based on preparing of environmental impact studies and their respective environmental management programs.
Furthermore, in 2022, Vale produced 33,488 thousand metric tons of iron ore in the Vargem Grande Complex.

Mining project ID

Project 5

Name

Paraopeba Complex

Share (%)

100

Country/Area
Brazil

Latitude
-20.106026

Longitude
-43.959732

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1930

Year of closure
2042

Description of project

The Paraopeba Complex consists of seven mines: Capão Xavier, Mutuca, Mar Azul, Jangada, Tod, Fábrica, and Viga. It also includes ten ore beneficiation plants and a pelletizing plant located at the mine site. With an annual production capacity of nearly 32 million tons of iron ore, the complex not only generates employment opportunities but also contributes to tax revenues while adhering to sustainable mining practices. Subsequently, the produced ore is transported via rail to terminals in Guaíba and Sepetiba (Rio de Janeiro State) as well as Tubarão (Espírito Santo State). From there, the cargo is shipped to various destinations worldwide. It is important to note that this report does not include Córrego do Feijão Mine (Brumadinho, Minas Gerais) and its associated dam break. This mine is part of this Complex but is inactive since the dam break. In this area we have several ongoing projects related to the repair and recovery. The mines within the Paraopeba Complex are classified as brownfield projects; the entire complex follows Brazilian environmental legislation based on preparing of environmental impact studies and their respective environmental management programs.
Furthermore, in 2022, Vale produced 30,106 thousand metric tons of iron ore in the Paraopeba Complex.

Mining project ID
Project 6

Name

Brucutu Água Limpa Complex

Share (%)

100

Country/Area

Brazil

Latitude

-19.946214

Longitude

-43.383113

Project stage

Production

Mining method

Open-cut

Raw material(s)

Iron ore

Year extraction started/is planned to start

2006

Year of closure

2040

Description of project

The Brucutu Água Limpa Complex is formed by the Brucutu mine, located in the municipality of São Gonçalo do Rio Abaixo, and Água Limpa mine, located in the municipalities of Rio Piracicaba and Santa Bárbara, in Minas Gerais. The Complex's annual production capacity is around 38 million tons of iron ore. The complex utilizes the Vitória-Minas Railway to transport its products to the Port of Tubarão, where it is exported to clients worldwide. The Brucutu mine is the first mine in Vale and Brazil to have the transport of large trucks (off-road) 100% autonomous, that is, without the need for operators.
The mines of the Brucutu Água Limpa Complex are brownfield projects and the entire complex follows Brazilian environmental legislation, at the federal, state and municipal levels. All mines have their environmental impact assessment and environmental management plans.
In addition, in 2022 Vale produced 20,759 thousand metric tons of iron ore in the Brucutu Complex.

Mining project ID

Project 7

Name

PTVI – PT Vale Indonesia

Share (%)

44.3

Country/Area

Indonesia

Latitude

-2.56812

Longitude

121.389641

Project stage

Production

Mining method

Open-cut

Raw material(s)

Nickel

Year extraction started/is planned to start

1968

Year of closure

2045

Description of project

This mine is under the legal framework of the Contract of Work, which was amended on October 17th, 2014, it is valid until December 28th, 2025, with a concession area of 118,017 hectares covering South Sulawesi (70,566 hectares), Central Sulawesi (22,699 hectares), and Southeast Sulawesi (24,752 hectares).
The Company extracts nickel laterite ore and processes it into the final nickel product in matte. The average volume of nickel production per year reaches 75,000 tons. In producing nickel in the Sorowako Block, pyro metallurgical technology is used (in melting the laterite nickel ore). The nickel product is exported entirely to Vale Canada Limited and Sumitomo Metal Mining in a particular long-term contract agreed upon by the two companies.
The Company also continues its plan to construct a nickel processing plant and its facilities in Sambalagi, Morowali Regency, Central Sulawesi, Pomalaa, Kolaka Regency, and Southeast Sulawesi. The project in Bahodopi is to build a smelter to process saprolite nickel ore and produce ferronickel, the primary material for stainless steel making. In Pomalaa, the project is to create a processing facility with HPAL (High-Pressure Acid Leaching) technology to process limonite ore and produce an intermediate product that can be further processed into material for Electric Vehicles (EV) batteries.

F-MM9.2/F-CO9.2

(F-MM9.2/F-CO9.2) Can you disclose the mining project area and the area of land disturbed for each of your mining projects?

	Disclosing mining project area and area of land disturbed?	Comment
Row 1	Yes	The corporate area monitors the area of land disturbed at each of Vale's mining sites annually by reporting the impacted area indicator, which is related to GRI indicator 304-1 and MM1. This can be tracked in our Integrated Report. All mining projects undergo a comprehensive environmental impact study that coronate the full extent of the impact on fauna and flora, as well as social impacts. These impacts are also reported annually in relation to the GRI 304-2 indicator, and species with affected habitats are reported under the GRI 304-4 indicator. Our primary impacts involve changes in land use and vegetation cover, resulting in the localized loss of flora and a reduction or alteration of fauna habitats. The removal of native vegetation cover is a fundamental aspect of mining activity. Consequently, some of its direct impacts on flora and fauna cannot be mitigated but are addressed through recovery, restoration, and offset measures. In 2022, the area impacted by all our operations worldwide totalled 87,731 ha. This figure includes all areas already affected by our operations, as well as those that have received formal authorization from environmental regulatory agencies for project implementation/operation.

F-MM9.2a/F-CO9.2a

(F-MM9.2a/F-CO9.2a) Provide details on the mining project area and the area of land disturbed for each of your mining projects.

Mining project ID

Project 1

Total area of owned land/lease/concession (hectares)

75,584.95

Total area disturbed to date (hectares)

11,135.6

Area disturbed in the reporting year (hectares)

226.34

Type(s) of habitat disturbed in the reporting year

Modified habitat

Natural habitat

Comment

The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate. It is stored for information management in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Integrated Report, referring to biodiversity data (specifically 304-3 and MM1). The area disturbed in the said year is calculated by comparing the values reported in the current year with the previous year (2022 and 2021, respectively).
In addition, this GIS platform also houses information about Vale's properties across its various areas of activity.
The total area disturbed brings modified and natural habitats, with forest and rupestrian grassland.

Mining project ID

Project 2

Total area of owned land/lease/concession (hectares)

20,626.8

Total area disturbed to date (hectares)

5,952.8

Area disturbed in the reporting year (hectares)

210.3

Type(s) of habitat disturbed in the reporting year

Modified habitat
Natural habitat

Comment

The calculation of the affected area by each Vale's operations is reported annually to the Sustainability Directorate by the operational areas. These figures are then stored and managed in a geographic information system (GIS) tool for information purposes. The area calculations are based on on-site measurements and shapes created using the reference coordinates of each polygon. This data and information are calculated and reported annually, aligning with GRI indicators in the Integrated Report, specifically about biodiversity data (MM1). The extent of disturbance each year is determined by comparing the values reported in the current year with the previous year (2022 and 2021, respectively).
Furthermore, this GIS platform serves as a repository for information on Vale's properties across its various operational areas. The total disturbed area encompasses modified and natural habitats, including forests and open fields.

Mining project ID

Project 3

Total area of owned land/lease/concession (hectares)

28,597.21

Total area disturbed to date (hectares)

3,765.94

Area disturbed in the reporting year (hectares)

44.8

Type(s) of habitat disturbed in the reporting year

Modified habitat
Natural habitat

Comment

The calculation of the affected area by each Vale's operations is reported annually by the operational areas directly to the Sustainability Directorate. It is stored for information management in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Integrated Report, referring to biodiversity data (specifically MM1). The affected area in the said year is calculated by comparing the values reported in the current year with the previous year (2022 and 2021, respectively).
In addition, this GIS platform also houses information about Vale's properties across its various areas of activity.
The affected area total to date brings modified and natural habitats, with forest and rupestrian grassland. The total area disturbed to date brings modified and natural habitats, with forest rupestrian grassland formation.

Mining project ID

Project 4

Total area of owned land/lease/concession (hectares)

23,714.64

Total area disturbed to date (hectares)

4,536.61

Area disturbed in the reporting year (hectares)

22.9

Type(s) of habitat disturbed in the reporting year

Modified habitat
Natural habitat

Comment

The calculation of the affected area by each Vale's operations is reported annually by the operational areas directly to the Sustainability Directorate. It is stored in a geographic information system (GIS) tool for information management. All these data

and information are calculated and reported annually against the GRI indicators in the Integrated Report, referring to biodiversity data (specifically MM1). The disturbed area in the said year is calculated by comparing the values reported in the current year with the previous year (2022 and 2021, respectively).
In addition, this GIS platform also houses information about Vale's properties across its various areas of activity.
The total area disturbed brings modified and natural habitats, with forest and rupestrian grassland formation.

Mining project ID

Project 5

Total area of owned land/lease/concession (hectares)

24,051.78

Total area disturbed to date (hectares)

4,785.03

Area disturbed in the reporting year (hectares)

0.7

Type(s) of habitat disturbed in the reporting year

Modified habitat

Comment

The calculation of the affected area by each Vale's operations is reported annually by the operational areas directly to the Sustainability Directorate. This information is stored and managed in a geographic information system (GIS) tool for information management. These data and information are used to calculate and report the GRI indicators in the Integrated Report, specifically referring to biodiversity data (MM1). The disturbed area in the reported year is determined by comparing the values reported for the current year (2022) with the previous year (2021).
Furthermore, the GIS platform also contains information about Vale's properties across its various areas of activity.
The total disturbed area to date includes both modified and natural habitats, including forested areas and rupestrian grassland.

Mining project ID

Project 6

Total area of owned land/lease/concession (hectares)

13,444.63

Total area disturbed to date (hectares)

3,714.13

Area disturbed in the reporting year (hectares)

51.6

Type(s) of habitat disturbed in the reporting year

Modified habitat
Natural habitat

Comment

The calculation of the affected area by each Vale's operations is reported annually by the operational areas directly to the Sustainability Directorate and stored for information management in a geographic information system (GIS) tool. These data and information are calculated and reported annually in the Integrated Report, specifically in reference to biodiversity data (MM1) according to the GRI indicators. The disturbed area in the reported year is determined by comparing the values reported in the current year (2022) with the previous year (2021).
Additionally, this GIS platform contains information about Vale's properties across its various areas of activity.
The total area disturbed to date encompasses both modified and natural habitats, including forest and rupestrian grassland formations.

Mining project ID

Project 7

Total area of owned land/lease/concession (hectares)

118.01

Total area disturbed to date (hectares)

6,966.6

Area disturbed in the reporting year (hectares)

199.8

Type(s) of habitat disturbed in the reporting year

Natural habitat

Comment

The calculation of the affected area by each Vale's operations is reported annually by the operational areas directly to the Sustainability Directorate. It is stored for information management in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Integrated Report, referring to biodiversity data (specifically MM1). The area disturbed in the said year is calculated by comparing the values reported in the current year with the previous year (2022 and 2021, respectively).
In addition, this GIS platform also houses information about Vale's properties across its various areas of activity.
The total area disturbed brings modified and natural habitats, with forest and grassland formation.

F-MM9.3/F-CO9.3

(F-MM9.3/F-CO9.3) Are any of your mining projects located in or near legally protected and internationally recognized areas?

	Are any of your projects in or near?	Comment
Legally protected area(s)	Yes	Part of the Carajás Complex area is situated within the Carajás National Forest, a protected area of sustainable use according to Brazilian legislation. The decree that created this forest allows for anthropogenic activities, including mining. This protected area corresponds to the IUCN Category VI. Our operations in the Iron Quadrangle - Minas Gerais state, Brazil (Paraopebas, Vargem Grande, and Mariana Complex) - interact with the Southern Environmental Protection Area (APA Sul). This area, too, is a protected area of sustainable use (IUCN Category V), and the creation decree allows for anthropogenic activities, including mining. Protected areas near or adjacent to our operations primarily consist of areas owned by Vale, such as Private Reserves of Natural Heritage (IUCN Category IV), some of which have been established, and others are in the process of being created. These are strategically located near our operational units to ensure their effective management. Moreover, we also support other protected areas, such as the Campos Ferruginosos National Park (IUCN Category II), which was established in conjunction with the licensing of the S11D Eliezer Batista Complex. It's important to clarify that we consider the protected areas within a 10 km buffer from the operations to be adjacent.
UNESCO World Heritage sites	No	In 2021, Vale publicly committed to not operate in UNESCO World Natural Heritage sites. It is important to note that the Vale Nature Reserve (RNV), a protected area owned by the company dedicated to preserving 23,000 hectares of remnants of the Atlantic Forest, is included in this. Additionally, the Sooretama Biological Reserve (REBio), an area protected by Vale in partnership with ICMBio, also falls within this category. Both reserves are part of the World Natural Heritage Site Reserves of the Atlantic Forest Discovery Coast and are recognized as Key Biodiversity Areas.
UNESCO Biosphere Reserves	Yes	Our operations in the Quadrilátero Ferrífero - Minas Gerais state/Brazil (Paraopebas, Vargem Grande and Mariana Complex) have interference in the Espinhaço Range Biosphere Reserve.
Ramsar sites	No	The mining complexes prioritized for this reporting do not overlap or are next to Ramsar Sites.

Key Biodiversity Area(s)	Yes	Part of the Carajás Complex area is situated within the Carajás National Forest, and this area overlaps with the Serra dos Carajás Key Biodiversity Area. The Mariana Complex and PTVI have portions that either overlap with or are next to other Key Biodiversity Areas.

F-MM9.3a/F-CO9.3a

(F-MM9.3a/F-CO9.3a) Provide details on mining projects that are in or near legally protected and internationally recognized areas.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Carajás National Forest

Proximity

Overlap

Area of overlap (hectares)

9,000

Please explain

Mining in Carajás began in 1985 when the company was still owned by the Brazilian government. At the time, an advisory group of environmental specialists, formed by scientists from various areas, undertook a study that proposed delimiting an area to guarantee the development of the Mineral Province of Carajás and the protection of the forest and its resources.

The Carajás National Forest was created in 1998 to reconcile mining operations with biodiversity conservation. Its creation decree (Decree 2486 of February 2, 1998) allows mining activities within the National Forest. It formalizes the partnership between Vale and the agency responsible for protecting and managing natural ecosystems. This protected area covers about 400,000 hectares with a predominance of Open Ombrophilous Forest and Dense Ombrophilous Forest interspersed on the tops of the mountains by the ferruginous rupestrian grassland, within which part of the Carajás Mineral Complex is inserted.

The Carajás National Forest (in Portuguese, Floresta Nacional Flona) is one of the most significant blocks of native vegetation in southeast Pará. Covering the municipalities of Parauapebas, Canaã dos Carajás, and Água Azul do Norte, it is managed by the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), with support from Vale. This region is renowned for its abundant mineral reserves and high biodiversity

value and is recognized as a Key Biodiversity Area.
Vale supports conservation, scientific research, inspection, and educational activities within the Carajás National Forest.
The National Forest creation decree allows mining activity and introduces the possibility of partnerships for the conservation of the area.
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms, and is stored for information management in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Água Santa Municipal Park

Proximity

Up to 10 km

Area of overlap (hectares)

Please explain

The area is situated within a 10 km radius of several protected areas, serving as buffer zones.
It is worth noting that a portion of the Itabira Complex is located within the buffer zone of the Municipal Park Água Santa, encompassing a green area of 1.2 hectares in the downtown Itabira.
The park, spanning 1.2 hectares in Itabira, boasts the scenic beauty and historical significance of Poço da Água Santa. This well is renowned for its thermal waters that emanate from rock fractures or geological faults at considerable depths.
Vale's operational areas annually report this information through forms to the Sustainability Department's functional areas, specifically the Corporate Environmental Management Executive Management. The collected data is stored in a geographic information system (GIS) tool for information management. This information serves as the basis for evaluating overlaps with areas of high biodiversity value, including public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), among others.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Intelecto Municipal Park

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The Intelecto Municipal Natural Park was created on December 27, 1991, by Municipal Law No. 2.770, called Parque Municipal do Campestre at that time. In an area of 21.6 hectares, in 2003, by Municipal Decree No. 1,851, the green area called Pico do Amor was incorporated. In 2006 Municipal Law no. 4.105 changed the name from Campestre Municipal Park to Intelecto Municipal Natural Park, reiterating the incorporation of the green area of the Pico do Amor, increasing its size to 35.13 hectares.
The Park boasts the last remaining vegetation of the Atlantic Forest, which includes forest remnants with diverse flora. It features a range of plant species such as Jatobá (Hymenaea courbaril), Cedar (Cedrus), Vinhático (Plathymenia), Sapucaia (Lecythis pisonis), Juçaras (Euterpe edulis), Braúnas (Melanoxylon brauna), as well as exotic fruit trees that were planted during the area's farming past. The Park is in Itabira City and offers recreational areas for the local community, including trails, kiosks, and a playground.
In addition, this Park has a Management Plan. This technical document establishes zoning and the rules that should preside over the use of the area and the management of natural resources, including implementing the structures necessary to manage the protected area.
Vale's operational areas annually report this information through forms to the Sustainability Department's functional areas, specifically the Corporate Environmental Management Executive Management. The collected data is stored in a geographic information system (GIS) tool for information management. This information serves as the basis for evaluating overlaps with areas of high biodiversity value, including public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), among others.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Ribeirão São José Municipal Park

Proximity

Up to 5 km

Area of overlap (hectares)

Please explain

The Ribeirão São José Municipal Natural Park was created by law no. 3465 of December 10, 1998. On July 16, 2003, Law 3779 was approved, which changed the name of the Municipal Park to the Municipal Natural Park of Ribeirão São José. The protected area has an area of 74.33 hectares.
The Park aims to preserve the natural ecosystems of great ecological relevance and scenic beauty, promote scientific research, develop environmental education and interpretation activities, and promote recreation in contact with nature and ecological tourism.
The Park is located in the place called Ribeirão São José, located more than 8km from the Cauê mine.
Vale's operational areas annually report this information through forms to the Sustainability Department's functional areas, specifically the Corporate Environmental Management Executive Management. The collected data is stored in a geographic information system (GIS) tool for information management. This information serves as the basis for evaluating overlaps with areas of high biodiversity value, including public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), among others.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Mata do Bispo Municipal Biological Reserve

Proximity

Up to 5 km

Area of overlap (hectares)

Please explain

Initially, the protected area was created as Mata do Bispo Municipal Park through Law No. 3466 of December 10, 1998. Later, on July 16, 2003, through Law No. 3783, the category of protected area was changed from Municipal Park to Municipal Biological Reserve of Mata do Bispo because of the existing natural attributes, especially concerning forest formation typical of the Atlantic Forest and water resources to be preserved. This Law also rectified the area to 691.8750 hectares. In November 2003, Law nº 3794 was approved, which revised some points of the descriptive memorial of the protected area.

Located northeast of Itabira (Minas Gerais, Brazil) in the region of Ribeirão São José, this protected area is a secure area of integral protection. It is situated more than 6km from the Cauê mine. Its primary objective is to preserve the biota and other natural attributes existing within its boundaries without direct human interference or environmental modifications, except for the measures necessary to recover and keep the natural equilibrium, biological diversity, and natural ecological processes.

Vale's operational areas annually report this information through forms to the Sustainability Department's functional areas, specifically the Corporate Environmental Management Executive Management. The collected data is stored in a geographic information system (GIS) tool for information management. This information serves ‘as the basis for evaluating overlaps with areas of high biodiversity value, including public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), among others.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

UNESCO Biosphere Reserves

Protected area category (IUCN classification)

Name of area

Espinhaço Range Biosphere Reserve

Proximity

Overlap

Area of overlap (hectares)

3,721.14

Please explain

The Serra do Espinhaço Biosphere Reserve extends in the North-South direction, over a length of approximately 1,200 km, from the Belo Horizonte Region to the northern border of the state of Bahia with the Pernambuco and Piauí, its width varying from a few kilometers to over 100 km. It constitutes a set of territories of high relevance for biodiversity conservation, encompassing protected areas, ecological corridors, and watersheds, with the primary objective of combining environmental protection and sustainable development.
The Quadrilátero Ferrífero Region, located in the southern portion of the Biosphere Reserve, is the southern continuation of the Espinhaço Range. As a result, all the mineral complexes in this region of Minas Gerais are within the Biosphere Reserve and are part of a sustainable development plan that prioritizes biodiversity conservation. Our operations bring impacts but also contribute to preserving an area approximately three times larger than the area occupied by the mines and associated structures in this region.
The calculation of the affected area by each Vale's operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored in a geographic information system (GIS) tool for information management. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

Key Biodiversity Area

Protected area category (IUCN classification)

Name of area

Ouro Preto/Mariana

Proximity

Overlap

Area of overlap (hectares)

Please explain

This area encompasses an expressive set of extensive forest remnants, largely still contiguous, that cover the mountains around the cities of Mariana and Ouro Preto (Minas Gerais, Brazil) at the southern limit of the Espinhaço Range. It is considered an area of extreme importance mainly because of the significant remnants of the Atlantic Forest in these locals.
The forests in this region are primarily semideciduous and include montane and riparian

vegetation. In some areas, clean or dirty fields replace the forest. In sectors of higher altitude, such as the Pico do Itacolomi area, there is typical rupestrian grassland. Industrial-scale mining is a common activity in several sectors of the region, being an essential threat to the preserved environments in the area.
Our operations bring impacts but also contribute to conserving an area approximately three times larger than the area occupied by the mines and associated structures. Almost all the mines in the Complex overlap this Key Biodiversity Area (KBA), except for the Alegria mine pit. The overlap was confirmed by Integrated Biodiversity Assessment Tool (IBAT) and geographic information system (GIS) tools.
The calculation of the affected area by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored in a Geographic Information GIS tool for information management. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

Key Biodiversity Area

Protected area category (IUCN classification)

Name of area

Serra do Caraça

Proximity

Up to 5 km

Area of overlap (hectares)

Please explain

The Serra do Caraça, about 120 km from Belo Horizonte, stands out in the regional landscape. This mountain massif encloses a significant altitudinal gradient, along which different floristic formations can be found, including montane Atlantic Forest, high montane forest filled with bromeliads and other epiphytes, and rupestrian grassland, which blend with high altitude fields at the mountain tops. In addition to the private natural heritage reserve (RPPN, Portuguese acronym for, Reserva Particular do Patrimônio Natural) Santuário Caraça, the area includes the unprotected portions of the massif until near Brumal (Santa Bárbara), at the mountain's base.
Unfortunately, mining poses a significant threat to the natural environments in the region. It has already caused changes to some unprotected parts of the Serra do Caraça and its immediate surroundings.

Forest fires in the rupestrian and high-altitude fields represent an additional important threat because it eliminates the native vegetation cover and opens the way for the invasion of alien plants to these peculiar environments.
We help protect part of this area in our RPPNs and support the region's fire prevention and fighting actions.
The area is in the surroundings of the Alegria mines, about 45 km away.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity

Up to 5 km

Area of overlap (hectares)

Please explain

The Mariana Complex is located near the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA Sul RMBH, Portuguese acronym for Área de Proteção Ambiental da Região Metropolitana do Sul de Belo Horizonte), a conservation area of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima.
Mining is a permitted activity in this protected area category, being the APA's main economic activity, and was responsible for developing population centres in the region. In addition, the objective of this area is to protect and conserve natural systems essential to biodiversity, especially the water resources necessary to supply the population of the Metropolitan Region of Belo Horizonte and adjacent areas, to improve the quality of life of the local people, protect ecosystems and sustainable development.

Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.
The location of the areas about the complexes was determined by consulting the IBAT and using GIS tools.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Cachoeira das Andorinhas Environmental Protection Area

Proximity

Adjacent

Area of overlap (hectares)

Please explain

According to Brazilian legislation, the Mariana Complex is located near the Cachoeira das Andorinhas Environmental Protection Area, a protected area of sustainable use belonging to category V of the IUCN. In 1989 this conservation area was established, spreading over 18.7 thousand hectares. It stretches from the border between Ouro Preto and the district of São Bartolomeu, running northward to the limits of the municipalities of Itabirito and Santa Bárbara.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Uaimii State Forest

Proximity

Adjacent

Area of overlap (hectares)

Please explain

Created on October 21st, 2003, Uaimii State Forest covers an area of 4,398 hectares in the municipality of Ouro Preto. According to the Brazilian system of protected areas, it is a protected area of sustainable use. It is the second State Forest of Minas Gerais, home to an essential remnant of the Atlantic Forest and endemic species of flora and fauna. It is located around the Timbopeba mine, part of the Mariana Complex.
It is characterized by an area with a forest cover of predominantly native species. It has the aim of the sustainable multiple uses of forest resources and scientific research, emphasizing methods for sustainable exploitation of native forests. In addition, it is a protected area model that allows public use, that is, allows public visitation conditioned to the standards established for managing the area.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Gandarela National Park

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The Serra do Gandarela National Park was created on October 13th, 2014, and is an important environmental conservation area in the heart of the Quadrilátero Ferrífero Region and the southern part of the Espinhaço Range, just 40 km from Belo Horizonte (Minas Gerais, Brazil). The Park's vegetation is composed of continuous fragments of the Atlantic Forest in transition with cerrado (tropical savanna in eastern Brazil), such as ferruginous and quartzitic rupestrian grasslands. It is an essential source of water resources, forming large aquifers and contributing to the supply of several cities, including the capital of Minas Gerais.
The Park is located around the Alegria mine and close to the Timbopeba mine (> 5Km), and Vale has several properties within the park, including a private natural heritage reserve (RPPN, Portuguese acronym for Reserva Particular do Patrimônio Natural), contributing to the protection and regularization of land ownership.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 4

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Andaime Private Heritage Reserve

Proximity

Adjacent

Area of overlap (hectares)

Please explain

Vale is committed to environmental conservation and maintains Private Heritage Reserves (RPPN, Portuguese acronym for Reserva Particular do Patrimônio Natural) in Minas Gerais. These reserves serve as a means of offsets and voluntary habitat and species conservation. The protected areas mentioned here are officially created and are part of the environmental compensation for the Vargem Grande Complex. This

protected area has 175 ha and was built in 2004 in Vale's properties adjacent to the operations to facilitate their management and protection.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 4

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Estação Ecológica de Arêdes

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The Arêdes Estação Ecológica, spanning 1,157 hectares in the municipality of Itabirito, Minas Gerais, was established in 2010 by Decree No. 45,397 following the National System of protected areas. The reason for its creation is the protection of flora, fauna, water resources, historical, archaeological heritage, and the development of scientific research. This protected area is located in the surroundings of the Pico mine structures in the Vargem Grande Complex.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in a geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 4

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity

Overlap

Area of overlap (hectares)

4,436

Please explain

The Vargem Grande Complex is located in an area overlapping the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA do Sul RMBH, a Portuguese acronym for Área de Proteção Ambiental do Sul da Região Metropolitana de Belo Horizonte), a protected area of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima.
The APA SUL RMBH is located within the Quadrilatero Ferrífero Region of Minas Gerais, one of Brazil's most important metallogenetic provinces. While mining is a permitted activity in this category of protected area, the region's economy is primarily driven by it. As such, mining has played a significant role in developing population centres in the region.
The calculation of the affected area by each Vale's operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored in a Geographic Information System (GIS) tool for information management. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 4

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

State Park Serra do Rola Moça

Proximity

Adjacent

Area of overlap (hectares)

Please explain

State Park Serra do Rola Moça was created in 1994 and had an area of about 4000 ha with Atlantic Forest and Cerrado (tropical savanna in eastern Brazil), covering regions of Belo Horizonte, Brumadinho, Nova Lima, and Ibirité. Brazilian legislation states it is an integral protection area in category II of the IUCN.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in a geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 4

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Estação Ecológica De Fechos

Proximity

Adjacent

Area of overlap (hectares)

Please explain

Estação Ecológica de Fechos was created in 1994, is considered category Ia by the IUCN, and covers an area of 554 hectares the municipality of Nova Lima. It was created to protect the water source in the watershed of the ribeirão dos Fechos and the existing natural environments, composed mainly of forests.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in a geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on

Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 5

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Estação Ecológica de Fechos

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The Estação Ecológica de Fechos was established in 1994 and covers an area of 554 hectares. It is classified as a category Ia protected area by the International Union for Conservation of Nature (IUCN). Located in Nova Lima (Minas Gerais, Brazil), its main purpose is to safeguard the water source in the Ribeirão dos Fechos watershed and protect the existing natural environments, primarily consisting of forests. The water from this area supplies approximately 280,000 people in the Metropolitan Region of Belo Horizonte (RMBH, Portuguese acronym for Região Metropolitana de Belo Horizonte) along the southern axis. The importance of the Fechos Watershed further increased for RMBH following the dam rupture in Brumadinho, which severely impacted the Paraopeba River, the region's second most significant water source.
Vale's operational areas provide annual reports to the relevant departments within the Sustainability Department - Corporate Environmental Management Executive Management. The information collected is stored in a Geographic Information System (GIS) tool for effective information management. This data serves as a foundation for assessing the overlap with areas of high biodiversity value and is cross-referenced with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 5

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity

Overlap

Area of overlap (hectares)

1,400

Please explain

The Paraopeba Complex is situated in an area that overlaps with the Environmental Protection Area in the southern region of the Belo Horizonte Metropolitan Region (APA Sul RMBH, Portuguese acronym for Área de Proteção Ambiental do Sul da Região Metropolitana de Belo Horizonte). This protected area, classified as a sustainable use area according to Brazilian legislation and falling under category V of the IUCN, spans an area of 1625.32 km². It encompasses parts of several municipalities, including Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo, and the entire municipality of Rio Acima.

The APA Sul RMBH is located within the Quadrilátero Ferrífero Region of Minas Gerais, considered one of Brazil's most significant metallogenetic provinces. Although mining is a permitted activity within this protected area category, the local economy relies primarily on mining, which has played a substantial role in the developing population centres in the region.

The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management through forms. This information is stored and managed in a geographic information system (GIS) tool. The data and information, including biodiversity data (specifically MM1), are calculated, and reported annually in the Sustainability Report, aligning with GRI indicators. The GIS platform also has information about Vale's properties across its various operational areas.

Mining project ID

Project 5

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Serra do Rola Moça State park

Proximity

Adjacent

Area of overlap (hectares)

Please explain

Serra do Rola Moça State Park, created in 1994, spans approximately 4,000 ha and encompasses both Atlantic Forest and Cerrado (tropical savanna in eastern Brazil) biomes. It is located in the municipalities of Belo Horizonte, Brumadinho, Nova Lima, and Ibirité. According to Brazilian legislation, it is classified as a category II integral protection area under the IUCN. The park is home to numerous springs that supply water to the Metropolitan Region of Belo Horizonte and boasts a diverse fauna, including endangered species such as the brown jaguar (*Puma concolor*), ocelot (*Leopardus pardalis*) and maned wolf (*Chrysocyon brachyurus*). Situated in the transition zone between the Cerrado and Atlantic Forest biomes, the park is known for its rare species of orchids, bromeliads, candeia trees, jacarandá trees, cedar trees, jequitibá trees, arnica plants, and Canela-de-ema (*Vellozia* sp.), which has become a symbol of the park.
Vale's operational areas provide annual reports to the relevant departments within the Sustainability Department - Corporate Environmental Management Executive Management. These reports are stored in a GIS tool for information management. The information serves as the foundation for evaluating the overlap with areas of high biodiversity value, as well as consulting public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 6

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Private Natural Heritage Reserve Comodato Reserva de Peti.

Proximity

Adjacent

Area of overlap (hectares)

Please explain

This area is a protected area, registered at the federal level and belongs to the category of Private Natural Heritage Reserve. It was created through Ordinance No. 99, of September 3, 2001, of the Brazilian Institute for the Environment and Renewable Natural Resources. The property belongs to Vale and has 96.42 hectares.
This protected area is located in São Gonçalo do Rio Abaixo (Minas Gerais) and

characterized by semideciduous seasonal forest and is continuous with the Peti Environmental Station, forming an important ecological corridor for the fauna in a transition area between Atlantic Forest and Cerrado (tropical savanna in eastern Brazil).
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 6

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Private Natural Heritage Reserve - Itajurú or Sobrado

Proximity

Up to 10 km

Area of overlap (hectares)

Please explain

This area is a protected area, registered at the federal level and belongs to the category of Private Natural Heritage Reserve. It was created through Ordinance No. 102, of August 9, 2002, of the Brazilian Institute for the Environment and Renewable Natural Resources. The property belongs to Vale and has 43.06 hectares, located in Santa Barbara, Minas Gerais.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in a geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 6

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity

Up to 10 km

Area of overlap (hectares)

Please explain

The Brucutu/Água Limpa Complex is located nearly the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA Sul RMBH, Portuguese acronym for Área de Proteção Ambiental do Sul da Região Metropolitana de Belo Horizonte), about 10 km away from Brucutu mine. This is a protected area of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima.

Mining is a permitted activity within this category of protected area, and it serves as the primary economic activity in the APA. As a result, it has contributed to developing population centres in the region.

Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the GIS tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 7

Type of legally protected/ internationally recognized area

Key Biodiversity Area

Protected area category (IUCN classification)

Name of area

KBA Feruhumpenai - Matano

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The operation is adjacent to the KBA Feruhumpenai – Matano and to Danau Matano, a Nature Recreation Park, IUCN Category V, at the provincial border of Central and South Sulawesi, Indonesia.
The KBA area was created in 2019, and it has an area of 161,002 ha, with 71% of it being a protected area.
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored for information management, in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 7

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Danau Matano Nature Recreation Park

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The operation is adjacent (< 5Km) to Danau Matano, a Nature Recreation Park, IUCN Category V, in East Luwu Regency, South Sulawesi province, Indonesia.
PT Vale’s mining operation areas are based on Contracts of Work with the Government of Indonesia, as amended in 2014. 41,822.95 ha or 59% of the total Sorowako operation area of 70,894 ha is next to a protected forest.
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored for information management, in a GIS tool. All these data and information are calculated and reported

annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Santo Antônio Municipal Environmental Protection AreaProximity

Overlap

Area of overlap (hectares)

600

Please explain

The Santo Antônio Environmental Protection Area (APAM, Portuguese acronym for Area de Proteção Municipal) covers a surface area of 63,517 hectares It is situated in the western part of the municipality of Itabira, in Minas Gerais, Brazil. This area corresponds to the Rio do Tanque Watershed and aims to balance human actions and the conservation of the region's watersheds.
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored for information management in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). In addition, this GIS platform also houses information about Vale's properties across its various areas of activity.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Piracicaba Municipal Environmental Protection Area

Proximity

Overlap

Area of overlap (hectares)

2,400

Please explain

The Environmental Protection Area (APAM, Portuguese acronym for Area de Proteção Municipal) Piracicaba has an area of 38,034 ha, and it is located in the western part of the municipality of Itabira, in Minas Gerais, Brazil, which corresponds to the watershed of the Rio do Peixe and tributaries of the Rio Santa Barbara. Despite the area's extensive size and a moderate degree of human occupation, it is home to a variety of essential abiotic, biotic, scenic beauty, and cultural attributes that contribute to the quality of life and well-being of local populations and have as primary objectives to protect the biological diversity, discipline the human occupation process and assure the sustainability of the use of natural resources. The overlap was calculated from GIS tools.

The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. It is stored for information management, in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). In addition, this GIS platform also houses information about Vale's properties across its various areas of activity.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Campos Ferruginosos National Park

Proximity

Adjacent

Area of overlap (hectares)

Please explain

The Campos Ferruginosos National Park is an integral protection area, created by the Presidential Decree on June 5, 2017, and encompasses an area of 79,086.04 hectares. The park was established through a partnership between the Instituto Chico Mendes de

Conservação da Biodiversidade (ICMBio) and Vale. Its establishment fulfilled one of the specific requirements of the license granted by IBAMA for Vale to operate the S11D Mine.
The park is situated between the cities of Canaã dos Carajás and Parauapebas in the south-eastern part of the state of Pará, Brazil. It mainly comprises portions of the Carajás National Forest –Carajás - and adjacent areas in the Bocaina Mountains. The park was created with the goal of protecting the biological diversity of the Bocaina and Tarzan Mountains. Additionally, it ensures the preservation of ecosystem services and the speleological heritage associated with ferruginous rupestrian grassland, a unique and endangered ecosystem found in Brazil. It is characterized by its rocky outcrops, iron-rich soils, and diverse flora and fauna. Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category Ia-III

Name of area

Tapirapé Biological Reserve

Proximity

Up to 10 km

Area of overlap (hectares)

Please explain

The Tapirapé Biological Reserve was created by Decree No. 97,719 on May 5, 1989, with an area of 99,271.75 hectares, and is located in the southeast of the state of Pará, in the municipality of Marabá, Brazil. The name of the reserve comes from the Tapirapé River, an important tributary of the Itacaiunas River, which runs along the northern boundary of the reserve before emptying into the Itacaiunas. At the time of its creation, the Vale Carajás Complex was in the Carajás National Forest, next to the Tapirapé Biological Reserve.
This area aims to protect samples of Amazonian ecosystems, especially the region of the chestnut trees. Additionally, the Reserve seeks to safeguard the exceptional

attributes of nature, reconciling the integral protection of flora, fauna, and natural beauties with their use for educational and scientific purposes.
Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Tapirapé-Aquiri National Forest

Proximity

Up to 25 km

Area of overlap (hectares)

Please explain

The Tapirapé-Aquiriri National Forest was created through Decree no. 97,720 of May 5, 1989, with an official area of 196,503.94 hectares in the municipalities of Marabá, for the most part, and São Félix do Xingu in the state of Pará, Brazil. This federal protected area has an advisory board, established through April 21, 2005, Ordinance, with the primary objective of aiding in the planning and development of the UC, mainly about implementing its management plan and fulfilling its creation objectives.
Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Itacaiúnas National Forest

Proximity

Up to 50 km

Area of overlap (hectares)

Please explain

The Itacaiúnas National Forest was established by Decree No. 2,480 of 02/02/1998 and presents about 71% of Open Ombrophilous Forest and just over 28% of Dense Ombrophilous Forest, inserted in the municipalities of Marabá, in Pará, Brazil. It has an area of 136,698.91 hectares and aims at the sustainable multiple uses of forest resources and scientific research, emphasizing methods for sustainable exploitation of native forests.

In addition, this area, along with the National Forests of Carajás and Tairapé – Aquiri, constitutes a complex of forest areas in the union domain, covering a total area of 743,348 thousand hectares.

Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Igarapé Gelado Environmental Protection Area

Proximity

Overlap

Area of overlap (hectares)

1,200

Please explain

The Igarapé Gelado Environmental Protection Area is located within the perimeter delimited by the Ministry of the Environment as a high-priority area for conservation. This protected area is part of the Carajás Mosaic. It was established by Decree No. 97,718 on May 5, 1989, and has an area of 23,285.09 ha.
The area is situated in the context of the Carajás Mineral Province and, despite not engaging in mining activities, has various types of ores detected due to mining research in the area, the authorizations for which remain valid to this day. Additionally, two mining tailings dams, namely Gelado Dam and Geladinho Dam, are part of the Serra Norte mine (within the Carajás Complex) and are located near the area.'Fundação Vale's involvement is noteworthy in this Environmental Protection Area as it engages in various areas, including education, employment and income generation, health, and other complementary aspects. These additional areas include culture, sports, promotion, and social protection.
Moreover, this area has a Management Plan approved by ICMBio Ordinance No. 58 on May 30, 2016, to ensure the protection of natural resources while promoting sustainable and harmonious coexistence between production and conservation.
Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Name of area

Xikrin do Cateté Indigenous Reserve

Proximity

Up to 25 km

Area of overlap (hectares)

Please explain

The Itacaiúnas and Cateté rivers bathe the Xikrin of Cateté Indigenous Reserve, located on firm land of tropical forest within the jurisdiction of the municipality of Parauapebas, in

Pará, Brazil. The Reserve was established by Decree No. 384 of 12/26/1991 and has an area of 439150.54.
Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 1

Type of legally protected/ internationally recognized area

Key Biodiversity Area

Protected area category (IUCN classification)

Name of area

Serra dos Carajás

Proximity

Overlap

Area of overlap (hectares)

9,821

Please explain

The Carajás region is classified as an Important Bird Area, being classified as Key Biodiversity Areas (KBA) in the World Database of Key Biodiversity Areas. The Serra dos Carajás KBA comprises a group of protected areas composed of the Tapirapé Biological Reserve and the Carajás, Itacaiúnas, and Tapirapé-Aquiri National Forests, plus the Xikrin Indigenous Territory of the Cateté River, all in the Tocantins-Xingu interfluve, in central-eastern Pará. Part of the Carajás Mine Complex, inserted in the Carajás National Forest, overlaps with this KBA.
Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 7

Type of legally protected/ internationally recognized area
Key Biodiversity Area

Protected area category (IUCN classification)

Name of area
KBA Danau Mahalona

Proximity
Adjacent

Area of overlap (hectares)

Please explain
The KBA Danau Mahalona area, established in 2019, spans across 9,632 hectares, with 24% of the area designated as a protected zone, in South Sulawesi, Indonesia.
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms. Itis stored for information management, in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID
Project 7

Type of legally protected/ internationally recognized area
Key Biodiversity Area

Protected area category (IUCN classification)

Name of area
KBA Danau Towuti

Proximity
Adjacent

Area of overlap (hectares)

Please explain
The KBA Danau Towuti area, established in 2019, covers an expanse of 97,733 ha, with 64% of the area designated as a protected zone, in South Sulawesi province, Indonesia.
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of

Corporate Environmental Management in forms. Itis stored for information management in a geographic information system (GIS) tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID

Project 2

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Pureza Environmental Protection Areas

Proximity

Up to 5 km

Area of overlap (hectares)

Please explain

Municipal Law No. 3547/2000 “Declares Environmental Protection Areas for the public supply sources of the Municipality of Itabira and its tributaries and makes other provisions.” This law creates Environmental Protection Areas under the name of APA (Portuguese acronym for Área de Proteção Ambiental) Pureza covering the contribution -of the watershed of Córrego Candidopolis and its tributaries. The total area of the APA is 3,400.54 ha, with 18% of this area, that is, 624.76 ha, belonging to the urban perimeter. The APA is delimited by the Ribeirão Candidopolis micro basin, belonging to the sub-basin of the Piracicaba River. Law No. 3547/2000 aims to protect the watershed areas in the municipality. The creation of APA Pureza in 2000 was a way for municipal management to limit the human occupation of the area to protect the source.
Vale's operational areas report information annually to the functional areas of the Sustainability Department - specifically, the Corporate Environmental Management Executive Management - through forms. This information is stored in a geographic information system (GIS) tool for information management. The data serves as the basis for evaluating overlaps with high biodiversity value areas and is compared with public databases such as the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

Mining project ID

Project 6

Type of legally protected/ internationally recognized area

Legally protected area

Protected area category (IUCN classification)

Category IV- VI

Name of area

Serra da Cambota Environmental Protection Area

Proximity

Up to 10 km

Area of overlap (hectares)

Please explain

The Environmental Protection Area (APA, Portuguese acronym for Área de Proteção Ambiental) Serra da Cambota was created through Law No. 1102, of October 6, 1999, and it is located at Barão dos Cocais, in Minas Gerais, Brazil. Its purpose is to ensure the well-being of the human populations existing there, to conserve and improve the ecological and local conditions, ensuring, mainly, the local water wealth and to promote the sustainable development of the communities existing there.
In addition, the APA comprises two private natural heritage reserve (RPPN, Portuguese acronym for Reserva Particular do Patrimônio Natural), Cambotas I with an area of 124.85 hectares and Cambotas II with an area of 182.61 hectares.
Vale's operational areas report the information annually to the functional areas of the Sustainability Department - Corporate Environmental Management Executive Management, where this information is stored in the geographic information system (GIS) tool for information management. This information is the base to evaluate the overlap with high biodiversity value areas and public databases like the World Database on Protected Areas, the World Database of Key Biodiversity Areas, Ramsar Sites Information Service (RSIS), and others.

F-MM9.4/F-CO9.4

(F-MM9.4/F-CO9.4) Are there artisanal and small-scale mining (ASM) operations active in your mining concessions or in their area of influence?

Data not available

F-MM9.5/F-CO9.5

(F-MM9.5/F-CO9.5) Have biodiversity-related issues led to detrimental impact(s) on your business in the reporting year?

	Biodiversity-related issues led to detrimental impacts on the business?	Comment
Row 1	No	

F-MM9.6/F-CO9.6

(F-MM9.6/F-CO9.6) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for violation of biodiversity-related regulation?

	Any penalties for violation of biodiversity-related regulation?	Comment
Row 1	Yes, but none considered significant	For Brazil, the criteria adopted to define significant cases of violations of environmental laws and regulations are: cases where a monetary sanction has been imposed with a possible + probable prognosis equal to or greater than USD$ 997 thousand ; (ii) materiality criterion: cases where the alleged illicit conduct is typified under the Environmental Crimes Law (9,605/1998), even if a monetary sanction with a value lower than USD$ 997 thousand has been imposed or a non-monetary sanction has been applied; and (iii) specifically for non-monetary sanctions, all non-monetary sanctions imposed in the reporting year shall be reported. In the case of Indonesia, the criteria for identifying significant cases are as follows: “Unwanted event that impacts our capability to run the business, therefore any unwanted event or noncompliance with laws and regulation that lead to actual impact on all dimensions under very critical categories will be considered as significant: (i) People: More than 1 fatality of people in the community, whose cause is related to an inefficiency of Vale's operational process; (ii) Environment: High magnitude environmental impact, with municipal or regional, which requires mobilization of internal and/or external resources, remedial and/or compensation measures that do little to mitigate the negative effects; (iii) Social and Human Rights: Damage to individual or collective assets or activities in more than one region, indigenous people or traditional community with repair solutions that can be performed in more than 10 years and/or irreparable damage to relevant national cultural assets and/or damage to goods or cultural relevance global; (iv) Reputational: National and/or international repercussions with intense involvement of the media/social media and government authorities, investors, customers, social groups and unions causing high impact/commotion; and (v) Finance: > US$ 500M”. In summary, in 2022 fines were imposed on the company regarding selected mining operations for violations of laws and regulations concerning biodiversity, but none of them were significant.

F10 Procedures

F-MM10.1/F-CO10.1

(F-MM10.1/F-CO10.1) Have biodiversity impacts and risks of your mining projects been assessed before the project development stage?

	Biodiversity impacts and risks assessed before the project development stage?	Please explain
Row 1	Yes, in all cases	In risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to project completion, seeking to evaluate possible interferences in natural heritage areas, protected areas, as well as sensitive habitats and species. In the initial stages of planning projects, we have the best opportunities to avoid and reduce impacts. Environmental impact studies precede all operational expansions and new projects according to the rules and regulations of each country and region in which they operate. This process is part of the principles established in our sustainability policy, which is focused on mapping and managing impacts and risks. Even though Vale always seeks the best technologies and methods that allow less interference in natural resources, our operations directly or indirectly impact natural habitats and the associated biota, mainly due to changes in land use and vegetation cover, as well as the environment's physical characteristics. These impacts result in vegetation suppression and other environmental changes that generate habitat loss and alteration for flora and fauna species. In 2019, Vale prepared an internal normative standard containing guidelines and processes for biodiversity management, focused on all stages of the life cycle, from project planning to post-closing, published in early 2020. The document reflects the company's commitments on risk and impact management, aligned with Vale's long-term objective to neutralize impacts to reduce significant biodiversity loss. According to the guidelines and processes, projects have two types of environmental assessment before the development stage. First, a Preliminary Socio-Environmental Assessment is carried out, and then Environmental Impact Studies assess all the local biodiversity. The use of the Impact Mitigation Hierarchy occurs through an impact management approach that must be applied sequentially to anticipate and avoid, where the prevention of impacts is not possible, to minimize; if impacts occur, recover/restore; and where those taught remain to some extent, compensate. The focus of this approach is a less net loss of biodiversity, mitigating risks and

		impacts. Then, socio-environmental studies evaluate the impacts and propose actions to reduce, control, mitigate, recover, and compensate.

F-MM10.1a/F-CO10.1a

(F-MM10.1a/F-CO10.1a) Select the options that best describe your procedures for identifying and assessing biodiversity-related impacts and risks.

Mining project ID

Project 1

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts
Indirect impacts

Scope defined by

Governmental agency requirements
Company own standards and/or policies

Methods and tools

Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The company has implemented a risk assessment procedure to understand biodiversity impacts and risks at the company level and reinforce the biodiversity risk assessment at the site level, as outlined in its internal normative standard titled "Guidelines and Processes for Biodiversity Management". This normative standard applies to all of Vale's projects and operations within the Brazilian territory. These guidelines are based on legal requirements and international good practices for performance standards. Additionally, all the company's mining projects have environmental impact studies, which are public reports that can be accessed by environmental agencies, either virtually or physically.

Regarding the process for analysing risks and impacts related to biodiversity, Vale adopts the following procedures: I) Expert consultation: Vale hires a company with the necessary experience to conduct the environmental impact study. Avery's detailed analysis of the region is carried out through this expertise.

II) National-specific tools and databases: All available databases related to the region's biodiversity are consulted- an essential step for crossing data with field research.

III) Desk-based research: A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora.

IV) Field surveys: Baseline and monitoring field expeditions are scheduled before and during project implementation and operation to examine abiotic and biotic aspects.

V) Stakeholder consultation/analysis: Environmental agencies and the contracted study company are consulted throughout the project to ensure environmental conditions are being met. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the territory's community relations teams. Furthermore, the tools and methods used to assess impacts consider various factors, including project-specific or location-specific characteristics, regulatory requirements, and industry best practices. Another example is the traditional Environmental Impact Assessment (EIA) method: EIA is a process that enables identifying, predicting, and evaluating environmental impacts from a project or activity. Vale conducts an EIA to analyse the potential effects on biodiversity and develop appropriate mitigation measures.

Mining project ID

Project 2

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts
Indirect impacts

Scope defined by

Governmental agency requirements
Company own standards and/or policies

Methods and tools

Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The company has implemented a risk assessment procedure to understand biodiversity impacts and risks at the company level and reinforce the biodiversity risk assessment at the site level, as outlined in its internal normative standard titled "Guidelines and Processes for Biodiversity Management". This normative standard applies to all of Vale's projects and operations within the Brazilian territory. These guidelines are based on legal requirements and international good practices for performance standards. Additionally, all the company’s mining projects have environmental impact studies, which are public reports that can be accessed by environmental agencies, either virtually or physically.
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II) National-specific tools and databases: All available databases related to the region's biodiversity are consulted- an essential step for crossing data with field research.
III) Desk-based research: A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora.
IV) Field surveys: Baseline and monitoring field expeditions are scheduled before and during project implementation and operation to examine abiotic and biotic aspects.
V) Stakeholder consultation/analysis: Environmental agencies and the contracted study company are consulted throughout the project to ensure environmental conditions are being met. Essential procedure to check if the environmental conditions are being

fulfilled. Data on the main stakeholders are collected with the territory's community relations teams. Furthermore, the tools and methods used to assess impacts considers various factors, including project-specific or location-specific characteristics, regulatory requirements, and industry best practices. Another example is the traditional Environmental Impact Assessment (EIA) method: EIA is a process that enables identifying, predicting, and evaluating environmental impacts from a project or activity. Vale conducts an EIA to analyse the potential impacts on biodiversity and develop appropriate mitigation measures.

Mining project ID

Project 3

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts
Indirect impacts

Scope defined by

Governmental agency requirements
Company own standards and/or policies

Methods and tools

Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The company has implemented a risk assessment procedure to understand biodiversity impacts and risks at the company level and reinforce the biodiversity risk assessment at the site level, as outlined in its internal normative standard titled "Guidelines and Processes for Biodiversity Management". This normative standard applies to all of Vale's projects and operations within the Brazilian territory. These guidelines are based on legal requirements and international good practices for performance standards. Additionally, all the company's mining projects have environmental impact studies, which are public reports that can be accessed by environmental agencies, either virtually or physically.

Regarding the process for analysing risks and impacts related to biodiversity, Vale adopts the following procedures: I) Expert consultation: Vale hires a company with the necessary experience to conduct the environmental impact study. Avery's detailed analysis of the region is carried out through this expertise.

II) National-specific tools and databases: All available databases related to the region's biodiversity are consulted- an essential step for crossing data with field research.

III) Desk-based research: A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora.

IV) Field surveys: Baseline and monitoring field expeditions are scheduled before and during project implementation and operation to examine abiotic and biotic aspects.

V) Stakeholder consultation/analysis: Environmental agencies and the contracted study company are consulted throughout the project to ensure environmental conditions are being met. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the territory's community relations teams. Furthermore, the tools and methods used to assess impacts consider various factors, including project-specific or location-specific characteristics, regulatory requirements, and industry best practices.

Another example is the traditional Environmental Impact Assessment (EIA) method: EIA is a process that enables identifying, predicting, and evaluating environmental impacts from a project or activity. Vale conducts an EIA to analyse the potential effects on biodiversity and develop proper mitigation measures.

Mining project ID

Project 4

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts

Indirect impacts

Scope defined by

Governmental agency requirements

Company own standards and/or policies

Methods and tools

Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The company has implemented a risk assessment procedure to understand biodiversity impacts and risks at the company level and reinforce the biodiversity risk assessment at the site level, as outlined in its internal normative standard titled "Guidelines and Processes for Biodiversity Management". This normative standard applies to all of Vale's projects and operations within the Brazilian territory. These guidelines are based on legal requirements and international good practices for performance standards. Additionally, all the company’s mining projects have environmental impact studies, which are public reports that can be accessed by environmental agencies, either virtually or physically.

Regarding the process for analysing risks and impacts related to biodiversity, Vale adopts the following procedures: I) Expert consultation: Vale hires a company with the necessary experience to conduct the environmental impact study. Avery’s detailed analysis of the region is carried out through this expertise.

II) National-specific tools and databases: All available databases related to the region's biodiversity are consulted- an essential step for crossing data with field research.

III) Desk-based research: A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora.

IV) Field surveys: Baseline and monitoring field expeditions are scheduled before and during project implementation and operation to examine abiotic and biotic aspects.

V) Stakeholder consultation/analysis: Environmental agencies and the contracted study company are consulted throughout the project to ensure environmental conditions are being met. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the territory's community

relations teams. Furthermore, the tools and methods used to assess impacts consider various factors, including project-specific or location-specific characteristics, regulatory requirements, and industry best practices.
Another example is the traditional Environmental Impact Assessment (EIA) method: EIA is a process that enables identifying, predicting, and evaluating environmental impacts from a project or activity. Vale conducts an EIA to analyse the potential effects on biodiversity and develop proper mitigation measures.

Mining project ID

Project 5

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts
Indirect impacts

Scope defined by

Governmental agency requirements
Company own standards and/or policies

Methods and tools

Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The company has implemented a risk assessment procedure to understand biodiversity impacts and risks at the company level and reinforce the biodiversity risk assessment at the site level, as outlined in its internal normative standard titled "Guidelines and Processes for Biodiversity Management". This normative standard applies to all of Vale's projects and operations within the Brazilian territory. These guidelines are based on legal requirements and international good practices for performance standards. Additionally, all the company's mining projects have environmental impact studies, which are public reports that can be accessed by environmental agencies, either virtually or physically.
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II) National-specific tools and databases: All available databases related to the region's biodiversity are consulted- an essential step for crossing data with field research.
III) Desk-based research: A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora.
IV) Field surveys: Baseline and monitoring field expeditions are scheduled before and during project implementation and operation to examine abiotic and biotic aspects.
V) Stakeholder consultation/analysis: Environmental agencies and the contracted study company are consulted throughout the project to ensure environmental conditions are being met. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the territory's community relations teams. Furthermore, the tools and methods used to assess impacts consider various factors, including project-specific or location-specific characteristics, regulatory requirements, and industry best practices.
Another example is the traditional Environmental Impact Assessment (EIA) method: EIA is a process that enables identifying, predicting, and evaluating environmental impacts from a project or activity. Vale conducts an EIA to analyse the potential impacts on biodiversity and develop proper mitigation measures.

Mining project ID

Project 6

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts
Indirect impacts

Scope defined by

Governmental agency requirements
Company own standards and/or policies

Methods and tools

Desk-based research

Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The company has implemented a risk assessment procedure to understand biodiversity impacts and risks at the company level and reinforce the biodiversity risk assessment at the site level, as outlined in its internal normative standard titled "Guidelines and Processes for Biodiversity Management". This normative standard applies to all of Vale's projects and operations within the Brazilian territory. These guidelines are based on legal requirements and international good practices for performance standards. Additionally, all the company’s mining projects have environmental impact studies, which are public reports that can be accessed by environmental agencies, either virtually or physically.

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II) National-specific tools and databases: All available databases related to the region's biodiversity are consulted- an essential step for crossing data with field research.

III) Desk-based research: A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora.

IV) Field surveys: Baseline and monitoring field expeditions are scheduled before and during project implementation and operation to examine abiotic and biotic aspects.

V) Stakeholder consultation/analysis: Environmental agencies and the contracted study company are consulted throughout the project to ensure environmental conditions are being met. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the territory's community relations teams. Furthermore, the tools and methods used to assess impacts consider

various factors, including project-specific or location-specific characteristics, regulatory requirements, and industry best practices.
Another example is the traditional Environmental Impact Assessment (EIA) method: EIA is a process that enables identifying, predicting, and evaluating environmental impacts from a project or activity. Vale conducts an EIA to analyse the potential effects on biodiversity and develop proper mitigation measures.

Mining project ID

Project 7

Type of assessment

Full-scale environmental and social impact assessment

Impacts considered

Direct impacts
Indirect impacts

Scope defined by

Governmental agency requirements
Company own standards and/or policies

Methods and tools

Desk-based research
Field surveys
Expert consultation
Stakeholder consultation/analysis
National specific tools and databases

Aspects considered

Locational alternatives
Threatened species
Endemic species
Protected areas
Natural habitats
Ecosystem services

Baseline biodiversity data available?

Yes

Is the Environmental Impact Statement publicly available?

Yes

Please explain

The definition of essential environmental attributes for management was based on the analysis of environmental studies and project conditions, considering input from internal and external stakeholders. The Local Working Group reviewed the information and prioritized environmental attributes directly or indirectly impacted by project implementation and PTVI operations.

The biodiversity management strategy of the PTVI project is outlined in the Environmental Impact Assessment (AMDAL, Indonesian acronym for Analisis Mengenai Dampak Lingkungan), accessible through the Ministry of Environment and Forestry, Provincial Environment Agency, and Local Environment Agency. The AMDAL documents encompass all the necessary information, guidelines, and planned actions to mitigate adverse environmental impacts, including measures for biodiversity conservation and ecosystem services.
Specialists, including botanists and experts in mammals, herpetofauna, and avifauna, participated in accurately identifying surveyed species. Field research was conducted to identify species in the region and assess their conservation status.
In 2022, PTVI will maintain its partnership with Hasanuddin University to update the baseline study and monitor biodiversity. Research on endangered flora and fauna species, carried out between 2018-2020, provided the foundation for actions in the nursery and arboretum, focusing on restoration and conservation of these species.
In 2023, PTVI signed a Memorandum of Understanding with Hasanuddin University to further collaborate on education and research programs related to the company's operational activities. The scope of this cooperation agreement includes assessment and research on forestry, conservation, and biodiversity protection, primarily associated with biodiversity-related contracts. The collaboration aims to update the Biodiversity Baseline conducted in the previous year.

F-MM10.2/F-CO10.2

(F-MM10.2/F-CO10.2) Does your organization undertake a corporate-level procedure to assess biodiversity-related risks to your business?

	Is there a procedure to assess biodiversity-related risks?	Comment
Row 1	Yes	Vale, a global mining company, is committed to managing risks effectively across its operations. All activities are supported by specific procedures designed to identify hazards and associated risks and to define critical controls to eliminate, control, and/or mitigate risks. Vale has a comprehensive Risk Management Governance flow, which involves periodical reviews to ensure alignment between strategic decisions, performance, definition, and monitoring of risk tolerance limits approved by the Company's Board of Directors upon recommendation of the Executive Board. The Risk Management Governance flow is based on Vale's Risk Management Policy and Risk Management Standard, reviewed in 2022, as well as an internal normative standard procedure focused on the identification, analysis, and classification of environmental risks. This procedure is aimed at preventing accidents that may generate environmental impacts, and Vale uses specific tools for management and monitoring. Vale uses a risk matrix to classify risks, considering the severity and probability of each event. The company

		ensures process reliability by systematically implementing critical controls through regular inspections and maintenance. Vale periodically reviews the effectiveness of its prevention/mitigation controls and the implementation of treatment strategies to ensure that risks are effectively monitored. Vale recognizes the importance of managing risks related to biodiversity. The company has mapped risk scenarios related to biodiversity and monitors them through specific panels according to Vale's process risk management. These scenarios are related to the occurrence of forest fires and changes that may affect areas with high biodiversity values (protected areas, for example), as well as interference in critical biodiversity features. To manage biodiversity effectively, Vale has an internal normative standard that sets guidelines and processes for biodiversity management. The procedure provides guidelines for risk assessment in site level based on prioritizing important biodiversity features in an area and categorizing them according to the risk level, based on a preliminary assessment of the probability and the consequence of impacts on them, and action priority. Vale believes that managing biodiversity risks neutralizes risks to their business and projects.

F-MM10.2a/F-CO10.2a

(F-MM10.2a/F-CO10.2a) Select the options that best describe your procedure for identifying and assessing biodiversity-related risks.

Row 1

Risk assessment procedure

Assessed as part of an established enterprise risk management framework

Frequency of assessment

Annually

How far into the future are risks considered?

> 6 years

Tools and methods used to identify and assess risks

Internal company methods
External consultants
National specific tools and databases

Please explain

Vale conducts biodiversity risk analysis at site and company levels during the planning of new projects and expansions, considering potential impacts. Specifically for new projects, risk analysis is conducted from the planning phase, developing diagnoses to assess potential interferences in high value, protected areas, as well as sensitive habitats and species. In 2015, Vale carried out an assessment at the company level to classify biodiversity sensitivity from site operations due to their location and nature interface, updated in 2017. This included 9 categories of areas with biodiversity value,

per global and national organizations (KBA, Protected Areas, Wilderness Areas, Hotspots, Endangered Species IUCN, etc.). We score biodiversity importance and sensitivity, forming the risk rating. High-risk areas are priority for managing impacts and risks, and reporting. From 2020, following the internal normative standard "Guidelines and Processes for Biodiversity Management" Vale adopted procedures for risk analysis through biodiversity attribute mapping and prioritization. This normative covers all Vale operations in Brazil, with revision timelines linked to project/expansion maturity as new data is obtained. These guidelines adhere to legal requirements and international best practices for investment performance standards, aligning with Vale's Sustainability Policy and the strategic goal of neutral biodiversity impact (no net loss). Additionally, the Impact Mitigation Hierarchy is an important tool that Vale has considered to help identify and manage risks and impacts related to biodiversity and to inform the company's management actions. In 2022, Vale engaged with the Task Force on Nature-related Financial Disclosures (TNFD), committed with International Council on Mining and Metals (ICMM) in TNFD's Pilot Program Partners and with Brazilian Business Council for Sustainable Development (CEBDS) in the Brazilian Consultative Group. We conducted a desktop review pilot last year and are implementing the LEAP (Locate, Evaluate, Assess and Prepare) methodology in an in-depth pilot, anticipating improved risk analysis and reporting.

F-MM10.2b/F-CO10.2b

(F-MM10.2b/F-CO10.2b) Which of the following issues are considered in your organization's biodiversity-related risk assessment(s)?

	Relevance & inclusion	Please explain
Deforestation	Relevant, always included	Although we work to reduce as much as possible the impacts of our projects and operations on the environment, our activities have direct and indirect impacts related to the need for vegetation suppression. Vale adopts an integrated management approach in the region, incorporating and applying concepts related to the of Impact Mitigation Hierarchy focusing on risks and impacts, whether potential or detected, considering important attributes, and working to continuously improve our processes, and among its considerations, deforestation, legally protected areas, internationally recognised areas, endangered species, regulations, and local communities, are directly linked to the company's commitments. In risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project's completion, seeking to evaluate possible interferences in high-value biodiversity areas, protected areas, as well as sensitive habitats and species. Project or expansion with interventions in natural habitats and vegetation are assessed and measured to avoid and mitigate the impacts. All operational expansions and new projects are preceded by environmental impact studies,

		according to the rules and regulations of each country and region in which they operate. Our internal normative standard entitled "Guidelines and Processes for Biodiversity Management", adopts risk analysis procedures through mapping and prioritization of biodiversity attributes, basing the implementation on the Impact Mitigation Hierarchy. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts by aiming to reduce significant biodiversity loss. At both company and site level, we track and report annually on indicators that reflect our affected area. Throughout the value chain, we evaluate our customers regarding the use and origin of forest-based raw materials by analysing and auditing documents. Working beyond our borders, in 2021, Vale Fund and Microsoft supported Imazon research institute in the development of PrevisIA, a platform to anticipate information about regions at risk of deforestation and fires in the Amazon Forest through artificial intelligence. PrevisIA analyses various data to identify land use conversion trends in the forest due to deforestation.
Legally protected areas	Relevant, always included	Although we work to reduce as much as possible the impacts of our projects and operations on the environment, our activities have direct and indirect impacts related to the need for vegetation suppression. Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Impact Mitigation Hierarchy with a focus on risks and impacts, whether potential or detected. We consider significant attributes of the territory, and work to continuously improve our processes. Considerations such as deforestation, legally protected areas, internationally recognized areas, endangered species, regulations, and local communities, are directly linked to the company's commitments. In risk and impact management, specific diagnoses are prepared - from planning entry into new territories up to the project's completion - seeking to evaluate possible interferences in high-value biodiversity areas, protected areas, as well as sensitive habitats and species. Projects or expansions with interventions in natural habitats and vegetation are assessed and measured to avoid and mitigate the impacts. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each site in which we operate. Our internal normative standard, titled "Guidelines and Processes for Biodiversity Management", adopts risk analysis procedures

		through mapping and prioritization of biodiversity attributes, forming the basis for the implementation of the Mitigation Hierarchy. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts with the aim to reduce significant biodiversity loss. At both the company and site level, we track and report annually on indicators that reflect our affected area. Throughout the value chain, we evaluate our customers with regard to the use and origin of forest-based raw materials by analysing and auditing documents. Working beyond our borders, in 2021, the Vale Fund and Microsoft supported Imazon research institute in the development of PrevisIA, a platform designed to anticipate information about regions at risk of deforestation and fires in the Amazon through artificial intelligence. PrevisIA analyses various data to identify land use conversion trends caused by deforestation.
Internationally recognized areas	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Impact Mitigation Hierarchy focusing on risks and impacts, whether potential or detected, considering important attributes of the territory, and working to continuously improve our processes. Among its considerations, it considers deforestation, legally protected areas, internationally recognized areas, endangered species, regulations, and local communities. In risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project completion, seeking to evaluate possible interferences in high-value biodiversity areas, protected areas, as well as sensitive habitats and species. Project or expansion interventions in natural habitats and vegetation are assessed, and measures to avoid and mitigate these interventions are discussed. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. Our internal normative standard "Guidelines and Processes for Biodiversity Management", adopts risk analysis procedures through mapping and prioritization of biodiversity attributes, forming the basis for the implementation of the Mitigation Hierarchy. The document reflects the company's commitments, focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts, aiming to reduce significant biodiversity loss. To integrate biodiversity into its global strategy, the company seeks continuous alignment with the commitments and goals established by the Convention on Biological Diversity (CBD) and the Global Strategic Plan for Biodiversity. As a

		member of the ICMM, Vale is committed to the Council's established principles, specifically Principle 7, which are related to not operating in World Heritage areas, respecting protected areas and high-value biodiversity areas, and implementing and strengthening the Impact Mitigation Hierarchy, with the aim of not having considerable biodiversity losses. In 2021, Vale made a public commitment to not operate in UNESCO Natural World Heritage Sites. At the company level, we track and report annually on indicators that reflect our interference with, and proximity to, protected areas and high-biodiversity value areas.
Threatened, migratory and endemic species	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to Mitigation Hierarchy, focusing on risks and impacts, whether potential or detected. It considers important attributes of the territory and works to continuously improve its processes. Among its considerations—such as deforestation, legally protected areas, internationally recognized areas, endangered species, regulations, and local communities—are directly linked to the company's commitments. In risk and impact management, specific diagnoses are prepared from planning entries into new territories through to project completion, seeking to evaluate possible interferences in high-value biodiversity areas, protected areas, as well as sensitive habitats and species (e.g., threatened, migratory, and endemic). Projects or expansions that involve interventions in natural habitats and vegetation are assessed, and measures to avoid and mitigate these interventions are discussed. All operational expansions and new projects are preceded by environmental impact studies in accordance with the rules and regulations of each country and region in which they operate. Our internal normative standard, entitled "Guidelines and Processes for Biodiversity Management," adopts risk analysis procedures through the mapping and prioritization of biodiversity attributes, forming the basis for the implementation of the Mitigation Hierarchy. The document reflects the company's commitments, which are focused on risk and impact management and are aligned with Vale's long-term objective to neutralize impacts with the aim of reducing significant biodiversity loss. At the company level, we track and report annually on indicators that reflect our interference with the habitats of threatened species. We monitor these indicators at the site level as well.
Ecosystem services	Relevant, always included	Our internal normative standard, entitled "Guidelines and Processes for Biodiversity Management," adopts risk analysis procedures through mapping and prioritization of biodiversity attributes, forming the basis for the implementation of Mitigation

		Hierarchy. The document reflects the company's commitments, which are focused on risk and impact management and aligned with Vale's long-term objective to neutralize impacts by aiming to reduce significant biodiversity loss. To integrate biodiversity into its global strategy, the company seeks continuous alignment with the commitments and goals established by the Convention on Biological Diversity (CBD) and the Global Strategic Plan for Biodiversity. As a member of International Council on Mining and Metals (ICMM), Vale is committed to the Council's established principles and, in 2019, emphasized alignment with The Expectation of Performance 7. This expectation centres on not operating in World Heritage areas and implementing and strengthening the mitigation hierarchy of impacts, with the aim of preventing significant biodiversity losses. In risk and impact management, specific diagnoses are prepared, from planning entries into new territories to the project's completion, seeking to evaluate possible interferences with natural heritage areas, protected areas, and sensitive habitats and species. All operational expansions and new projects are preceded by environmental impact studies, in accordance with the rules and regulations of each country and region in which they operate. Ecosystem services, on which we depend and which we impact, such as water supply and quality and emissions related to climate regulation, are studied within the physical aspects of environmental impact assessments. Ecosystem services related to the interests and practices of the surrounding communities are also mapped and studied within both physical and biotic aspects of environmental impact assessments.
Regulation	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to Mitigation Hierarchy, focusing on risks and impacts, whether potential or detected. It takes into account important attributes of the territory and works to continuously improve its processes. Among its considerations, deforestation, legally protected areas, internationally recognized areas, endangered species, regulations, and local communities are directly linked to the company's commitments. In risk and impact management, specific diagnoses are prepared, from planning entry into new territories through to project completion, seeking to evaluate possible interferences in high-value biodiversity areas, protected areas, as well as sensitive habitats and species (such as threatened, migratory, and endemic). Project or expansion interventions in natural habitats and vegetation are assessed, and measures to avoid and mitigate these interventions are discussed. All operational expansions and

		new projects are preceded by environmental impact studies, in accordance with the rules and regulations of each country and region in which they operate. All applicable legal requirements are considered in the analysis of risks and impacts, including possible legal restrictions that may necessitate specific changes in project layouts, and inform control and mitigation strategies. In 2020, we published an internal normative standard entitled "Guidelines and Processes for Biodiversity Management," which adopted risk analysis procedures through mapping and prioritization of biodiversity attributes, forming the basis for the implementation of Mitigation Hierarchy. This is based on legal requirements and international best practices. Compliance with legal requirements is a specific and indispensable requirement in the evaluation of our supply chain. All documents are evaluated in the supplier registration and customer evaluation process, and audits are conducted periodically.
Indigenous peoples	Relevant, always included	In cases where indigenous people and traditional communities are situated in the area of influence of the company's activities, specific legislation should be checked and complied with, promoting engagement, free, prior, and informed consultation. Vale incorporates respect for indigenous and traditional communities in a transversal way in internal risk analysis and business feasibility processes, considering the community's interests in its decision-making. Vale has been working to improve its management strategy with intense training for its own and third-party employees, through constant reviews of processes and the development of planning and support tools. It has maintained, renewed, and created agreements with indigenous peoples and traditional communities to establish and maintain solid partnerships. Therefore, Vale maintains an open and transparent dialogue for conflict resolution and creates programs and projects that benefit communities with whom it interacts. The Company has specific teams dedicated to social activities in the territories and to forging permanent relationships with communities, guided by policies and standards supported by tools and specialists. Vale's relationships with its communities are one of the critical aspects of its business. As it is present across large, extended territories, it must have a broad and diverse connection with the communities in areas influenced by its projects. Vale's goal is to create value for indigenous peoples and traditional communities; respect their culture, way of life, and environment; and seek to create a positive legacy for these populations through actions that contribute to their ethnic development.

		Regardless of the local contexts in which it operates, Vale follows the International Council on Mining and Metals (ICMM) position statements and principles and rejects any discrimination or disadvantage that may be related to culture, identity, or vulnerability. Vale seeks to apply these principles to groups that have the characteristics commonly found in indigenous peoples and traditional communities. In 2021, 100% of Vale's operations assessed the risk of human rights violations, periodically monitoring them with other business risks. In addition, the operations adopted prevention and mitigation control measures for these risks and conducted tests to ensure their effectiveness.
Local communities	Relevant, always included	Vale believes that it should manage the socio-economic implications of its activities through actions to control or mitigate risks, compensate for negative impacts, and enhance positive impacts. Therefore, it has created internal rules and guidelines, emphasising Sustainability Policy and the Social Action Guide. Vale's operational areas manage of socioeconomic impacts in their respective contexts, through mapping, assessment, and program implementation according to legal requirements and corporate guidelines. We conduct studies to devise strategies for mitigating negative and enhancing positive impacts, aligning with local policies. They also consider stakeholders' expectations through their social performance, based on three main dimensions: risk and impact management, stakeholder management, and the generation of benefits and a positive legacy in the regions. Another aspect considered is the potential synergy between enterprises within the regional scope. Vale engages with local communities in the territories where it operates and, from this perspective, maintains channels to listen and respond through open and continuous dialogue with them. Based on its policies, external references, and internal orientations, Vale develops plans for its engagement with and social investment in communities, executing the initiatives of engagement, communication, relationship-building, and social investments aimed at territorial development, particularly in the areas of health, education, and income generation, in a participatory manner. Vale's engagement with its communities is guided by Vale's Social Performance model, which was developed and implemented by managing human rights processes, social and environmental risks and impacts, the health and safety of communities, resettlements, relationships with local communities, relationships with Indigenous peoples and traditional communities, actions to support local development, social and environmental

		investments, and conflict management with communities. The Relationship Plans are monitored by teams working with communities, which have a systematic routine of participatory meetings to monitor the execution of actions and evaluate the adherence and effectiveness of the results. This follow-up is recorded in the Stakeholder, Demands, and Issues System (SDI).
Other, please specify	Not considered	

F-MM10.2c/F-CO10.2c

(F-MM10.2c/F-CO10.2c) Which of the following stakeholders are considered in your organization's biodiversity-related risk assessments?

	Relevance & inclusion	Please explain
Customers	Relevant, always included	Our customers are important stakeholders in our environmental management process. We analyse our customers' expectations of our biodiversity management performance, as well as legal requirements and international best practices, and use these as the basis for our continuous improvement process and risk assessment. Our engagement is through specific meetings and specific questionnaire requirements. In addition, we project our environmental commitments against our customers' performance and strive to be a catalyst for improvement in our supply chain, monitoring their performance on environmental issues. Vale understands the challenge of integrating biodiversity management into the value chain. In this sense, it has addressed initiatives to support the supply and commercial areas for the adoption of medium requirements environment, also covering biodiversity, in engagement with customers and suppliers. For instance, customers who consume raw materials of forest origin are requested documents to attest to socio-environmental compliance regarding the supply of your production process and auditing documents.
Employees	Relevant, always included	Vale's management is based on respect, awareness, and promotion of Human Rights, as well as on risk prevention and management of adverse impacts, including their mitigation and remediation in Vale's activities. The company values the involvement with stakeholders, aware that there is still room for improvement in this process. Vale employees (owned and outsourced) have a dual role in biodiversity management: they are subjects and agents. They are trained in different spheres (basic knowledge about biodiversity and its importance, risk analyses, and biodiversity management

		processes), and they also participate in the construction and elaboration of risk analyses as specialists in biodiversity-related topics or as suppliers of information on projects and related areas. In addition, they are active agents in monitoring risks and implementing risk prevention and mitigation strategies (some examples in Vale & Biodiversidade 2021).
Investors	Relevant, always included	Vale has a Risk Management Policy that seeks to establish guidelines for the global management of potential risks to which Vale and its subsidiaries are exposed. Business risk management focuses on potentially relevant risks that, in the event of an occurrence, may impact people, communities, the environment, operational continuity, reputation, and the achievement of the Company's general business objectives. So, Vale maintains a dialogue and alignment with different national and international stakeholders that contribute to the effective management of biodiversity through collaboration in building positive agendas, which bring a legacy of positive reputation, attracting more investments and contributing to expansion in the Marketplace. Investors are considered when assessing risks related to biodiversity, as well as their demands, expectations, and concerns regarding our biodiversity management performance. Putting in place an efficient biodiversity management process minimizes our operational risks but also and stills confidence in a secure investment. Engagement with investors is carried out through responses to questionnaires, disclosure of results, and specific scheduled meetings.
Local communities	Relevant, always included	Vale's Social Performance model is effective through risk management, which aims to identify and prevent risks to communities and the company; manage negative impacts, and promote a social legacy, which generates benefits and contributes to territorial development. This model is supported by the relationship with communities that are based on gaining trust, active listening, transparent posture, and engagement in decision-making and is guided by respect for Human Rights. Vale's social activities are based on the principles and guidelines of the Code of Conduct, the Anti-Corruption, Human Rights, and Sustainability policies, as well as the Sustainability Guidelines. According to our guidelines, Vale leaders must contribute to the local stakeholders' management process, ensuring identification, engagement, and monitoring of relationships with the public. All environmental impact assessments involve socioeconomic and local community studies and listening to stakeholders in meetings and public consultations. In biodiversity risk and impact assessment and management, specific features and ecosystem services related to the interests and practices of the local communities, indigenous peoples, and traditional communities are also mapped and assessed. The

		process of prioritizing biodiversity features considers social aspects according to each region, economy, and culture. For example, in Carajás, Jaborandi (*Pilocarpus microphyllus*), a plant species whose leaves are the source of pilocarpine (an active ingredient in medicines), represent the livelihood of several families. This species is considered a priority for impact avoidance and mitigation strategies, research, recovery, and conservation. In 2022, Vale mapped 1,532 local relationship communities. In Brazil, 165 of these communities are considered engagement priorities. Currently, 78% of these communities have a Relationship Plan in place. The aim is to cover 100% of these communities by 2026. In 2022, to gather input on local communities beyond traditional channels, Vale carried out its first “Community Perception Survey”, covering all of Vale’s Brazilian areas of operation. The survey sought to identify the level of trust in the company, as well as expectations regarding Vale’s presence in the region. The results will be consolidated in 2023 and will support the social strategies for the areas where we operate.
Indigenous peoples	Relevant, always included	Vale works with a focus on constructive relationships, of mutual benefits, based on respect for cultural diversity and the rights of these populations, recognizing the differentiated relationship they have with the territory, which involves not only physical and socioeconomic aspects but also cultural and spiritual. Our relationship with Indigenous Peoples and Traditional Communities is guided by Vale's Global Human Rights Policy, which is aligned with the main international benchmarks related to the theme, such as the UN Guiding Principles for Business and Human Rights, the Equator Principles and the Positioning of the International Council on Mining and Metals on Mining and Indigenous Peoples, Convention No. 169 of the International Labour Organization, the UN Global Compact, the Global Reporting Initiative, IFC Performance Standard No. 07, and the United Nations Declaration on the Rights of Indigenous Peoples, as well as the laws provided for in the countries where Vale operates. These international principles and standards are deployed in guidelines that guide the work of the professionals responsible for the relationship with these populations, such as the application of participatory methodologies (formation of forums and/or community committees) for consultation and free, prior, and informed consent. In addition to the risk and impact management processes, voluntary programs and agreements are implemented, and built in a participatory manner with these populations, considering their cultural and territorial specificities, favouring a solid relationship of partnership and trust. In biodiversity risk and impact assessment and management, specific features and ecosystem services related to the interests

		and practices of the local communities, indigenous people, and traditional communities are also mapped and assessed. The process of prioritizing biodiversity features takes into consideration social aspects according to each region, economy, and culture.
NGOs	Relevant, sometimes included	Non-governmental organizations are important players in the conservation of biodiversity in the different territories where Vale operates. Their positions and expectations at different moments point to the main pressures and attributes that are threatened, providing an important basis that is considered in the analysis of risks in the territories. Several nongovernmental organizations are also active players in the partnerships established by Vale in the territories in projects aimed at restoration and conservation. As an example, we can cite the partnership in Minas Gerais (Brazil) with AMDA for fire prevention and combat in protected areas of Vale and third parties. The Vale Fund works with various organizations in partnerships to promote impact businesses and support conservation. More information about engagement with these organizations will be in the Engagement item. In 2022, Vale held workshops involving representatives from universities, research institutions and non-governmental organizations to collaboratively build the Nature's Strategic Positioning.
Regulators	Relevant, always included	Vale has a Risk Management Policy that seeks to establish guidelines and guidelines for the global management of potential risks to which Vale and its subsidiaries are exposed. Business risk management focuses on potentially relevant risks that, in the event of an occurrence, may impact people, communities, the environment, operational continuity, reputation, and the achievement of the Company's general business objectives. Vale maintains a dialogue and alignment with different national and international stakeholders that contribute to the effective management of biodiversity through collaboration in building positive agendas which brings a legacy of positive reputation, attracting more investments and contributing to expansion in the Marketplace. Regulators are considered in assessing biodiversity-related risks, since if biodiversity impacts occur, Vale may lose licenses, delay in receiving other environmental licenses, as well as paralyse the operation. Vale maintains an open dialogue with various regulatory bodies agencies, both in the processes of licensing and maintaining the licenses for our operations and for establishing partnerships in the territories where we operate. This dialogue improves to our processes and projects and strengthens our mitigation strategy and the pathways followed for scientific research. For example, in Carajás we maintain dialogue and partnership with the Instituto

		Chico Mendes de Conservação da Biodiversidade (ICMBio), which is the manager of Carajás National Forest, and with the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) in the licensing processes of all our projects, discussing the projects, the impacts, risks and the measures proposed in the mitigation strategy of each project; and also, in the scope of research and conservation projects.
Suppliers	Relevant, always included	Vale's suppliers are managed according to the same compliance standards that are upheld within the company concerning social and environmental safety and ethics and integrity aspects. During this process, Vale verifies the history of third-party supplier companies and their partners early in the registration phase, analysing their compliance with the requirements of Vale's Global Anti-Corruption Program. We also verify public information regarding slave labour sanctions and public data published by the Brazilian Federal Government, among other criteria. If any irregularity is found, the supplier is not registered and may be deemed disqualified to serve us and, consequently, will not be registered. Vale's suppliers considered key in terms of GHG emissions in the supply chain are annually invited to participate in the CDP Supply Chain program. All of Vale's suppliers are assessed for environmental licenses, records, and history of environmental non-conformities, among others, including subcontractors, and this procedure is consolidated in specific internal standards that assess supplier performance in relation to health, safety, and the environment. Among Vale registered suppliers with active contracts, we have specific consultancies that support the risk assessments and impacts with specialists and tools. For active suppliers, Vale also carries out periodic monitoring of social, environmental, human rights, health, and social performance, and government relationships. In relation to local labour obligations, a dirty list is monitored employers who use work analogous to slavery, a list of government public sanctions with monthly periodicity. Quarterly, there is the monitoring of public sanctions (by the Compliance with Sanctions) and, every six months, is the Supplier Performance Index. This is a supplier performance assessment on five criteria — technical quality, environmental protection, health and safety, respect for employees, and continuous improvement.
Other stakeholders, please specify	Relevant, always included	Vale collaborates with different universities and institutions supporting research and studies. These research institutes and universities are important partners in the development of research projects and the expansion of knowledge whose results are directly applied in the analysis of biodiversity risks and impacts, as well as

		integrating partnerships for restoration and conservation in our territories of operation. Vale maintains the Vale Technological Institute of Sustainable Development, an independent research institution that focuses specifically on genetic diversity and biodiversity in the Amazon. The knowledge generated by our research is used to support avoid, mitigation, recovery, and conservation strategies.

F-MM10.3/F-CO10.3

(F-MM10.3/F-CO10.3) Do you adopt biodiversity action plans to manage your impacts on biodiversity?

Yes

F-MM10.3a/F-CO10.3a

(F-MM10.3a/F-CO10.3a) Describe your criteria for defining which sites are required to produce biodiversity action plans.

The main requirements for preparing of management plans or biodiversity action plans are legal requirements, location in areas of high biodiversity value, and presence of sensitive and/or threatened species. Most of Vale's operational units have biodiversity management plans or programs associated with legal requirements within licensing processes, covering actions to control and mitigate impacts, as well as recovery/restoration, compensation, and impact monitoring actions. In 2015, Vale carried out an assessment at a company-wide level to map and classify the sensitivity to biodiversity arising from site operations as a result of their location and interface with nature; this was updated in 2017. The analysis included nine categories of areas with relevant biodiversity value, according to global and national organizations (KBA, Protected Areas, Wilderness Areas, Hotspots, occurrence of Endangered Species IUCN, among others). We use a score to characterise the importance and sensitivity of biodiversity, which generated risk rating. The areas with high and very high risks were considered priorities for elaborating a biodiversity management plan or action plan.

In 2017, we established a partnership with The Biodiversity Consultancy to develop Guidelines for the Development of Biodiversity Action Plans, with a focus on establishing improvements in our processes, in addition to application in a pilot project that culminated in the development of an internal normative standard establishing guidelines and procedures for biodiversity management in new projects/expansions and operations.

Of all our operational units assessed in 2022, 47 (88.7%) required the preparation of biodiversity management plans. Of these, 80.9% already have Management Plans in place, and the remainder have plans under implementation or planned. The Carajás Biodiversity Management Plan, published in 2021, is a living document that integrates and consolidates all initiatives related to risk and impact management on habitats and susceptible species in operations and Vale's projects in the region.

F11 Impacts, risks and opportunities

F-MM11.1/F-CO11.1

(F-MM11.1/F-CO11.1) Have any of your projects caused, or have the potential to cause, significant adverse impact(s) on biodiversity?

	Any projects caused, or have the potential to cause, significant adverse impact(s) on biodiversity?	Comment
Row 1	Yes	Vale employs the best methods, technologies, and actions that allow for the least interference with natural resources. However, our operations still have direct and indirect impacts on biodiversity. Our primary impacts are related to changes in land use and vegetation cover, which directly result in localized loss of flora and the reduction or alteration of fauna habitats. The removal of native vegetation cover is inherent to mining activity. Therefore, some of its direct impacts on flora and fauna cannot be mitigated but are addressed with recovery, restoration, and compensatory measures. In 2022, the total impacted area by all our operations worldwide reached 87,731 hectares. This number encompasses all areas already affected by our operations, as well as areas that already have formal authorization from environmental regulatory agencies for project implementation/operation. Newly suppressed areas worldwide totalled 892 hectares in 2022, and areas of permanent recovery totalled 1,097 hectares. Given the location of mining reserves, and the inherent locational rigidity of mineral occurrences, some of our operations are situated in areas with high biodiversity values, necessitating a robust management process. The impacted area may host populations of threatened and endemic species that may suffer the loss of individuals and even entire populations due to the reduction and/or alteration of their habitats. In 2022, 4,175 species were recorded in habitats impacted by Vale's operations or located near these operations. Of these, 78 are considered threatened according to the IUCN categories: Critically Endangered (5), Endangered (20), and Vulnerable (53).

F-MM11.1a/F-CO11.1a

(F-MM11.1a/F-CO11.1a) For your disclosed mining projects, provide details of the significant adverse impacts on biodiversity, with the respective response.

Mining project ID

Project 1

Type of impact

Direct

Impact

Conversion and/or degradation of natural habitats (other than forests)

Description of the impact

Implementing mining project structures involves opening pits without alternative locations. This process results in the suppression of native vegetation and reduction of natural habitats, including grassland habitats such as ferruginous rupestrian grassland. This type of habitat is closely associated with the presence of iron ore reserves.
The conversion of natural habitats into modified ones leads to the loss of individual flora species and can also result in the loss of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened. This includes species endemic to ferruginous rupestrian grassland, as well as birds, frogs, and snakes that rely on these habitats.

Consequence

Serious

Likelihood

Likely

Describe response

Since the open pits don’t have alternative locations, in response to the impact of vegetation suppression, it became necessary to apply mitigating actions and measures, such as the flora and fauna rescue. For flora specimens, it is essential to prioritize their reintroduction in recovery and restoration areas and compensatory efforts such as the reforestation of the other regions or other actions agreed upon between the applicant and the competent environmental agency. The flora rescue removes specimens and seeds of different species in the area that will be suppressed. The seedlings are used in recovery and restoration processes, with a view to the conservation of genetic variability, prioritizing those threatened and endemic species.
It is a mitigation measure, carried out during the project's implementation phase and related to the biotic environment, with its application period considered to be short-term but will reflect long-term benefits.
In response to the suppression vegetation, in 2022, a total of 5,723 specimens of terrestrial, rupicolous, epiphytic and hemiepiphytic plants and seedlings belonging to 88 species and 22 botanical families were rescued, including *Ipomoea cavalcantei*, *Pilocarpus microphyllus*,*Erythroxyllum nelson-rosae*, *Daphnopsis filipedunculat*a, *Marsdenia bergii*, and *Hypolytrum paraense*, in the Serra Norte mine (Pará, Brazil).
Also, in 2022, 10,317 specimens of plants were monitored from translocations and replanting. Of this total, 8,366 individuals survived, representing an 81.1% survival rate.
The pilot project Biocimentação is also being developed and tested in a recovery project regarding a waste pile, which brings innovation for the recovery of the ferruginous canga, an essential substrate for the establishing endemic species of the iron ore

outcrops.
Fauna rescue programs aim to save wildlife in areas affected by deforestation and capture those found displaced or in transit. The projects involve various stakeholders in implementation, licensing, and community meetings.
Vale published the Carajás Biodiversity Management Plan, which aims to integrate sustainability into its operations in the Carajás protected area mosaic and surrounding areas. This plan includes various actions for managing biodiversity, including research on endemic and endangered species and their habitats. One of these actions is the Biocimentação Project.

Mining project ID

Project 1

Type of impact

Indirect

Impact

Other, please specify

Wildlife scaring

Description of the impact

The forced dispersal of fauna is associated with three main aspects: (i) Removal of vegetation cover, which causes habitat reduction/loss.; (ii) Mobilization of labor/ and (iii)Increased local noise levels.
Although removing the vegetation itself could not cause serious harmful effects on wildlife populations, this dispersion generates indirect impacts with more potentially undesirable effects, such as the imbalance of faunal communities in the receiving areas and the increase in the trampling rate.
At the sites where the structures are installed, on access roads, and in their surroundings, the noise generated by the plant suppression task, the movement of people, and the installation processes of the project's structures causes environmental disturbances, inducing the escape of various representatives of fauna. This dispersal of individuals can alter the site's ecological interactions.
Species that cannot disperse will suffer stress due to the sudden loss of their habitats, the loud noises from suppression, and the presence of workers and machinery on the site.
Those dispersing specimens will be more susceptible to trampling and will induce an imbalance in the receiving fauna communities due to competition among the migrating fauna for new ecological niches.
In the long term, this impact is understood to be temporary and reversible. Although certain species avoid the surroundings, others may establish themselves there.

Consequence

Moderate

Likelihood

Likely

Describe response

The project has implemented a noise and vibration control and monitoring plan, and a Plan for the Recovery of Degraded Areas (PRDA) to mitigate the impact of noise and vibration caused by forest suppression.
Another essential program also carried out was the rescue of wild fauna. This action is necessary to minimize the effects of the impact on fauna. The rescued specimens are either released referentially in areas adjacent to the affected forest remnants or sent to release areas of the same vegetation type. The captured animals are carefully packed in transport boxes specific to the different species, sizes, and distances of the transport route. The stakeholders involved in this process were a contracted company that conducted the scaring and rescue of fauna and the competent environmental agencies.
According to the annual Report on Environmental Performance (in Portuguese RADA), in 2022, the recovery activities of degraded areas in Serra Norte reached the proposed objective for the year since all regions made available by the mine planning and infrastructure area were revegetated, totalling 71.70 ha. Fulfilling the goal of guaranteeing the prompt implementation of the Program in 100% of the regions made available and prepared for recovery.
In 2022, Serra Norte's degraded areas achieved full recovery with 71.70 ha revegetated, fulfilling the goal of ensuring the prompt implementation of the Program in 100% of the regions made available and prepared for recovery. Fauna monitoring involved thorough inspection and activities that ensured 100% of intervened areas were observed. A total of 666 animals were rescued, dominated by the Reptilia class (235) and Amphibia (199) due to their slow movement. Aves and Mammalia had 124 and 108 rescues respectively. Noise and vibration monitoring surpassed the recorded equivalent by 24% in the day and 38% at night, meeting expected control action efficiency.
Using the Accrual Index of Noise (IAR), variations in adherence to the Technical Standard No. 10.151:2019 of the Brazilian Association for Technical Standards, standard was assessed through the historical monitoring series from 2013 to 2022. The 2022 results showed a slight increase in daytime noise levels and a decrease at night compared to the previous year, indicating minimal changes in the project's acoustic impact on the environment during this period.

Mining project ID

Project 2

Type of impact

Direct

Impact

Conversion and/or degradation of natural habitats (other than forests)

Description of the impact

The remaining areas of Seasonal Semideciduous Forest within the enterprise's vicinity were in two distinct stages of regeneration: initial and intermediate, resulting from Vale's restoration efforts 1992.
The suppression of vegetation in these formations significantly impacted the reduction of

biological diversity through the loss of individuals, the reduction of populations, and the loss in production and dispersion of propagules. In addition, other effects associated with suppression were considered, such as the decrease in specific fauna sites.
This impact was considered harmful, relevant, and, therefore, of moderate magnitude. Its manifestation was assessed in the short term (immediately due to the elimination of individuals) and the medium to long term (because of population reduction, fragmentation, and consequent progressive loss of genetic variability in the population).

Consequence

Moderate

Likelihood

Almost certain

Describe response

In cases where the removal of native plant species is unavoidable, as in mining projects involving pit expansion that require specific location requirements, mitigating actions and measures have become necessary. These include flora rescue efforts, prioritizing their reintroduction in the area between the pit and the access road to Itabira, and offset measures such as ecological restoration through reforestation in other regions or alternative actions agreed upon by the applicant and the relevant environmental agency.
The rescue of flora provided for the removal of specimens of different species present in the forest area to be suppressed, through the collection of seeds, seedlings, and seedlings for use in the processes of plant restoration, with a view to the conservation of genetic variability, prioritizing those that are threatened with extinction.
It was a preventive measure carried out during the project's implementation phase and related to the biotic environment, with its application period considered to be short-term but will reflect long-term benefits.
The goal of flora re-composition is to plant native species that will blend harmoniously with the surrounding landscape and reduce visual impact, thereby improving the area's environmental conditions. Native species should be purchased, preferably from the Flora Rescue Project.
It comprises the forest restoration in an area equivalent to the site suppressed as required by law, preferably in degraded areas and subject to reclamation. Through the implantation of pioneer native species, it is expected to create an environment conducive to developing secondary species through natural succession.
The main stakeholders involved are:
- Vale employees.
- Specialists from consultancies and universities are interested in conducting environmental studies and programs.
- The environmental agencies monitor all the processes.
- The surrounding communities.
According to the results obtained in 2022, Itabira complex had 210.30 hectares of the suppressed area and 61 hectares of the offset area.

Mining project ID

Project 2

Type of impact

Direct

Impact

Fragmentation of ecosystems

Description of the impact

Although the operational area of the Complex is already consolidated, eventual expansions may require suppression of the new areas that may still have native vegetation cover. As a result of suppression, natural areas that remain continuous may suffer from the process of habitat fragmentation.
This impact is reduced because most of the environmental matrix that characterizes the region is modified, with native habitats presenting low quality. The environmental impact can be classified as harmful and relevant.

Consequence

Moderate

Likelihood

Likely

Describe response

Vegetation suppression is monitored to reduce the impact of habitat fragmentation, and a monitoring system is in place, which includes the rescue of flora before to any deforestation activities and, when necessary, the rescue and relocation of fauna. It is particularly relevant for certain species that may have difficulty moving from the area to be cleared.
It should be noted that the actions of rescue, translocation, relocation, or destination during deforestation occurred only in case of need, in other words, when the conditions verified did not allow the animal to move by its means.
This program was licensed by IBAMA (federal environmental agency) in compliance with the guidelines of Normative Instruction No. 146 of January 10, 2007, which establishes the criteria and standards for the request for granting authorization for capturing, collecting, and transporting fauna in the country, while specific legislation for mining projects is not being prepared. The main stakeholders involved are:
- Vale employees.
- Specialists from consultancies and universities are interested in conducting environmental studies and programs.
- The environmental agencies monitor all the processes.
-The surrounding communities.
According to the results obtained in 2022, the Itabira complex had 210.30 hectares of the suppressed area and 61 hectares of the compensated area.

Mining project ID

Project 2

Type of impact

Indirect

Impact

Other, please specify

Fauna scaring

Description of the impact

The impacts caused by the increase in noise, dust, and the traffic of vehicles and people, are like those described and evaluated as a consequence of the vegetation suppression actions; that is, they cause evasion of individuals from the areas surrounding the enterprise and loss of biodiversity. But it is classified as reversible, as it was intense only during the implementation phase; local, as it reached the limits of the indirectly affected area; moderately relevant, as it came from a small portion of the mammal community and expected the situation to return to the previous levels. The classification in these valuation criteria makes this impact of moderate magnitude.

Consequence

Moderate

Likelihood

Likely

Describe response

To mitigate the impact of vegetation suppression on the environment and its fauna, Vale has implemented the Program for Monitoring Suppression and Fauna Rescue. This program aims to minimise the effect of vegetation suppression by ensuring that only the necessary areas are affected. These actions are accompanied by programs for disturbance and rescuing fauna, which aim to reduce the impacts of suppression on fauna species, as well as flora rescue programs, which have as their objective the rescue of individuals, seeds, and seedlings of species that will be used to produce seedlings and re-establish populations within the recovery/restoration actions, conserving genetic material. This program was licensed by IBAMA (federal environmental agency) in compliance with the guidelines of Normative Instruction No. 146 of January 10, 2007, which establishes the criteria and standards for the request for granting authorization for capturing, collecting, and transporting fauna in the country, while specific legislation for mining projects is not being prepared.
According to the results obtained in 2022, the Itabira complex had 210.30 hectares of the suppressed area and 61 hectares of the offset area.

Mining project ID

Project 2

Type of impact

Direct

Impact

Loss of rare and threatened species

Description of the impact

Implementing mining project structures and eventual expansions leads to the suppression of native vegetation and the reduction of natural habitats. It directly affects some plant species, including rare, endemic, and threatened ones.
Among the species that may be affected are rare, endemic, and threatened, which may suffer direct impacts with the loss of individuals.
Among the species that could be impacted, we can mention those threatened, such as Dalbergia nigra (jacarandá) and other animal species. The presence of carnivore species such as Chrysocyon brachyurus (loboguará) and leopards pardalis (ocelot), and Lontra longicaudis (otter) indicates that mammals still find places to establish home ranges and reproduce within the fragmented landscape of the Itabira region. For these species, habitat loss is a negative impact that can lead to a reduced populations in the region.

Consequence

Extreme

Likelihood

Likely

Describe response

Several environmental compensation programs, including biodiversity offsets, have been implemented to mitigate the impact of vegetation suppression. The Vegetation Suppression Program, which involves clearing vegetation cover, is crucial for certain project structures, such as the pit. Its objective is to minimize the impact on biodiversity by strictly limiting the extent of suppression actions to necessary areas. The Flora rescue program focuses on rescuing individuals, seeds, and seedlings of species for re-establishment within recovery and restoration actions, ensuring the conservation of genetic material.
Furthermore, compensation measures involve investments in protected areas and the creation of new regions. In the Itabira Complex, one private natural heritage reserve has already been established, with others currently in progress, totalling over 700 hectares of forest. This diverse public protected area, along with the private areas maintained by Vale and habitat restoration areas, play a vital role in preserving endemic, rare, and threatened species in the Itabira region.
Throughout these initiatives, various stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, the licensing process, and community meetings. Their collaboration is essential for the success of these projects.
According to the results obtained in 2022, the Itabira complex had a suppressed area of 210.30 hectares and a compensated area of 61 hectares.

Mining project ID

Project 3

Type of impact

Direct

Impact

Conversion and/or degradation of natural habitats (other than forests)

Description of the impact

The semideciduous seasonal forest and the rupestrian grassland are the primary natural environments in the Complex. Any suppression of vegetation in these formations will lead to the loss or reduction of habitats for various flora and fauna species, resulting in decreased populations and genetic variability within the affected areas. This negative impact is considered significant and of high magnitude. As the suppression of native vegetation is an unavoidable impact on the implementation and operation of mines, it is necessary to apply mitigating measures, such as monitoring of suppression, with the rescue of flora and fauna, reclamation and offset measures, such as the creation of a forest nursery, restoration or other action agreed between the applicant and the environmental agency focused on the compensation of impacts.

Consequence

Extreme

Likelihood

Likely

Describe response

The locational alternatives with the smallest suppression area are selected to minimize this impact. For the implementation of the project, the suppression areas are restricted to avoid additional effects. Before the suppression action, seeds, plantlets, and specimens are rescued to produce seedlings and germplasm conservation. The production of seedlings in nurseries supports the restoration of degraded areas and the conservation of genetic variability. During suppression, fauna specimens that have difficulty moving are rescued and relocated.
The Complex has been conducting integrated fauna monitoring for more than ten years, which accompanies the communities in the face of the different environmental alterations resulting from the implantation and operation of the projects.
The main stakeholders involved are:
- Vale employees.
- Specialists from consultancies and universities are interested in conducting environmental studies and programs.
- The environmental agencies monitor all the processes.
- The surrounding communities.
According to the results obtained in 2022, the Mariana complex had 892.56 ha of suppressed area and 978.68 ha of offset area.

Mining project ID

Project 3

Type of impact

Direct

Impact

Fragmentation of ecosystems

Description of the impact

The reduction in connectivity between fragments is a significant impact on the habitat. Fragmentation introduces several new factors in the evolutionary history of natural populations of plants and animals. These changes affect the demographic parameters of mortality and birth rates of different species and, therefore, the structure and dynamics of ecosystems.

In the case of arboreal species, the abundance of pollinators, dispersers, predators, and pathogens alters seedling recruitment rates; fires and microclimate changes, which affect the edges of the fragments more intensely, alter the mortality rates of trees.

These factors are related to biological phenomena that affect plant birth and mortality, such as the edge effect, genetic drift, and interactions between plants and animals. In the area where the enterprise is located, in addition to the decrease in biodiversity in the forest, the suppression of vegetation will cause a reduction in connectivity between the remaining fragments in the area of influence, which will become less protected and suffer greater edge effects.

Given the importance of maintaining habitat connectivity, the reduction caused by habitat fragmentation is considered a relevant negative impact of high magnitude.

Consequence

Extreme

Likelihood

Likely

Describe response

The locational alternatives with the smallest suppression area are selected to minimise this impact.

The project also conducts restoration efforts for flora and habitats for fauna species. Rescuing flora includes removing specimens and seeds of different species belonging to the vegetation present in the enterprise area. Its general objective is to collect seeds and seedlings for restoration, to conserve genetic variability. Priority is given to rescuing species threatened with extinction as a preventive measure during the project's implementation phase. It is the entrepreneur's responsibility, with the application term considered to be short-term but with long-term benefits.

The forest restoration project is an offset measure that aims to reintroduce the species rescued during the implementation of the enterprise, and others produced in the seedling nursery, aiming to improve environmental conditions of areas close to the enterprise that is altered.

In this project, the main goal will be the implantation of native plant species, which will form fragments, aiming at decreasing the impact and improving the conditions of the environment in the area and offering the formation of a habitat that can shelter the fauna locally. It will be an offset measure, with the term of application remaining long-term, reflecting long-term benefits.

In addition, investment in existing or new protected areas as compensatory measures is planned to maintain and protect habitat and species, besides creating ecological corridors.
The main stakeholders involved are:
-Vale employees
-Specialists from consultancies and universities are interested in conducting environmental studies and programs.
-The environmental agencies monitor all the processes.
-The surrounding communities.
According to the results obtained in 2022, the Mariana complex had 892.56 hectares of the suppressed area and 978.68 hectares of the compensated area.

Mining project ID

Project 3

Type of impact

Indirect

Impact

Other, please specify

Fauna scaring

Description of the impact

The impacts of increased noise, dust, vehicular, and human traffic can cause the displacement of individuals from the surrounding areas, leading to a loss of biodiversity. However, this impact is considered reversible as it was only intense during the implementation phase. It is also classified as local, reaching the limits of the indirectly affected area. In terms of relevance, it is moderately significant as it affects only a small portion of the community and is expected to return to previous levels. Based on these evaluation criteria, this impact is of moderate magnitude. In terms of environmental assessment parameters, the increase in traffic, noise, and dust is temporary, discontinuous, real, direct, occurring in the short term, and of a negative nature.

Consequence

Serious

Likelihood

Likely

Describe response

The Program for Monitoring Plant Suppression and Fauna Rescue has been implemented to address this impact.
This program is licensed by IBAMA (the federal environmental agency) in compliance with the guidelines of Normative Instruction No. 146, issued on January 10, 2007. This instruction establishes the criteria and standards for requesting authorization to capture, collect, and transport fauna in Brazil.
According to the results obtained in 2022, the Mariana complex had a suppressed area

of 892.56 hectares and an offset area of 978.68 hectares.
Furthermore, as an example, at the Fábrica Nova mine in 2022, 21.22 hectares of native vegetation were removed for expansion. During the monitoring of suppression activities, traces of various species were recorded.

Mining project ID

Project 3

Type of impact

Direct

Impact

Loss of rare and threatened species

Description of the impact

Implementation mining project structures and expansions lead to the suppression of native vegetation and the reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with deforestation and urbanisation.
The creation of borders and anthropized areas can affect fauna's movement between fragments, limiting gene flow and reducing their genetic variability. Additionally, the edge effect caused by wind, light, and dust exposure can negatively impact on animal survival up to approximately 300 meters from the edge.
The conversion of natural habitats into modified habitats leads to the loss of individuals or fauna specimens. Among the species that may be affected are rare, endemic, and threatened, which may suffer indirect impacts from fragmentation.
Some of the species that are particularly vulnerable to these impacts include the endemic *Manacus manacus* (white-bearded manakin) and the threatened *Leopardus pardalis* (ocelot), and *Tapirus terrestris* (tapir).

Consequence

Extreme

Likelihood

Likely

Describe response

In response to the impact of vegetation suppression, mitigation actions and environmental compensation programs are implemented to restore habitats and invest in protected areas. The Vegetation Suppression Program, which involves eliminating vegetation cover, is an unavoidable activity for certain project structures, such as the pit, due to their fixed location. This program aims to closely monitor all suppression actions and ensure they are limited to the necessary area, minimizing the impact on vegetation.

Additionally, Flora Rescue Programs are in place to rescue individuals, seeds, and seedlings of species affected by vegetation suppression. These rescued individuals are

used for seedling production and population restoration within recovery and restoration actions, with a focus on conserving genetic material.
To further mitigate the impact of vegetation suppression, compensation actions are implemented through investments in protected areas and the creation of new protected areas. These measures contribute to the preservation and enhancement of natural habitats.
Throughout this process, various stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, the licensing process, and community meetings. Their collaboration and expertise play a crucial role in the success of these initiatives.
The combined efforts of these programs and actions aim to minimize the loss of rare and threatened species, promoting the restoration and conservation of biodiversity in the affected areas.
Throughout the process, various stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, the licensing process, and community meetings.
Based on the results obtained in 2022, the Mariana complex experienced vegetation suppression of 892.56 hectares and compensated for 978.68 hectares.

Mining project ID

Project 4

Type of impact

Direct

Impact

Conversion and/or degradation of natural habitats (other than forests)

Description of the impact

Supressing native vegetation cover for mining operations and associated infrastructure, can result in the loss and reduction of habitats for fauna and flora species.
The fragmentation of natural habitats can disrupt the dispersal ability of flora and fauna specimens, and the conversion of habitats can force specimens to migrate to surrounding natural environments, potentially causing imbalances in the receiving communities. This movement, coupled with increased vehicle and machinery traffic, can lead to a rise in accidents involving animals.
These direct and indirect impacts resulting from vegetation removal are assessed for all mines in the Vargem Grande Complex, and specific measures are implemented to minimize, restore, and compensate for them.

Consequence

Serious

Likelihood

Likely

Describe response

To minimise environmental impacts, the Vargem Grande Complex implements various programs and procedures for vegetation and material removal. These include field demarcation, hiring specialized companies, determining access and storage areas, and defining procedures for vegetation removal.
To reduce impacts on animal and plant species, several programs are currently in place:
- Flora Rescue Program: Preserving genetic heritage, conserving rare and threatened species, acquiring scientific knowledge, and rehabilitating degraded areas.
- Fauna Rescue Program: Monitoring deforestation fronts and rescuing displaced animals.
- Recovery of Degraded Areas: Rehabilitating degraded areas, protecting soil, controlling erosion, restoring local flora, and minimizing visual impact.
- Environmental Compensation Actions: Restoring areas, planting endangered species, and creating protected areas to preserve affected flora and fauna.
The main stakeholders involved include Vale employees, specialists from consultancies and universities, environmental agencies, and the surrounding communities.
Results from restoration and protection actions in 2022 include:
Total recovery area: 1,098 hectares
- Permanent recovery area: 1,098 hectares
- Wilderness area recovered: 222 hectares
- Hotspots area recovered: 782 hectares
- Protected area: 965,400 hectares
Monitoring of species in areas affected by operations in 2022 recorded:
- 523 species classified as Least Concern
- 53 species classified as vulnerable
- 36 species classified as near threatened
- 20 species classified as endangered
- 5 species classified as critically endangered

Mining project ID

Project 4

Type of impact

Direct

Impact

Loss of rare and threatened species

Description of the impact

Removing native vegetation cover can have severe consequences for both flora and fauna species, resulting in the loss or reduction of habitats and even the extinction of certain rare, endemic, or threatened species.
These include species such *Ocotea odorifera* (plant), *Drymophila ochropyga, Manacus manacus and Haplospiza unicolor* (birds), *Tamandua tetradactyla, Leopardus pardalis and Chrysocyon brachyurus* (mammals).

Consequence

Serious

Likelihood

Likely

Describe response

Vale implements programs to minimise the impact on fauna and flora species, with specific initiatives that include:
- Flora Rescue Program: This program aims to preserve the genetic heritage of local flora, conserve rare and threatened species, acquire scientific knowledge about affected environments, and rehabilitate degraded areas. For example, in 2021, the Tamanduá Mine rescued and replanted 1,797 individuals of 22 species and twelve families.
- Recovery of Degraded Areas: This program focuses on rehabilitating areas affected by the project, including soil protection, erosion control, recovery of local flora, and minimizing visual impact on the landscape.
- Environmental Compensation Actions: These actions involve restoring areas and planting endangered and legally protected species, as well as creating protected areas to preserve the flora and fauna impacted by the project.

Vale's Biofactory in the Quadrilátero Ferrífero in Minas Gerais plays a crucial role in multiplying native flora specimens using biotechnology. The Biofactory produces plantlets and seedlings of Atlantic Forest and Cerrado (tropical savanna in eastern Brazil) species, including threatened and endemic ones, for the recovery of degraded areas and compensatory measures. In 2022, the Biofactory produced 35,000 seedlings, including 12 endemic, and threatened species.

These initiatives involve the participation of various stakeholders, including universities, research institutions, consulting companies, associations, and local communities. Their involvement contributes to the success of the programs.

Results from the restoration and protection actions in 2022 include:
1,098 hectares of total recovery area
1,098 hectares of permanent recovery area
222 hectares of wilderness area recovered
782 hectares of hotspots area recovered
965,400 hectares of protected area

Monitoring species with habitats in areas affected by operations in 2022 identified:
523 species classified as Least Concern
53 species classified as vulnerable
36 species classified as near threatened
20 species classified as endangered
5 species classified as critically endangered

Mining project ID

Project 5

Type of impact

Direct

Impact

Conversion and/or degradation of natural habitats (other than forests)

Description of the impact

Supressing native vegetation cover for mining operations and associated infrastructure can result in the loss and reduction of habitats for fauna and flora species.
The fragmentation of natural habitats can disrupt the dispersal ability of flora and fauna specimens, and the conversion of habitats can force specimens to migrate to surrounding natural environments, potentially causing imbalances in the receiving communities. This movement, coupled with increased vehicle and machinery traffic, can lead to a rise in accidents involving animals.
These direct and indirect impacts resulting from vegetation removal are evaluated for all mines in the Paraopeba Complex, and specific actions are implemented to minimize, recover and compensate for them.

Consequence

Serious

Likelihood

Likely

Describe response

To minimise environmental impacts, the Paraopeba Complex implements various programs and procedures for vegetation and material removal. These include field demarcation, hiring specialized companies, determining access and storage areas, and defining procedures for vegetation removal.
To reduce impacts on wild fauna and plant species, several programs are currently in place:
- Flora Rescue Program: Preserving genetic heritage, conserving rare and threatened species, acquiring scientific knowledge, and rehabilitating degraded areas.
- Fauna Rescue Program: Monitoring deforestation fronts and rescuing displaced animals.
- Recovery of Degraded Areas: Rehabilitating degraded areas, protecting soil, controlling erosion, restoring local flora, and minimizing visual impact.
- Environmental Compensation Actions: Restoring areas, planting endangered species, and creating protected areas to preserve affected flora and fauna.
The main stakeholders involved include Vale employees, specialists from consultancies and universities, environmental agencies, and the surrounding communities.
Results from restoration and protection actions in 2022 include:
Total recovery area: 1,098 hectares
- Permanent recovery area: 1,098 hectares
- Wilderness area recovered: 222 hectares
- Hotspots area recovered: 782 hectares
- Protected area: 965,400 hectares
Monitoring of species in areas affected by operations in 2022 recorded:
- 523 species classified as Least Concern
- 53 species classified as vulnerable
- 36 species classified as near threatened
- 20 species classified as endangered
- 5 species classified as critically endangered

Mining project ID

Project 5

Type of impact

Direct

Impact

Loss of rare and threatened species

Description of the impact

Removing native vegetation to create space for mining operations and associated structures can harm the natural environment. It may result in the loss and reduction of habitats for fauna species and the suppression of native forest vegetation and grassland areas, ultimately reducing biodiversity.
The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities. This movement associated with the increased traffic of vehicles and machinery can lead to an increase in cases of accidents with animals.
These direct and indirect impacts resulting from vegetation removal are evaluated for all mines in the Paraopeba Complex, and specific actions are implemented to minimize, recover and compensate for them.

Consequence

Serious

Likelihood

Likely

Describe response

To minimise environmental impacts, the Paraopeba Complex implements various programs and procedures for vegetation and material removal. These include field demarcation, hiring specialized companies, determining access and storage areas, and defining procedures for vegetation removal.
To reduce impacts on animal and plant species, several programs are currently in place:
- Flora Rescue Program: Preserving genetic heritage, conserving rare and threatened species, acquiring scientific knowledge, and rehabilitating degraded areas.
- Fauna Rescue Program: Monitoring deforestation fronts and rescuing displaced animals.
- Recovery of Degraded Areas: Rehabilitating degraded areas, protecting soil, controlling erosion, restoring local flora, and minimizing visual impact.
- Environmental Compensation Actions: Restoring areas, planting endangered species, and creating protected areas to preserve affected flora and fauna.

The main stakeholders involved include Vale employees, specialists from consultancies and universities, environmental agencies, and the surrounding communities.
Results from restoration and protection actions in 2022 include:

Total recovery area: 1,098 hectares
- Permanent recovery area: 1,098 hectares
- Wilderness area recovered: 222 hectares
- Hotspots area recovered: 782 hectares
- Protected area: 965,400 hectares
Monitoring of species in areas affected by operations in 2022 recorded:
- 523 species classified as Least Concern
- 53 species classified as vulnerable
- 36 species classified as near threatened
- 20 species classified as endangered
- 5 species classified as critically endangered

Mining project ID

Project 6

Type of impact

Direct

Impact

Deforestation and/or forest degradation

Description of the impact

The complex's natural habitat consists of forest formations and rupestrian grassland. The suppression of vegetation in these areas can lead to the loss and reduction of habitats for both flora and fauna, resulting in a decrease in populations and a reduction in the production and dispersal of propagules. This reduction can also lead to a decrease in genetic variability in areas of direct influence, which is considered a highly relevant and negative impact. As the suppression of native vegetation is sometimes an unavoidable impact on the implementation and operation of mines, since we have structures with locational rigidity it is necessary to apply mitigating measures, such as monitoring of suppression, with the rescue of flora and fauna, and recovery and offset measures, such as the creation of a forest nursery, reforestation or other action agreed between the applicant and the competent environmental authority focused on the compensation of impacts.

Consequence

Serious

Likelihood

Likely

Describe response

The Flora Rescue Project aims to minimise the resulting acts of the suppressing natural habitats. As flora recovery activities in areas of natural suppression environments are important, in the sense of safeguarding a portion of the genetic heritage of the plant species occurring there. Notably, the intrinsic carrying out a complete flora rescue program is conducted to establish priority actions, based on a selection of plant species

to be covered by the program so that the effort be directed towards the rescue and conservation of these.
The actions undertaken in this program are carried out to preserve genetic resources and can subsidise ecological restoration projects, through the availability of seeds and propagules of some plant species.
The species selection is based on various factors, including proposed indications and regional occurrences. These factors arise from the rescue of flora, which Vale has carried out .
The main stakeholders involved in the project are:
-Vale employees.
-Specialists from consultancies and universities are interested in conducting environmental studies and programs.
-The environmental agencies monitor all the processes.
-The surrounding communities.
According to the results obtained in 2022, the Brucutu/Água Limpa complex had a total of 51.60 hectares of suppressed area and 117 hectares of offset area.

Mining project ID

Project 6

Type of impact

Direct

Impact

Fragmentation of ecosystems

Description of the impact

The main impact of the implementation and operation of the complex is related to the suppression of vegetation for the implementation and maintenance of structures.
This results in reduced connectivity between the remaining fragments of habitat, which is a significant issue for the local ecosystem.
Fragmentation introduces new factors into the evolutionary history of natural populations of plants and animals. Different species are affected in different ways, which can alter the demographic parameters of mortality and birth rates, and ultimately impact the structure and dynamics of the ecosystem.
However, the region where the complex is located is characterized by a long history of anthropic intervention in its ecosystems, with the remaining forests currently fragmented and at various stages of succession. Thus, the removal of vegetation will lead to a reduction in connectivity between the remaining fragments in the area of influence, and the negative impact is significant, but of moderate magnitude when considered in the current context.

Consequence

Serious

Likelihood

Likely

Describe response

In order to minimise the negative effects of habitat fragmentation, it is crucial to monitor vegetation suppression and rescue any flora before suppression of vegetation activities take place. In some cases, it is also necessary to rescue and relocate fauna, particularly for species that have difficulty moving from the area to be deforested.
The fauna rescue and relocation actions are pertinent for some groups of fauna species, especially those that have difficulty moving from the area to be deforested.
Actions of rescue, translocation, relocation or destination, during deforestation, occurred only in case of need, in other words, when the conditions verified did not allow the animal to move by its own means.
This program, executed both in Brucutu and Água Limpa mines, the program's primary objectives are to plan construction activities while monitoring deforestation activities, as well as execute actions to rescue, sort, and relocate captured fauna.
In Brucutu the Program for Monitoring Threatened Fauna Species is being carried out in the mine's areas of influence, to monitor the species against the changes caused by the operation and expansions of the mine. In addition, in the Complex the monitoring of invertebrates, fish, reptiles, amphibians, birds and mammals has been going on for almost 10 years.
The main stakeholders involved in the project are:
-Vale employees.
-Specialists from consultancies and universities are interested in conducting environmental studies and programs.
-The environmental agencies monitor all the processes.
-The surrounding communities.
According to the results obtained in 2022, the Brucutu/Água Limpa complex had a total of 51.60 hectares of suppressed area and 117 hectares of offset area.

Mining project ID

Project 6

Type of impact

Indirect

Impact

Other, please specify

Fauna scaring

Description of the impact

The impacts resulting from the increased levels of noise, dust, and traffic caused by the enterprise lead to the displacement of individuals from the areas surrounding the enterprise and a loss of biodiversity.
But is classified as reversible, as it will be intense only during the implementation phase; local, as it reaches the limits of the indirectly affected area; moderately relevant as it is expected to reach the fauna community and the situation will return to previous levels.
The classification in these valuation criteria makes this impact of moderate magnitude.
As for the environmental assessment parameters, the increase in traffic, noise and dust

will have a temporary duration; discontinuous; real; direct; occurring in the short term and of a negative nature.

Consequence

Moderate

Likelihood

Likely

Describe response

To address the negative impact of vegetation suppression, our project undertook careful planning and analysis of locational and technological alternatives to minimise the impact on areas with high biodiversity. In addition, there are mitigation actions and environmental offset programs in execution related to the monitoring of suppression, flora rescue, fauna scaring and rescue, habitat restoration and investment in protected areas.

The Vegetation Suppression Program, since the elimination of vegetation cover, is an unavoidable activity for the operation of some project's structures, such as the pit, which has locational rigidity. This program aims to accompany all suppression actions and ensure that they extend only to the area strictly necessary, minimizing as much as possible the impact on the vegetation. Before the suppression, we implement flora rescue actions to rescue individuals, seeds, and seedlings of species that will be used to produce seedlings and re-establish populations during the recovery and restoration actions, thus conserving genetic material. The suppression is accompanied by programs for scaring and rescuing fauna.

The Fauna Monitoring Program has been in place at the Complex for more than 10 years, monitoring invertebrates, fish, amphibians, reptiles, birds, and mammals. Specific monitoring of endangered species is also conducted at the Brucutu mine.

The main stakeholders involved in the project are:

-Vale employees.

-Specialists from consultancies and universities are interested in conducting environmental studies and programs.

-The environmental agencies monitor all the processes.

-The surrounding communities.

According to the results obtained in 2022, the Brucutu/Água Limpa complex had a total of 51.60 hectares of suppressed area and 117 hectares of offset area.

Mining project ID

Project 6

Type of impact

Direct

Impact

Loss of rare and threatened species

Description of the impact

The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and the reduction of natural habitats.
The suppression of native vegetation leads to the reduction or loss of flora individuals, which can affect rare, endemic and threatened species.
The edge effect can also compromise the survival of some species of plants, and according to the literature, the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge.
Among the species that occur in the region that may be affected are threatened species such as *Dalbergia nigra (jacaranda)*.

Consequence

Serious

Likelihood

Likely

Describe response

In response to the impact of vegetation suppression, during the planning of the project and its expansions, analyses of locational and technological alternatives were carried out, to avoid impacts in areas or fragments of natural vegetation with greater relevance to biodiversity. In addition, there are mitigation actions and environmental compensation programs in execution related to monitoring suppression, flora rescue and investment in protected areas.
The Vegetation Suppression Program is an unavoidable activity for the operation of mining. However, its goal is to minimize the impact on vegetation by ensuring that suppression actions are limited to the necessary area. Before any suppression, flora rescue actions are implemented to save individuals, seeds, and seedlings of the species that will be used to produce seedlings and re-establish populations in recovery/restoration actions. This approach helps conserve genetic material.
Additionally, programs are in place to scare and rescue fauna during the suppression.
Rescued seeds and plantlets are used to produce seedlings, used in the recovery of degraded areas and in offset plantings. In addition, compensation actions based on investments in protected areas and the creation of new protected areas are also carried out.
Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of communities.
According to the results obtained in 2022, the Brucutu/Água Limpa complex had a total of 51.60 hectares of suppressed area and 117 hectares of offset area.

Mining project ID

Project 7

Type of impact

Direct

Impact

Fragmentation of ecosystems

Description of the impact

PTVI's mining operations primarily focus on protected forest regions characterized by predominantly tropical forests that house a diverse range of tree species and serve as habitats for endangered endemic species.
Due to the natural distribution of ore chemistry, PTVI applies a compartmented mining method to allow ore blending to get the right chemistry to feed smelters. This method created a fragmentation of forest area which affects the natural habitats, which are habitats for various flora and fauna species, including endemic and threatened species.
A survey was conducted of the diversity of flora and fauna at the site to be impacted. The survey results were used as a baseline for assessing impacts and planning reclamation actions.

Consequence

Moderate

Likelihood

Likely

Describe response

Baseline studies for flora and fauna have been conducted throughout the area of interest to establish a parameter or impact assessments.
Vegetation suppression is monitored to reduce the impact of habitat fragmentation, with the rescue of flora before the actions and the eventual rescue of fauna when necessary.
The fauna rescue and relocation actions are pertinent for some groups of fauna species, especially those that have difficulty moving from the area to be deforested.
PT Vale has taken corrective action to encourage continuous improvements, such as environmental monitoring activities, reporting, evaluation, implementation of environmental management systems, environmental audits, monitoring of compliance with laws and regulations, and reclamation of post-mining land for environmental management.
The main stakeholders involved in the project are:
-Vale employees.
-Specialists from consultancies and universities are interested in conducting environmental studies and programs.
-The environmental agencies monitor all the processes.
-The surrounding communities.

Mining project ID

Project 2

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

The implementation of mining project structures and eventual expansions lead to the reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with t deforestation and urbanisation.
The conversion of natural habitats into modified habitats leads to the loss of individuals of flora species and can also lead to the loss of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer indirect impacts from the effects of fragmentation.
Among the species that could be impacted, we can mention those threatened, such *Dalbergia nigra* (jacarandá) and another animal species. The presence carnivore species such as *Chrysocyon brachyurus* (maned wolf) and *Leopards pardalis* (ocelot) and *Lontra longicaudis* (otter), indicates that mammals still find places to establish home ranges and reproduce within the fragmented landscape of the Itabira region. For these species, the loss of habitat is a negative impact that can lead to a reduction of populations in the region.

Consequence

Extreme

Likelihood

Likely

Describe response

In response to the impact of fragmentation, the Flora rescue programs actions are accompanied by programs for scaring and rescuing fauna, which aim to reduce the impacts of suppression on fauna species, as well as flora rescue programs.
Compensation actions based on investments in protected area and the creation of new protected areas are also carried out. In the Itabira Complex we have one private natural heritage reserve created and other in process, totalling more than 700 hectares of forest formations. The different public protected area in the municipality as well as the private protected areas maintained by Vale and habitat restoration areas are of fundamental importance to maintain endemic, rare, and threatened species in Itabira region.
Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of the communities.

Mining project ID

Project 3

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with deforestation and urbanisation.

The creation of borders and anthropized areas can affect the movement of fauna between fragments, also limiting gene flow and contributing to the reduction of their genetic variability. The edge effect can also compromise the survival of some animals, and according to literature the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge.

The conversion of natural habitats into modified habitats leads to the loss of individuals of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer indirect impacts from the effects of fragmentation.

Among the species that are impacted we can mention those endemics to the Atlantic Forest (*Manacus manacus*, white-bearded manakin), and threatned (*Leopardus pardalis*, ocelot; *Tapirus terrestris*, tapir).

Consequence

Extreme

Likelihood

Likely

Describe response

In response to the impact of fragmentation, there are mitigation actions and environmental compensation programs related to ecological restoration and investment in public protected areas.

The Flora rescue programs actions are accompanied by programs for scaring and rescuing fauna, which aim to reduce the impacts of suppression on fauna species.

Compensation actions based on investments in public protected area and the creation of new protected areas are also carried out. In the Itabira Complex we have one RPPN created and other in process, totalling more than 700 hectares of forest formations. The different protected area in the municipality as well as the protected areas maintained by Vale and habitat restoration areas are of fundamental importance to maintain endemic, rare, and threatened species in Itabira region.

Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of the communities.

Mining project ID

Project 5

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities.
In the Paraopeba Complex, examples of this species include *Ocotea odorifera* (plant), *Drymophila ochropyga, Manacus manacus* and *Haplospiza unicolor* (birds), *Tamandua tetradactyla*, *Leopardus pardalis* and *Chrysocyon brachyurus* (mammals).

Consequence

Serious

Likelihood

Likely

Describe response

To minimise environmental impacts, the Paraopeba Complex implements various programs and procedures for vegetation and material removal. These include field demarcation, hiring specialized companies, determining access and storage areas, and defining procedures for vegetation removal.
To reduce impacts on animal and plant species, several programs are currently in place:
- Flora Rescue Program: Preserving genetic heritage, conserving rare and threatened species, acquiring scientific knowledge, and rehabilitating degraded areas.
- Fauna Rescue Program: Monitoring deforestation fronts and rescuing displaced animals.
- Recovery of Degraded Areas: Rehabilitating degraded areas, protecting soil, controlling erosion, restoring local flora, and minimizing visual impact.
- Environmental Compensation Actions: Restoring areas, planting endangered species, and creating protected areas to preserve affected flora and fauna.
The main stakeholders involved include Vale employees, specialists from consultancies and universities, environmental agencies, and the surrounding communities.
Results from restoration and protection actions in 2022 include:
Total recovery area: 1,098 hectares
- Permanent recovery area: 1,098 hecatres
- Wilderness area recovered: 222 hectares
- Hotspots area recovered: 782 hectares
- Protected area: 965,400 hectares
Monitoring of species in areas affected by operations in 2022 recorded:
- 523 species classified as Least Concern
- 53 species classified as vulnerable
- 36 species classified as near threatened
- 20 species classified as endangered
- 5 species classified as critically endangered

Mining project ID

Project 6

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and the reduction of natural habitats.
The suppression of native vegetation leads to the reduction or loss of flora individuals, which can affect rare, endemic and threatened species.
The edge effect can also compromise the survival of some species of plants, and according to the literature, the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge.
Among the species that occur in the region that may be affected are threatened species such as *Dalbergia nigra (jacaranda)*.

Consequence

Serious

Likelihood

Likely

Describe response

In response to the impact of vegetation suppression, thorough analyses of locational and technological alternatives were conducted during the project planning and expansions. The objective was to avoid impacts on areas or fragments of natural vegetation with significant biodiversity value. Mitigation actions and environmental compensation programs are also implemented to monitor suppression, conduct flora rescue operations, and invest in public protected areas.
The Vegetation Suppression Program is an essential part of project operations, but it aims is to minimise the impact on biodiversity by strictly limiting suppression actions to the necessary area. Before any vegetation suppression, flora rescue actions are carried out to save individuals, seeds, and seedlings of species. These rescued plant materials are used for seedling production and reestablishing populations in recovery and restoration efforts, thereby conserving genetic diversity. Furthermore, fauna scare, and rescue programs are implemented during the vegetation suppression.
The rescued seeds and plantlets are utilized in seedling production for the restoration of degraded areas and compensatory plantings. Additionally, compensation actions involve investments in protected areas and the creation of new protected areas.
Throughout this process, multiple stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, licensing procedures, and community 102meetings. Their involvement is crucial for the success of these projects.

In 2022, the Brucutu/Água Limpa complex recorded a total suppressed area of 51.60 hectares and an offset area of 117 hectares.

Mining project ID

Project 4

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities.

Consequence

Serious

Likelihood

Likely

Describe response

Vale implements programs to minimise the impact on fauna and flora species, with specific initiatives that include:
- Flora Rescue Program: This program aims to preserve the genetic heritage of local flora, conserve rare and threatened species, acquire scientific knowledge about affected environments, and rehabilitate degraded areas. For example, in 2022, the Abóboras Mine rescued and replanted 656 individuals of 21 different species.
- Recovery of Degraded Areas: This program focuses on rehabilitating areas affected by the project, including soil protection, erosion control, recovery of local flora, and minimizing visual impact on the landscape.
- Environmental Compensation Actions: These actions involve restoring areas and planting endangered and legally protected species, as well as creating protected areas to preserve the flora and fauna impacted by the project.
Vale's Biofactory in the Quadrilátero Ferrífero in Minas Gerais plays a crucial role in multiplying native flora specimens using biotechnology. The Biofactory produces plantlets and seedlings of Atlantic Forest and Cerrado (tropical savanna in eastern Brazil) species, including threatened and endemic ones, for the recovery of degraded areas and compensatory measures. In 2022, the Biofactory produced 35,000 seedlings, including 12 endemic, and threatened species.
These initiatives involve the participation of various stakeholders, including universities, research institutions, consulting companies, associations, and local communities. Their involvement contributes to the success of the programs.

Results from the restoration and protection actions in 2022 include:
1,098 hectares of total recovery area
1,098 hectares of permanent recovery area
222 hectares of wilderness area recovered
782 hectares of hotspots area recovered
965,400 hectares of protected area
Monitoring species with habitats in areas affected by operations in 2022 identified:
523 species classified as Least Concern
53 species classified as vulnerable
36 species classified as near threatened
20 species classified as endangered
5 species classified as critically endangered

Mining project ID

Project 1

Type of impact

Direct

Impact

Deforestation and/or forest degradation

Description of the impact

Implementing mining project structures and eventual expansions leads to the suppression and reduction of forest habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure on the Carajás National Forest, with deforested areas. This fragmentation creates borders and anthropized areas that can affect fauna's movement between fragments, limiting gene flow and reducing their genetic variability. Additionally, the edge effect can also compromise the survival of some species of flora, and according to literature, the results of exposure to wind, light, and dust can be seen at about 300 m from the edge.
The conversion of natural habitats into modified habitats leads to the loss of individuals of flora species and can also lead to the loss of fauna species. Among the species that may be affected are rare, endemic, and threatened, which may suffer direct impacts, loss of individuals, and indirect effects from fragmentation. Among the impacted species, we can typically find forest species, such as primates and birds dependent on the forest understory.

Consequence

Serious

Likelihood

Likely

Describe response

In response to the impact of vegetation suppression, have being necessary to apply mitigating actions and measures. These measures include the rescue of the flora, prioritizing its reintroduction in recovery and restoration areas, and compensatory measures such as the ecological restoration of the other regions or other actions agreed upon between the environmental agencies. The flora rescue removes specimens and seeds of different species in the area to be suppressed. The seedlings are used in recovery and restoration processes to conserve genetic variability and prioritize those threatened with extinction.
It was a preventive measure carried out during the project's implementation phase and related to the biotic environment, with its application period considered to be short-term but will reflect long-term benefits.
Vale donated nearly all collected seeds (98.53%) to the Carajás nursery. Although not quite 100%, the seeds contributed to germination experiments, direct sowing in restoration areas, and herbarium contributions, aligning with the program's objectives to enhance connectivity. In 2022, 2,519 plants across 83 species and 32 families were rescued, with forests yielding the most rescues (1,413), followed by canga domains (rupestrian grassland) (1,019). Rescues in regenerating anthropized areas were unique, reflecting a focus on securing plants vital for ecosystem restoration and rehabilitation of degraded areas.
This project surpasses legal obligations by seeking to expand forest cover in areas once used for agriculture and enhancing landscape connectivity. Additionally, it nurtures partnerships with a local cooperative for purchasing native seeds, fostering sustainable forest utilization.
Fauna rescue programs are designed to save wildlife in areas impacted by forest vegetation removal, keeping pace with deforestation to capture transient or displaced fauna.
Throughout the process, projects involve multiple stakeholders, engaging them in program implementation, licensing procedures, and community meetings.
The 2021 Carajás Biodiversity Management Plan aims to incorporate sustainability in Vale's activities in and around Carajás's protected areas. It outlines biodiversity management throughout a mining project's duration, balancing conservation with local development, and focusing on operational risks to biological diversity.

Mining project ID

Project 7

Type of impact

Direct

Impact

Deforestation and/or forest degradation

Description of the impact

Significant impacts are expected to occur during the implementation and operational phases of mining activities, mainly related to the removal of vegetation cover, acting directly and indirectly on flora and fauna, including the loss of modified and natural

habitats, disturbance of existing flora populations, with structural changes and changes in the composition of flora and fauna communities, including aquatic communities and priority and threatened species.
The removal of vegetation cover also causes changes in the landscape. The suppression of habitats leads to the loss of flora and fauna specimens, among them endangered and endemic species.

Consequence

Serious

Likelihood

Likely

Describe response

Baseline studies for flora and fauna have been conducted throughout the area of interest to establish a parameter for impact assessments. Seeds are collected and taken to a nursery, where they are grown into seedlings for subsequent use in the recovery process of the mined areas to mitigate the impact of vegetation suppression actions. Seedlings of various species are produced, including endemic and endangered species. The entire mined area goes through a recovery process, which also considers the re-establishment of the populations of endemic and endangered species and the return of fauna. The recovered regions, as well as the surroundings of the mined areas, are monitored. Research is also conducted for this monitoring.
The main stakeholders involved in the project are:
-Vale employees.
-Specialists from consultancies and universities are interested in conducting environmental studies and programs.
-The environmental agencies monitor all the processes.
-The surrounding communities.
Furthermore, PT Vale handed over 140hectares of critical land in a rehabilitated watershed to the Ministry of Environment and Forestry in 2022. The handed-over land was in Pongkeru sub-watershed in Ledu-Ledu and Kawata Villages, Wasuponda Sub-district, East Luwu District, South Sulawesi.
PT Vale has taken corrective action to encourage continuous improvements, such as environmental monitoring activities, reporting, evaluation, implementation of environmental management systems, environmental audits, monitoring of compliance with laws and regulations, and reclamation of post-mining land for environmental management.

Mining project ID

Project 7

Type of impact

Indirect

Impact

Other, please specify

Fauna scaring

Description of the impact

The generation of dust and noise can generate indirect impacts on habitats, flora, and fauna. Runoff containing suspended sediments can result in sediments in downstream streams, impacting aquatic communities. However, with the construction of sediment control structures, such as sediment ponds, control dams, and pocket ponds, gradually, suspended particles drifting downstream can be controlled to a minimum so that the impact on the downstream ecosystem is minimal and manageable.

Consequence

Moderate

Likelihood

Likely

Describe response

Baseline studies for flora and fauna have been conducted throughout the area of interest to establish a parameter for impact assessments.
PT Vale has taken corrective action to encourage continuous improvements, such as environmental monitoring activities, reporting, evaluation, implementation of environmental management systems, environmental audits, monitoring of compliance with laws and regulations, and reclamation of post-mining land for environmental management.
The main stakeholders involved in the project are:
-Vale employees.
-Specialists from consultancies and universities are interested in conducting environmental studies and programs.
-The environmental agencies monitor all the processes.
-The surrounding communities.

Mining project ID

Project 2

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

Implementing mining project structures and eventual expansions leads to the suppression of native vegetation and the reduction of natural habitats. It directly affects some plant species, including rare, endemic, and threatened ones.
Among the species that may be affected are rare, endemic, and threatened, which may suffer direct impacts with the loss of individuals.

Consequence

Extreme

Likelihood

Likely

Describe response

Several environmental compensation programs, including biodiversity offsets, have been implemented to mitigate the impact of vegetation suppression. The Vegetation Suppression Program, which involves clearing vegetation cover, is crucial for certain project structures, such as the pit. Its objective is to minimize the impact on biodiversity by strictly limiting the extent of suppression actions to necessary areas. The Flora rescue program focuses on rescuing individuals, seeds, and seedlings of species for re-establishment within recovery and restoration actions, ensuring the conservation of genetic material.

Furthermore, compensation measures involve investments in protected areas and the creation of new regions. In the Itabira Complex, one private natural heritage reserve has already been established, with others currently in progress, totalling over 700 hectares of forest. This diverse protected area, along with the private protected areas maintained by Vale and habitat restoration areas, play a vital role in preserving endemic, rare, and threatened species in the Itabira region.

Throughout these initiatives, various stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, the licensing process, and community meetings. Their collaboration is essential for the success of these projects.

According to the results obtained in 2022, the Itabira complex had a suppressed area of 210.30 hectares and a offset area of 61 hectares.

Mining project ID

Project 3

Type of impact

Indirect

Impact

Loss of rare and threatened species

Description of the impact

Implementation mining project structures and expansions lead to the suppression of native vegetation and the reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with deforestation and urbanisation.

The creation of borders and anthropized areas can affect fauna's movement between fragments, limiting gene flow and reducing their genetic variability. Additionally, the edge effect caused by wind, light, and dust exposure can negatively impact on wildlife survival up to approximately 300 meters from the edge. The conversion of natural habitats into modified habitats leads to the loss of individuals or fauna specimens. Among the species that may be affected are rare, endemic, and threatened, which may suffer

indirect impacts from fragmentation.
Some of the species that are particularly vulnerable to these impacts include the endemic Manacus manacus (rendiera) and the threatened Leopardus pardalis (jaguatirica) and Tapirus terrestris (tapir).

Consequence

Extreme

Likelihood

Likely

Describe response

In response to the impact of vegetation suppression, mitigation actions and environmental compensation programs are implemented to restore habitats and invest in public protected areas. The Vegetation Suppression Program, which involves eliminating vegetation cover, is an unavoidable activity for certain project structures, such as the pit, due to their fixed location. This program aims to closely monitor all suppression actions and ensure they are limited to the necessary area, minimizing the impact on vegetation.
Additionally, Flora Rescue Programs are in place to rescue individuals, seeds, and seedlings of species affected by vegetation suppression. These rescued individuals are used for seedling production and population restoration within recovery and restoration actions, with a focus on conserving genetic material.
To further mitigate the impact of vegetation suppression, compensation actions are implemented through investments in public protected areas and the creation of new protected areas. These measures contribute to the preservation and enhancement of natural habitats.
Throughout this process, various stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, the licensing process, and community meetings. Their collaboration and expertise play a crucial role in the success of these initiatives.
The combined efforts of these programs and actions aim to minimize the loss of rare and threatened species, promoting the restoration and conservation of biodiversity in the affected areas.
Throughout the process, various stakeholders, including universities, research institutions, consulting companies, associations, and community members, actively participate in program implementation, the licensing process, and community meetings.
Based on the results obtained in 2022, the Mariana complex experienced vegetation suppression of 892.56 hectares and compensated for 978.68 hectares.

F-MM11.2/F-CO11.2

(F-MM11.2/F-CO11.2) Have you identified any biodiversity risks with the potential to have a substantive financial or strategic impact on your business?

Yes

F-MM11.2a/F-CO11.2a

(F-MM11.2a/F-CO11.2a) How does your organization define substantive impact on your business?

Vale has a Risk Management Policy (reviewed in 2022) that seeks to establish guidelines for the global management of potential risks to which Vale and its subsidiaries are exposed. Business risk management focuses on potentially relevant risks that, in the event of an occurrence, may impact people, communities, the environment, operational continuity, reputation, and the achievement of the Company's general business objectives. By Vale's Risk Management Policy, a Severity matrix is defined to standardize the potential measurement of risks and compete for all types of impacts (People, Environment, Social and Human Rights, Reputational and Financial). Vale defines a strategy to divide its risks into categories such as light, moderate, significant, critical, and very critical. Also, to support the responsibilities of the risk management process, the Executive Board uses 5 Executive Committees of Business Risks, with a distinct scope of action, such as Operational Risks, Geotechnical Risks, Strategic, Financial and Cyber Risks, Risk of Compliance, and Risks of Sustainability, Institutional Relations, and Reputation, whose responsibilities, competencies are defined in POL-0009-G - Risk Management Policy and/or the Rules of Procedure Internal Committees of Business Risks. For the definition of substantive financial and strategic impacts on the business, they are considered from a moderate to a very critical level, always representing amounts above US$ 100 MM.
In addition to the risks, opportunities with potential results were also identified. The substantial impact in the context of opportunity about Biodiversity for Vale is any action that generates a positive environmental or social impact and, consequently, has a positive impact on its reputation. These opportunities will be further addressed in question F-MM11.3a.

F-MM11.2b/F-CO11.2b

(F-MM11.2b/F-CO11.2b) For your disclosed mining projects, provide details of risks identified with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Type of risk
Physical

Primary risk driver
Forest fires

Primary potential impact
Disruption to workforce management and planning

Magnitude of the potential impact
High

Likelihood

Likely

Where does the risk driver occur?

Company-wide

Mining project ID

Company-specific description

Forest fires are, unfortunately, an accident that has potential occurrence in our areas, especially during the dry season. Vale complexes located adjacent to or within native vegetation have the highest chance of an event and may have more critical consequences when located adjacent to protected areas. For example, Vale complexes in Pará and Minas Gerais in Brazil that are inside or adjacent to protected areas face such risks.

In addition, secondary impacts, such as the need for local mine workers to fight the fire and the expenses incurred to contain it, can also have cascading effects.

Timeframe

Current - up to 1 year

Primary response to risk

Implementation of environmental best practices in direct operations

Description of response

All Vale mining projects have a fire brigade ready to act when necessary third party is contracted if the fire is not contained, even in partnership with environmental agencies and firefighters. This structure is already implemented in Vale's operations and has been improved over time. Vale's response to fires is known to be rapid and well-coordinated, with a concerted effort to contain the fire as soon as possible. This proactive approach helps reduce biodiversity loss and mitigates negative press coverage, which could impact Vale's business.

The fire brigade AMDA/Vale acts directly in combat forest fires, and it works powerfully to prevent these events and mitigate fire damage.

For example, in Southeast Corridor (Itabira, Mariana, and Brucutu/Água Limpa complexes), the analysis of incident records in 2022 shows a lower number of fires, as well as a smaller total burned area compared to the year 2021. While 9,134 ha were burned in 232 incidents in 2021, in 2022 the fire affected 4,210 ha in 214 incidents. It is expected that the continuity of work in the coming years will bring an even higher level of efficiency to the group, not only due to the greater experience of its members but also due to the improvement of materials, equipment, and techniques used. And in Carajás all fire incidents in the mosaic of protected areas were recorded in the year 2022 and all incidents received were attended to.

Type of risk

Regulatory

Primary risk driver

Increased difficulty in obtaining operations permits

Primary potential impact

Increased compliance costs

Magnitude of the potential impact

High

Likelihood

Very likely

Where does the risk driver occur?

Selected mines, business units or geographies only

Mining project ID

Project 1
Project 2
Project 3
Project 4
Project 5
Project 6

Company-specific description

In response to dam break, other environmental and health, and safety laws and regulations have been passed, and others may arise. Authorities may impose more stringent conditions on the licensing process for the Company's projects and operations. Moreover, Vale may face stricter requirements and delays in receiving environmental licenses to operate other tailings dams.
The climate and biodiversity loss crisis has brought the discussions about loss reductions to the forefront in recent years, reflected in the new targets of the global biodiversity agenda and also in increasingly demanding legal requirements.
In recent years, social, environmental, health, and safety regulations have become increasingly stringent in many countries where Vale operates. This trend could adversely affect Vale's operations, such as restrictions on its activities and products, new requirements for environmental licenses and work permits, licensing and operating delays, increased costs, and costly recovery efforts.

Timeframe

1-3 years

Primary response to risk

Greater compliance with regulatory requirements

Description of response

After Brumadinho dam break, Vale improved risk management through defence restructuring and intensified training for compliance with current and future operations, aiming to prevent dam ruptures with adverse financial and strategic consequences while preserving biodiversity. Since 2020, Vale has been implementing the Tailing and Dam Management System (TDMS), which covers the Routine, Performance, and Risks pillars

and all the strategic aspects of dam safety and tailings storage structures (in Portuguese, Estrutura de Armazenamento de Rejeitos - EARs). In 2021, Vale implemented the TDMS across all business units, defining roles and responsibilities. Geotechnical teams received training, and external independent reviewers were incorporated. Independent audits of Vale's dams in Minas Gerais continue as part of the 2019 agreement with the Public Prosecution Office. Also, environmental risks that have been identified in the environmental impact studies (reviewed and updated every 5 years or less), are considered and integrated into the system.
To comply with the Global Industry Standard on Tailings Management (GISTM), the GISTM 100 Journey program was launched in 2022. By December, our internal assessment showed 90% compliance with GISTM requirements for assessed structures. The goal is full compliance for all tailings storage facilities by 2025, with 'Extreme' and 'Very High' consequence structures targeted by August 2023.

Type of risk

Regulatory

Primary risk driver

Exposure to sanctions and litigation

Primary potential impact

Fines, penalties or enforcement orders

Magnitude of the potential impact

Medium-high

Likelihood

Likely

Where does the risk driver occur?

Company-wide

Mining project ID

Company-specific description

Nearly all aspects of Vale's activities, products, and services associated with its capital projects and operations worldwide are subject to social, environmental, health, and safety regulations, which may expose it to increased liability or costs. These regulations require Vale to obtain various licenses, permits, and authorizations for its operations and projects. In addition, Vale must conduct rigorous environmental and social impact assessments to obtain approval for its projects and permission to initiate construction and continue operations.
Significant changes to existing operations are also subject to these requirements. Social, environmental, and health and safety regulations also impose standards, procedures, and controls on mineral exploration, mining, processing, pelletizing activities, railway and marine services, ports, decommissioning distribution, and

marketing of its products. Such regulation may give rise to significant costs and liabilities. Litigation regarding these and related matters may adversely affect the Company's financial condition or otherwise harm its reputation.

Timeframe

1-3 years

Primary response to risk

Greater due diligence

Description of response

Vale is improving its entire ESG structure to permeate all its areas and operations. In addition, it is also investing in transparency through the creation of the ESG Portal, where it shows all its commitments to the environment, social and governance issues. As such, it is aware of any penalties or fines it may incur when violating ESG-related critical problems.

Vale has a goal in the 2030 agenda related to eliminating significant ESG gaps in best practices. Because of this, Vale has created an action plan that lists openings and clarifies our activities to fill them. And this action plan is available in Vale's ESG Portal.

Vale takes compliance with environmental legislation very seriously and conducts ongoing assessments to ensure that its operations and projects follow applicable laws and regulations. These assessments include reviewing each environmental license's specific terms and conditions and conducting environmental compliance processes globally to verify that all operations and projects fully comply with environmental legislation.

Environmental conditions and the environmental compliance indicator are monitored monthly in the performance meetings attended by the President, Vice-Presidents, Directors, and Managers.

Also, Vale implements internal policies, and that address compliance issues. In addition, have a risk management plan in place, including operational and emerging risks, as well as a waste and dam management system that involves periodic assessments of dam stability conditions, known as Declarations of Stability Condition (DSCs).

Type of risk

Reputational and markets

Primary risk driver

Negative media coverage

Primary potential impact

Brand damage

Magnitude of the potential impact

High

Likelihood

Very likely

Where does the risk driver occur?

Company-wide

Mining project ID

Company-specific description

The negative propagation of the media about the company is a significant risk for its business, considering that the stakeholders are more attentive to the ESG practices of the companies. Therefore, any harmful information disclosed may impact Vale's reputation, and the company's movement on the Brazilian stock exchange is noticeable when any negative information on the stock price falls.

Timeframe

4-6 years

Primary response to risk

Engagement in multi-stakeholder initiatives

Description of response

Vale is committed to integrating sustainability into its business by building a strong and positive economic, social, and environmental legacy and mitigating the impacts of its operations.

Therefore, we seek to build strong and lasting relationships with our stakeholders, invest in mitigating the effects of our activities, work with high ethical standards, have transparent management and actively contribute to advances related to the environment, biodiversity, and sustainable development.

Because of this, Vale is improving its entire ESG structure to permeate its areas and operations. In addition, it is also investing in transparency through the creation of the ESG Portal. Through various initiatives, the portal demonstrates its commitment to environmental, social, and governance issues. All of Vale's sustainability reports address the actions for the repair of Brumadinho, including the ESG Portal itself.

Furthermore, Vale studied the methodology behind our main sources of ESG information and identified gaps in best practices. From this, we created an action plan that lists gaps and clarifies our initiatives to fill them. Our gaps are constantly reassessed, based on investor feedback and new reports from important ESG stakeholders, in order to evolve in our commitments.

This action plan is part of the goal in the 2030 agenda, and it is available in Vale’s ESG Portal.

Learn more at: https://vale.com/pt/web/esg/brumadinho

Type of risk

Physical

Primary risk driver

Forest fires

Primary potential impact

Brand damage

Magnitude of the potential impact

High

Likelihood

More likely than not

Where does the risk driver occur?

Selected mines, business units or geographies only

Mining project ID

Project 1

Company-specific description

One of the mapped risks is forest fires that result in biodiversity loss. Any fire adjacent to the Carajás National Forest is delicate, as the fire spreads quickly in a short time due to its dense and extensive forest. Unfortunately, in 2021, a fire was followed by explosions caused by a storm in Canaã dos Carajás. There were no reports of injuries.
In 2022, five occurrences of fires were recorded in areas close to the Carajás Complex, totalling 2,360.25 hectares of impacted areas.
Risks like this, when they occur, impact the region's biodiversity and the company financially through fines and penalties. Both significant impacts result in other secondary consequences, such as brand damage and workforce management and planning disruption.

Timeframe

1-3 years

Primary response to risk

Promotion of sustainable forest management, including financial incentives

Description of response

Vale has a globally applicable Risk Management Standard, which is regularly reviewed, and outlines layered lines of defence for each risk. All operations are equipped with firefighting systems, enabling a prompt and controlled response to fire threats. The company has established fire risk management measures, including the possibility of engaging third-party assistance for larger fires. These improvements contribute to mitigate the impact of future fire incidents. In 2022, aerial monitoring via helicopters and drones was conducted in fire-prone areas within and around protected areas, ensuring a swift response to potential incidents. "Cold lines" were established through aerial applications and water releases in specific locations with a history of fires, increasing vegetation humidity. This approach was implemented in Campos Ferruginosos National Park and S11D areas. Vale also implements environmental education programs, in partnership with Ecology Brasil for the Carajás complex. The monthly Dialogues on Health, Safety, Environment, and Community focus on human-environment connection. These activities align with Vale's Sustainable Development Policy and cover diverse

environmental topics. In 2022, three "Conversation Circles on Burning and the Environment" were held, emphasizing fire prevention, and raising awareness of forest preservation. Daily rounds were conducted by Forest Fire Fighting groups to ensure a prompt response to potential incidents.

F-MM11.3/F-CO11.3

(F-MM11.3/F-CO11.3) Have you identified any biodiversity-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

F-MM11.3a/F-CO11.3a

(F-MM11.3a/F-CO11.3a) For your disclosed mining projects, provide details of the identified opportunities with the potential to have a substantive financial or strategic impact on your business.

Type of opportunity

Reputational and markets

Primary biodiversity-related opportunity

Improved community relations

Where does the opportunity occur?

Selected mines, business units or geographies only

Mining project ID

Project 1

Estimated timeframe for realization

>6 years

Company specific description & strategy to realize opportunity

The Horizons Project, established by the partnership between Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) and Vale, combines conservation with generating income preserving rivers, and mitigating greenhouse gas emissions through carbon capture. The Project has been working on five interconnected subprojects related to enhancing the management of environmental licensing knowledge; expansion of the region's economic matrix with a focus on agroforestry and agricultural and extractive activities; conservation of water resources; land regularization and biodiversity monitoring.

The Cooperation Agreement between ICMBio and Vale was signed (Process SEI ICMBio No. 02122.001002 / 2019-83) on April 22, 2020.

One of the areas of action within the Project is the creation of ecological corridors to connect the protected area mosaic to other forests, landscapes-especially in the northeast, the Rio Negro protected area, the Lindoeste area, and the southeast of the mosaic-while advancing the social and economic development of the region through the

implementation of agroforestry systems. Implementing these initiatives will benefit biodiversity conservation, climate, and people.
This project has as much of a positive impact on the biodiversity of Carajás as it does on Vale's reputation, adding more value to the company.
The main key results achieved between November 2022 and January 2023 were:
- III Lecture Cycle;
- I Castanheira Seminar and Workshop;
- Annual planning and action monitoring ;
- Field activities for scientific research;
- Field activities and implementation of the pilot project in Conservation Agricultures;
- Implementation of technical support scholarships in various areas of NGI Carajás (Carajás Integrated Management Center);
- Preparatory workshops for the elaboration of the Management Plan for Campos Ferruginosos National Park;
- Completion of the Protocol for fauna sighting of the Monitora Program.

Type of opportunity
Other

Primary biodiversity-related opportunity
Contribution to biodiversity knowledge

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 1

Estimated timeframe for realization
>6 years

Company specific description & strategy to realize opportunity
The Institute Technological Vale: ITV Sustainable Development (ITV-DS) is a non-profit research institute that Vale supports. Since 2010, ITV has been developing research on Applied Computing, Meteorology, and Climate Change, Environmental Recovery, Environmental Genomics, Environmental Geology, and Water Resources, Biodiversity, and Ecosystem Services and Socioeconomics focused on developing Sustainability solutions building and sharing knowledge about Amazon. The institute is very active in the Carajás region, where the Amazoomics project produced high-quality genomes for 29 endangered species of Brazilian fauna. Genomic information is currently a substantial knowledge base for understanding physiology and genetics. The data are also essential for studies on the evolution of species. The project's first stage will be carried out in partnership with the Vale Amazon BioPark, which is home to several species of fauna. It is currently the largest project of genomic studies of biodiversity in progress in the country and has the collaboration of researchers and entities that work to conserving threatened species.
In the Jaborandi Bioeconomy survey, ITV-DS sought to identify and understand the

jaborandi species with the highest content of pilocarpine, a substance used in the treatment of glaucoma and in the fight against dry mouth. By mapping the genome and selecting matrices for reproduction, they gather the information that guides the best way to extract the leaves. They also seek to map new areas of natural occurrence that can be managed orderly and investigate environmental conditions that favour their growth. Jaborandi, primarily found in Pará, Maranhão, and Piauí, is facing threats from deforestation and unsustainable harvesting practices. This plant species is a crucial source of income for the local population. Studies with Jaborandi help to value non-timber forest products, keeping the forest standing and promoting the bioeconomy of the Amazon. This project was developed in partnership with other research institutions and the Carajás Extractivist Cooperative. This opportunity follows the definition given in question F-MM11.2a

Type of opportunity

Other

Primary biodiversity-related opportunity

Contribution to biodiversity knowledge

Where does the opportunity occur?

Selected mines, business units or geographies only

Mining project ID

Project 1

Estimated timeframe for realization

>6 years

Company specific description & strategy to realize opportunity

The Carajás Nursery is located two kilometers from the Urban Center of Carajás, towards the industrial gate of N5.

The purpose of the nursery is to produce and make seedlings of regional native species available for programs of ecosystem restoration of habitats and recovery of mined areas, as well as providing seedlings for environmental actions and donations to the local community.

Planting seedlings plays a fundamental role, as it contributes to the conservation of plant species, especially those threatened with extinction, improves air quality, protects springs, streams, and rivers, promotes soil protection, and facilitates agroecological balance. The production of seedlings of native species has mainly been achieved by the method of sexual propagation, that is, through seeds.

Currently, all the seeds in the nursery come from the Flora Rescue Projects or are bought from the Flona de Carajás Extractive Cooperative to generate income and develop for members and their families.

This initiative, which is currently being implemented, brought social and environmental benefits and significantly improved the company's relationship with the local community. Thus, this opportunity had a considerable positive social impact.

The improvement in the relationship with the communities and benefiting the local

economy where there is a Vale project, also enables a positive reputation for several stakeholders. This impact follows the definition given in question F-MM11.2a.

Type of opportunity

Other

Primary biodiversity-related opportunity

Contribution to biodiversity knowledge

Where does the opportunity occur?

Selected mines, business units or geographies only

Mining project ID

Project 2
Project 3
Project 4
Project 5
Project 6

Estimated timeframe for realization

Current - up to 1 year

Company specific description & strategy to realize opportunity

The Brazilian state of Minas Gerais harbors exceptional biodiversity. Serra do Espinhaco and the Quadrilatero Ferrifero Region, a north-south trending mountain range, form a unique geomorphological landscape found nowhere else in the world. This area is home to the Espinhaço Biosphere Reserve, designated by UNESCO in 2005 for its species richness and endemism. A diversity of geological features, relief, and a wide variety of minerals characterizes the region. It hosts to three types of Brazilian biomes, including two considered biodiversity hotspots (Atlantic Forest and Cerrado). These ecosystems are home to many rare, endemic, and endangered plants and animals.
A joint program was carried out with a network of taxonomists (15 different research institutions, mainly universities) on endemic species of the Quadrilátero Ferrífero Region, with monthly surveys for endemic species present in prospects in total protected areas of the region. The surveys found six species previously thought to be extinct, and nine potentially new species not previously documented. Among the 41 species surveyed, 11 were found to be endemic to the Quadrilátero Ferrífero Region. These studies have helped to improve knowledge about the distribution of special-concern species or species that are particularly vulnerable due to their restricted range. Researchers must identify and map the potential parent plants to obtain species propagules for conservation purposes. Expanded knowledge about the ecology of this group of unique plants supports future research on their reproduction and reintroduction in different substrates.
In addition, information on species distribution and survival on different types of substrates can be useful in developing protocols for the reproduction and rehabilitation of degraded areas.
This opportunity was a significant action to increase biodiversity knowledge, encourage

scientific research, and update data. And in this way, as a result, it provides a positive image of Vale's reputation, as mentioned in question F-MM11.2a.
In 2021 Vale published the third volume of the" Guia de Plantas – Flores no Campo Rupestre", the result of part of this work, which brings together some of the species found in ten protected areas in 2019.

Type of opportunity

Other

Primary biodiversity-related opportunity

Contribution to biodiversity knowledge

Where does the opportunity occur?

Selected mines, business units or geographies only

Mining project ID

Project 2
Project 3
Project 4
Project 5
Project 6

Estimated timeframe for realization

>6 years

Company specific description & strategy to realize opportunity

Since 2015, Vale has maintained the Biofactory in the Quadrilátero Ferrífero region in Minas Gerais, intending to multiply specimens of native flora using biotechnology. Initially, the focus was on rare and endangered species, particularly those found in rupestrian grassland, such as orchids, bromeliads, vellozias, and cacti. Today, the facility reproduces seedlings of several rare, endemic, and endangered species from the Atlantic Forest and Cerrado (tropical savanna in eastern Brazil).
Under the ideal conditions created in the lab, a single seed pod can turn into hundreds or even thousands of individuals. These are then grown in greenhouses and, after acclimatization under conditions approximating their natural habitat, are reintroduced in the wild. The species produced are used in rehabilitating mine sites or restoring habitats and are monitored to ensure the different species, individuals, and populations have been successfully established. The technology applied here allows the production of many seedlings of species with low germination capacity, allowing their reintroduction and dissemination back into the wild.
The partnership with research institutions and universities allows us to increasingly improve the techniques and develop specific indicators for monitoring the restoration of areas and tracking the development of these species.
This seed-growing opportunity not only allows a contribution to biodiversity but, consequently, positively impacts Vale's reputation, as mentioned in question F-MM11.2a.

In 2022, the Biofactory produced 35,000 seedlings, including 12 endemic, and threatened species from the Atlantic Forest and Cerrado.

Type of opportunity
Efficiency

Primary biodiversity-related opportunity
Cost savings

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 7

Estimated timeframe for realization
Current - up to 1 year

Company specific description & strategy to realize opportunity
The Company follows a risk control approach to reduce potential losses due to volatility in nickel and fuel prices. At the same time, the Company also follows efficiency programs to reduce production costs to the lowest possible level, so that it remains competitive regardless of world nickel price movements.

Type of opportunity
Products and services

Primary biodiversity-related opportunity
Increased R&D and innovation opportunities

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 2
Project 3
Project 4
Project 5
Project 6

Estimated timeframe for realization
Unknown

Company specific description & strategy to realize opportunity
Vale invested around USD 9,9 million in the development of sand produced from adjustments to the iron ore operation in the State of Minas Gerais. Previously discarded in piles and dams, the sandy material is processed and transformed into a product,

following the same quality controls as iron ore production. The Vale's sand reaches the construction industry as a 100% legal and efficient alternative for cement, precast concrete, interlocking blocks, and paving.
It is an essentially physical process and sand is not toxic since it does not change the material's composition. Another positive point for civil construction is that the product has high chemical and granulometric uniformity.
One of Vale's significant sand differentials is to contribute to the circular economy since the material destined for the dams in tailings returns to society as an alternative to a product that suffers from predatory extraction. It also reduces the impact on the environment and biodiversity since it reduces the need for new areas for disposal and, therefore, recent interventions in vegetation, habitats, and species. This sandy material opportunity not only allows a contribution to biodiversity but, consequently, positively impacts Vale's reputation, as mentioned in question F-MM11.2a.
Around 800 thousand tons of sustainable sand were produced in 2021 and 2022 – material that would be enough for the construction of approximately 15 stadiums similar to the original Maracanã building – and the forecast is that production will be expanded in the coming years, also extended to other Vale units.

Type of opportunity

Reputational and markets

Primary biodiversity-related opportunity

Positive reputational value

Where does the opportunity occur?

Selected mines, business units or geographies only

Mining project ID

Project 1

Estimated timeframe for realization

4-6 years

Company specific description & strategy to realize opportunity

Prospecting, modelling, and predicting biodiversity are fundamental tools for planning strategic actions. They can support various aspects, including impact mitigation and offsetting, while adding scientific consensus and solidity to company management practices and operational safety. The line of research on cave ecosystem biodiversity at the Vale Technological Institute (ITV-DS), in collaboration with Vale's Speleology and Technology management, has made consistent efforts over the past five years. These efforts have resulted in scientific publications and addressed technical requirements across multiple fronts related to biodiversity in Carajás's ferruginous ecosystems. This initiative provides in-depth knowledge of the biodiversity associated with subterranean ecosystems in areas of Vale's active interest. It offers technical support for decision-making in environmental licensing processes and overall management of the company's biodiversity assets.

F12 Governance

F-MM12.1/F-CO12.1

(F-MM12.1/F-CO12.1) Is there board-level oversight of biodiversity-related issues within your organization?

Yes

F-MM12.1a/F-CO12.1a

(F-MM12.1a/F-CO12.1a) Identify the position(s) of the individual(s) (do not include any names) on the board with responsibility for biodiversity-related issues.

Position of individual	Please explain
Chief Executive Officer (CEO)	The CEO is appointed by the Board of Directors. The Chief Executive Officer has the attribution to submit to the Board of Directors the names of candidates for the Executive Committee with renowned knowledge and specialization in the subject of the responsibility of the respective operational area and may also at any time submit to the Board of Directors a motion to remove. The Executive Board meets on an ordinary basis once every fifteen days and extraordinarily whenever called by the Chief Executive Officer or his substitute. The CEO together with the Executive Board has several duties among them: preparing and submitting to the Board of Directors, the Company's purpose, strategic guidelines, and strategic plan, in the case of the latter two, on an annual basis, considering socioenvironmental issues and executing the approved strategic plan; preparing and submitting the Company's annual and multi-annual budgets to the Board of Directors, and executing the approved budgets; planning and steering the Company's operations and reporting the Company's economic and financial performance, as well as Vale's performance in its sustainability initiatives, to the Board of Directors, and producing reports with specific performance indicators; engagement on advances in governance, relationship with communities, repair of Brumadinho, dams, and other topics. In addition, Vale's CEO introduced two new strategic pillars for the company: New Pact with Society and Safety and Operational Excellence. The New Pact with Society is consistent with making Vale's operations increasingly sustainable which is integral to our business model and our sustainability and includes, among others, targets related to biodiversity, climate change, and water management. As an example, Vale made progress towards its forestry target, reaching an accumulated result of 172,484 hectares (165,092 of which are protected and 7,392 hectares of recovery).
Chief Sustainability Officer (CSO)	In 2021 the Board of Directors decided to establish an exclusive executive board for the theme of Sustainability. The Executive Vice President of Sustainability (EVPS), a position equivalent to the CSO, is a company's legal representative and is responsible for day-to-day operations and the implementation of the general policies and guidelines set forth by the Board of Directors.

	The EVPS is below the Chief Executive Officer. The EVPS is responsible for dealing with and connecting all topics related to the company's business from an overall perspective. This role includes the identification, addressing, and treatment of critical issues that result in risks or business impact, defining the establishment of sustainability goals (including biodiversity), monitoring, and implementing policies, strategies, and specific initiatives, as well as the evaluation of proposals of investments in sustainability.
Board-level committee	The Board Committees advise the Board of Directors, including proposing improvements related to their areas of expertise. To enhance efficiency and quality in decision-making, the Board ensures the Company's activities are conducted in accordance with laws, ethics, and internal controls. The Board deliberates on strategic guidelines and plans, monitors and evaluates Vale's economic and financial performance, analyses its corporate and financial risk policies, and elects and evaluates the Executive Officers. The Sustainability Committee evaluates the sustainability strategy across social, environmental, climate, and economic dimensions, ensuring alignment with the overall strategy of the Company. Some activities of the Board-level committee, specifically The Sustainability Committee, include recommending subjects related to sustainability in the company's strategic planning, evaluating, and proposing changes in the company's socio-environmental strategies, and monitoring their respective implementations. They analyse matters related to Environmental and Social Sustainability, through specific sessions on climate change, biodiversity, water resource management, environmental licensing, risk reduction for dams, new technologies for the energy matrix, human rights, and relationships with various stakeholders, including traditional communities and indigenous peoples. They evaluate Vale's performance and monitor indicators related to sustainability aspects (including Dow Jones Sustainability Index), and also assess and advise on policies within its competence, communicating Vale's strategy and reputation related to its performance in areas such as safety, human rights, environment, health, community relations, and institutional relationships (Government and Priority Entities). Additionally, the Sustainability Committee represents the Board by proposing guidance for the Integrated Report. The Committee also assesses and recommends guidelines for reparation actions related to the Mariana (Renova Foundation) and Brumadinho's dam failures, monitoring their respective implementations. Dow Jones Sustainability Index

F-MM12.1b/F-CO12.1b

(F-MM12.1b/F-CO12.1b) Provide further details on the board's oversight of biodiversity-related issues.

	Frequency that biodiversity-related issues are	Governance mechanisms into which biodiversity-	Please exp–ain

	a scheduled agenda item	related issues are integrated	
Row 1	Scheduled - some meetings	Monitoring implementation and performance	Vale's Board of Directors' mission is to protect the company's assets and maximize the return on investment for its shareholders in the long term, acting within the highest ethical principles to ensure the company's perpetuity. This is aimed at transforming natural resources into prosperity and sustainable development. To operationalize the Sustainability Strategy, the Board of Directors relies on a Sustainability Committee for advice. This committee aims to align the company's policies and practices with sustainability, enhance discussions on the subject, and provide greater efficiency and quality to the board's decisions. The Executive Committee relies on Executive Risk Committees to support the preventive action against risks to which Vale is exposed. It also benefits from thematic and multidisciplinary forums, which include the participation of external members, to assist in the definition and monitoring of the Sustainability Strategy. The Board of Directors meets almost every month, having convened 16 times in 2022, to monitor and evaluate the company's economic and financial performance and to deliberate on strategic guidelines and plans. The Sustainability Committee held eight meetings in 2022. Biodiversity-related issues form a regular part of these meetings' agenda, with topics such as forests, Forest Targets, biodiversity, and performance being discussed. Additional meetings can be called by its chairman, vice-chairman, or any two directors to discuss biodiversity issues if necessary.

F-MM12.2/F-CO12.2

(F-MM12.2/F-CO12.2) Provide the highest management-level position(s) or committee(s) with responsibility for biodiversity-related issues (do not include the names of individuals)

Name of the position(s) and/or committee(s)

Sustainability committee

Responsibility

Both assessing and managing biodiversity-related risks and opportunities

Frequency of reporting to the board on biodiversity-related issues

More frequently than quarterly

Please explain

The Sustainability Committee advises the Board on sustainability-related issues, including biodiversity. The Committee works continuously, not only upon demand of the Board, and follows an annual calendar. At least two members of the Committee must also be members of the Board. (Note: nowadays, all the CS members are members of the Board).

Among some of the attributions that belong to the Sustainability Committee, we highlight the following: review and recommend Sustainability issues, and their approach, in the company's strategic planning, evaluating, complementing and suggesting changes in the company's socio-environmental strategies, monitoring their respective implementation; assist in the definition, evaluation and monitoring of the Sustainability indicators and propose improvements; evaluate and propose Vale's adoption or adherence to initiatives or agreements at the national or international level related to issues of social and environmental responsibility, as well as monitoring the preparation and dissemination of the Sustainability Report/ Integrated Report, CDP questionnaire, and GHG inventory; evaluate projects, initiatives as well as the Company's investment proposals from the perspective of sustainability (biodiversity and social perspectives), in addition to making possible recommendations to the Board of Directors; and monitor the scope of action and effectiveness of the area of institutional relations in dealings with regulatory bodies and other institutional relations associated with sustainability issues.

Name of the position(s) and/or committee(s)

Chief Sustainability Officer (CSO)

Responsibility

Both assessing and managing biodiversity-related risks and opportunities

Frequency of reporting to the board on biodiversity-related issues

More frequently than quarterly

Please explain

The Chief Sustainability Officer (The Executive Vice President of Sustainability) is the highest level in a management position responsible for sustainability issues, such as biodiversity and forest. This position is below the CEO's.

The Chief Sustainability Officer is the company's legal representative, and its position has the attribution of representing the company for sustainability issues, such as biodiversity and forest. It is responsible for proposing biodiversity policies, plans, projects, and targets to the approval of the Executive Board, as well as for implementing the general policies and guidelines set forth by the Board of Directors. The Chief Sustainability Officer is also responsible for evaluating, monitoring, and reporting Vale's performance, risks, and opportunities regarding environmental issues (like biodiversity

and forest) to the Board of Directors.
These topics are periodically presented to the Risk Management Executive Board, where they are reviewed for quarterly reporting to the Board of Directors and published in the Annual Report and the Sustainability Report.
Vale's purpose to improve lives and transform the future is shared by all of its business areas and fronts. To this end, the company promotes management based on voluntary business actions and partnerships with different levels of government, public institutions, other companies, and civil society. In this process, the Chief Sustainability Officer has the function of unfolding and monitoring progress in the execution of strategies and policies, in addition to being an agent of internal and external engagement, through actions and dialogue with stakeholders, as well as strengthening ties between Vale and society, being an important facilitator for the implementation of the new pact with society, one of Vale's strategic pillars.

F-MM12.3/F-CO12.3

(F-MM12.3/F-CO12.3) Do you provide incentives to C-suite employees or board members for the management of biodiversity-related issues?

	Are there incentives to C-suite employees or board members?	Comment
Row 1	Yes	Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the variable remuneration of the teams. All of these goals, once defined, are registered and monitored in the Career, Succession, and Performance system. Sustainability integrates the variable remuneration of all Vale employees and impacts all hierarchical levels, up to the CEO. In 2022, sustainability-related targets represented 5% of employees' short-term variable compensation and ESG-related targets represented 25% of executives' long-term variable compensation, including the CEO and Executive Board (15% sustainability + 10% Safety).

F-MM12.3a/F-CO12.3a

(F-MM12.3a/F-CO12.3a) What incentives are provided to C-Suite employees or board members for the management of biodiversity-related issues (do not include the names of individuals)?

	Role entitled to incentive	Indicator for incentivized performance	Please explain
Monetary reward	Corporate executive team	Achievement of commitments and targets	In 2020, Vale adopted metrics even more focused on environmental, social, and governance (ESG) issues when considering its officers' short- and long-term variable compensation, seeking to strengthen our

	Chief Executive Officer (CEO) Chief Financial Officer (CFO) Chief Operating Officer (COO) Chief Procurement Officer (CPO) Chief Risk Officer (CRO) Chief Sustainability Officer (CSO)		strategic pillars of Safety & Operational Excellence and the New Pact with Society. The Sustainability metrics are based on the 2030 Commitments that include: (i) reduction of greenhouse gas emissions in line with the Paris Agreement; (ii) 100% clean energy self-generation worldwide; (iii) a 10% reduction in freshwater intake; (iv) recovery and protection of 500,000 ha of degraded land beyond Vale's limits; and (v) socioeconomic contribution to health care, education, and income generation. All of these goals, once defined, are registered and monitored in the Career, Succession, and Performance CSP) system. Alignment of remuneration with Vale's ambition of being a leader in low-carbon mining is associated with reduced emissions and reclamation of areas, therefore directly associated with reduced pressures on biodiversity and habitat rehabilitation/restoration. These indicators are relevant and strategic for Vale because they link the compensation of our employees as our goals, helping the sustainable performance of the Company and the return for its investors. This encourages the continuous improvement of the company's performance on material socio-environmental issues. Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the variable remuneration of the teams. In 2022, the targets related to sustainability represented 5% of the employees' short-term variable remuneration, and 10% of the CEO and Executive Board.
Non-monetary reward	No one is entitled to these incentives	No indicator for incentivized performance	Vale has no non-monetary rewards.

F-MM12.4/F-CO12.4

(F-MM12.4/F-CO12.4) Does your organization have a policy that includes biodiversity-related issues?

Yes, we have a documented biodiversity policy that is publicly available

F-MM12.4a/F-CO12.4a

(F-MM12.4a/F-CO12.4a) Select the options that best describe the scope and content of your policy.

	Format	Content	Please explain
Row 1	Part of company-wide environmental/sustainability policy	Recognition of the overall importance of natural habitats Recognition of potential business impact on natural habitats Commitments beyond regulatory compliance Commitment to transparency	Biodiversity, as a cross-cutting theme, is part of our Sustainability Policy. This policy is applied globally to Vale's activities. Therefore, in accordance with our Sustainability Policy, the following commitments serve as the foundation for our performance: Understanding and monitoring the territories in which we operate; Complying with legal requirements and continuously improving our processes and products, striving for greater efficiency in the use of natural resources and ecosystem services; Managing risks and impacts through the adoption of prevention, mitigation/control, compensation, and monitoring measures; Promoting transparency regarding practices and performance with stakeholders; Building a positive legacy in the territories in which we operate; Contributing to the achievement of global and national targets. With a focus on these commitments, Vale's long-term objective is to seek Net Neutral Impact (No Net Loss) on biodiversity. In 2022, the Policy was reviewed and published in 2023. This review introduces a new goal: to leverage positive outcomes for nature through investment in restoration, conservation, nature-based solutions, and research, development, and innovation. These measures will generate positive results for biodiversity, climate, water, and people, based on the engagement and strengthening of local communities, including indigenous peoples and traditional communities, and partnerships beyond our borders. We aim to influence transformative external agendas that contribute to positive outcomes for nature (advocacy).

			This policy revision also incorporates important premises related to biodiversity, such as the application of the impact mitigation hierarchy and the optimization of the use of natural resources and biodiversity conservation in our operations.

F-MM12.5/F-CO12.5

(F-MM12.5/F-CO12.5) Has your organization made any public commitment(s) to reduce or avoid impacts on biodiversity?

Yes

F-MM12.5a/F-CO12.5a

(F-MM12.5a/F-CO12.5a) Provide details on your public commitment(s), including the description of specific criteria, coverage, and timeframe.

Commitment

No Net Loss

Coverage

Company-wide

% of total production covered by commitment

100%

Commitment timeframe

No specified timeframe

Please explain

Vale has established a long-term objective of seeking no net loss, with a focus on reducing significant losses of biodiversity on new projects and expansions located in areas with high biodiversity values. This commitment is fully aligned with the commitments made under the Sustainability Policy and the company's sustainability strategy. To achieve this goal, we are working to implement and reinforce the entire risk, impact, attributes, and performance management process.
In 2020, Vale published an internal normative standard that provides guidelines and processes for biodiversity management, applicable at all stages of the project life cycle, from planning to post-closure. This document introduces the Impact Mitigation Hierarchy, risk management, metrics, and the necessary processes, enabling new projects and even ongoing operations to assess and manage biodiversity risks. It also sets goals and actions related to achieving No Net Loss in all new projects and expansions.
In 2021, through the book Vale & Biodiversity, we share real-world examples of this

approach and the outcomes of initiatives around the world that have delivered on our Strategies for Sustainability and Biodiversity.

Commitment

Other, please specify

Forest Target - Recover and protect 500,000 hectares of areas by 2030

Coverage

Company-wide

% of total production covered by commitment

100%

Commitment timeframe

2019

Please explain

In 2018, Vale publicly announced their 2030 targets. In 2019, Vale enhanced and made their 2030 Agenda more ambitious, aligning it with the UN Sustainable Development Goals. Specifically addressing biodiversity, the Agenda introduced the Forestry Goal - to recover and protect 500,000 hectares of areas beyond our borders by 2030. This goal is associated with the ambition to produce a positive outcome for nature. Moreover, it aligns with and could contribute to Brazil's commitment to restore 12 million hectares of native vegetation as stipulated in the National Policy for the Recovery of Native Vegetation.
In 2022, we recovered 1,214 hectares and protected 50,000 hectares. Up until 2022, we had recovered and protected a total of 172,484 hectares (including 165,092 hectares under protection and 7,392 hectares restored).
Additionally, Vale's agenda includes goals related to water and climate change that aim to reduce pressures on nature and biodiversity. This commitment extends to all of Vale's operations globally, covering 100% of its activities.

Commitment

Adoption of the mitigation hierarchy approach

Coverage

Company-wide

% of total production covered by commitment

100%

Commitment timeframe

No specified timeframe

Please explain

In 2022, the Sustainability Policy was review and published in 2023. The review a premises related to impact management: “apply mitigation hierarchy to avoid, minimise, remedy/recover and/or compensate/repair the negative socio-environmental impacts resulting from the Company's activities and act to enhance the positive impacts.”
In 2020, Vale published an internal normative standard that provides guidelines and processes for biodiversity management based in Impact Mitigation Hierarchy. The approach also became part of the Vale Management System (VPS) requirements and have been implemented and improved since then.
In 2021, through the book Vale & Biodiversity, we share real-world examples of this approach and the outcomes of initiatives around the world that have delivered on our Strategies for Sustainability and Biodiversity.
Important: as a member of International Council on Mining and Metals (ICMM), Vale is committed to the principles established by the Board and in 2019 reinforced its commitment to Performance Expectation, which is focused on not operating in World Heritage Areas and on the implementation and strengthening of the impact mitigation hierarchy, with the objective of not having considerable biodiversity losses.
This coverage is 100%, as it covers the entire Vale at the global level of its operations.

Commitment

Not to explore or develop mines in World Heritage sites

Coverage

Company-wide

% of total production covered by commitment

100%

Commitment timeframe

No specified timeframe

Please explain

We do not have operations in UNESCO World Natural Heritage Sites and, as a member of International Council on Mining and Metals (ICMM), we commit not to operate in these areas. In 2021, Vale made a public commitment not to operate in UNESCO Natural World Heritage Sites that reinforces this.
Important to say that the Vale Natural Reserve (RNV, in Portuguese, Reserva Natural Vale), a protected area owned by the company that is voluntarily dedicated to the conservation of 23,000 ha of Atlantic Forest remnants, as well as the Sooretama Biological Reserve, a protected area that Vale protects in partnership with ICMBio, are part of the Discovery Coast Atlantic Forest Reserves World Heritage Site. They are also a Key Biodiversity Area (KBA).
This coverage is comprehensive, encompassing Vale's global operations at a 100% level.

F13 Business strategy

F-MM13.1/F-CO13.1

(F-MM13.1/F-CO13.1) Are biodiversity issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are biodiversity-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, biodiversity-related issues are integrated	21-30	Focused on maximizing societal value, Vale has made strides in risk reduction and asset review over the past four years, fulfilling our 2019-2022 strategic plan. Having accomplished these objectives, we've restructured our strategic planning, recognizing the need for innovative business practices to shape Vale's future — a company aspiring for more sustainable mining, low-carbon solutions, and disciplined capital allocation. Consequently, Vale has established new strategic pillars for the future, with 'contributing to nature-positive outcomes' being one. Vale recognizes that sustainable solutions, innovative practices, and nature-based solutions integrated into our business model and plans are essential. We understand that nature provides vital services for our operations, such as water supply and climate regulation. However, our activities also impact these services, necessitating that we view our business as a part of nature and integrate our actions with its components — biodiversity, water, climate, and communities — for long-term business continuity. We acknowledge the critical role of biodiversity in sustainable business practices. A long-term goal is to neutralize impacts on biodiversity in new projects and expansions. To this end, Vale issued an internal standard in 2020 that governs its biodiversity management efforts across all business areas, operations, and projects. This standard delineates our risk and impact management approach, which includes comprehensive diagnoses from new project planning stages. These assessments gauge possible interference with protected areas, sensitive habitats, and globally significant species. Our commitment to biodiversity conservation is mirrored in our compliance with local and regional environmental

			impact regulations. We conduct environmental impact studies before initiating expansions or new projects, ensuring adherence to each region's laws where we operate. Lastly, our ambition to achieve carbon neutrality by 2050 aligns with our biodiversity and forest strategy, specifically the Forest Target, our voluntary commitment to recover and protect 500,000 hectares beyond our borders. This strategy aims to generate positive outcomes for biodiversity, climate, and people.
Strategy for long-term objectives	Yes, biodiversity-related issues are integrated	5-10	The Forest Target within our 2030 Agenda commits to fostering positive impacts for climate, biodiversity, and people. Vale pledges to restore 100k hectares and protect an additional 400k hectares, aligning with global climate and restoration targets. We're focusing on recovery, enhancing vegetation cover, carbon sequestration, and social benefits, through sustainable businesses, primarily agroforestry. With Vale Fund's support, five agroforestry ventures restored over 7k hectares by 2022. In 2022, the Fund contributed to the forestry target through various initiatives, including an Acceleration Program with CERTI Foundation, Darwin Startups, and Palladium, reinforcing five businesses in the 100k hectares recovery portfolio. For the protection aspect, preserving native vegetation cover and carbon stocks, we're collaborating with third-party protected area and exploring Reducing Emissions from Deforestation and forest Degradation (REDD+) projects. We have partnerships with the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) and other environmental agencies, jointly protecting over 115k hectares of Brazil's Atlantic Forest. Also, Vale is studying new protective strategies, learning, and innovating. A REDD+ project added in 2022 contributed to safeguarding an additional 50k hectares. Vale commits to preventing and neutralizing significant impacts from new projects and expansions in high-biodiversity-value areas, aiming for no net loss and, if possible, yielding positive impacts. To achieve this, we developed an internal norm standard that regulates biodiversity management—risks and impacts—across our business. In 2022, we continued to implement guidelines and processes through training, project risk analyses, research prioritization, management system requirements, and risk scenario construction. The

			Carajás Biodiversity Management Plan, published in 2021, exemplifies these strategies.
Financial planning	Yes, biodiversity-related issues are integrated	5-10	Our governance model aims to realize the principles of clarity of roles, transparency, and stability that guide our actions. In this sense, in addition to the forums that are established in our governance model, such as the Advisory Committees to the Board of Directors (focused on different areas such as Sustainability and Finance), we have multi-disciplinary thematic groups, with the participation of members from outside Vale, which function as a sounding panel, and which support us on strategic themes. Planning and execution monitoring is carried out for the entire sustainability agenda (and 2030 Sustainability Agenda) to meet the long-term goals established. The 2030 agenda is a priority investment. In 2022, USD 140.5 million was earmarked for voluntary socio-environmental and institutional expenditures with own resources, including those related to Brumadinho. The main actions were in infrastructure and mobility, social protection, health, environmental liabilities, water resources and atmospheric emissions. Vale also allocated USD 94.3 million in incentive funds through contributions to Rights Funds and support to projects of civil society organizations based on four federal tax incentive laws: Fund for Children and Adolescents; Fund for the Elderly; Sports Law and Culture Incentive Law. This strategic aspect encompasses all of Vale's operations.

F14 Implementation

F-MM14.1/F-CO14.1

(F-MM14.1/F-CO14.1) Have you specified any measurable and time-bound targets related to your commitment(s) to reduce or avoid impacts on biodiversity?

Yes

F-MM14.1a/F-CO14.1a

(F-MM14.1a/F-CO14.1a) Provide details of your target(s) related to your commitment(s) to reduce or avoid impacts on biodiversity, and progress made.

Target reference number

Target 1

Target label

Recover and protect 500,000 hectares of areas by 2030.

Base year

2019

Target year

2030

% of target achieved

21-30%

Please explain

In 2018, Vale announced its 2030 Agenda, aligning with the UN Sustainable Development Goals. One of the targets focuses on the recovery of degraded areas. Building upon our existing conservation initiatives, we have set a more ambitious goal: the Forest Target - to recover and protect 500,000 hectares of areas beyond our borders by 2030. This voluntary target will have positive impacts on biodiversity, climate, and communities. It is also in line with our ambition to achieve net-zero emissions (Scope 1 and Scope 2) by 2050.

This goal is also in alignment with and can contribute to Brazil's commitment to restore 12 million hectares of native vegetation, as outlined in the National Policy for the Recovery of Native Vegetation. The target is divided into two components: recovering 100,000 hectares and protecting 400,000 hectares.

Regarding the recovery component, which aims to increase vegetation cover and carbon sequestration, we are utilizing mapping and supporting sustainable business models as strategies to reach the 2030 target. Initially, our focus is on agroforestry systems. As for the protection component, which aims to maintain and ensure the quality of native vegetation cover and carbon stocks, we are collaborating with third-party protected areas and Reducing Emissions from Deforestation and forest Degradation (REDD+) projects.

Vale has already recovery over 7,000 hectares through investments in five agroforestry businesses with positive socio-environmental impacts. We have also protected over 115,000 hectares through agreements with seven protected areas. Additionally, in 2022, Vale acquired its first REDD+ Carbon Credits in partnership with Fundo Vale and Grupo Algar, resulting in the conservation of an equivalent of 50,000 hectares of forests.

Furthermore, Vale's 2030 agenda includes goals related to water and climate change, which are interconnected with biodiversity, as they aim to reduce pressures and impacts on nature.

Target reference number

Target 2

Target label

The commitment was to reduce by 10% the capture of fresh water for use in our processes by 2030.

Base year

2017

Target year

2030

% of target achieved

11-20%

Please explain

The Vale 2030 Agenda also includes goals related to water and climate change, which are closely tied to biodiversity by addressing the reduction of impacts on vital ecosystem services and curbing freshwater extraction as well as greenhouse gas emissions.
Our commitment is to achieve a 10% reduction in freshwater usage for our processes by 2030. In 2021, Vale successfully met its specific target of reducing water usage (10% reduction) set in 2018. We will unveil the new target in 2023, extending its scope beyond internal use to consider local factors such as water availability, quality, access, and the ecological well-being of the watersheds in which we operate. To establish this, we have adopted Indicator 6.4.2 of the United Nations 2030 Agenda as a reference point. This indicator evaluates water stress within the analysed watershed, calculating the ratio between the total freshwater withdrawn and the available water resources for usage.

Target reference number

Target 3

Target label

Reduce by 16% emissions of Material Particulate, reduce emissions by 16% sulphur oxides and reduce emissions by 10% nitrogen oxides.

Base year

2018

Target year

2030

% of target achieved

51-60%

Please explain

Given the impacts of atmospheric emissions and with the ambition to be a leader in sustainable mining, Vale established 2021 the following goals: to reduce by 16% emissions of Material Particulate, Reduce emissions by 16% sulphur oxides and Reduce emissions by 10% nitrogen oxides.
The accumulated result in 2022 indicated that Vale reduced emissions of particulate

matter by 43% (4.2 kt), 40% (75.7 kt) in sulphur oxide emissions and 40% (44.7 kt) in emissions of nitrogen oxides.

F-MM14.2/F-CO14.2

(F-MM14.2/F-CO14.2) Provide details on mining projects that are required to produce Biodiversity Action Plans.

Row 1

Number of mining projects required to produce a biodiversity action plan

47

% of mining projects required to produce a biodiversity action plan that have one in place

88.7

Format

Stand-alone document
Part of general Environmental Management System

Frequency biodiversity action plans are reviewed

Regularly

Please explain

In 2015, Vale conducted a company-wide assessment to map and classify the sensitivity of biodiversity resulting from site operations and their interface with nature. This assessment was updated in 2017. The analysis included nine categories of areas with significant biodiversity value, based on global and national organizations' criteria (such as Key Biodiversity Area, Protected Areas, Wilderness Areas, Hotspots, and the occurrence of Endangered Species according to IUCN, among others). We used a scoring system to determine the importance and sensitivity of biodiversity, which resulted in a risk rating. The areas identified with high and very high risks were primarily located in Brazil and Indonesia, making them top priorities for impact and risk management, as well as reporting purposes.
The majority of Vale's operational units have biodiversity action/management plans or programs in place, which are associated with legal requirements within the scope of licensing processes. These plans encompass control and mitigation measures, impact recovery/restoration, compensation, and monitoring. Out of all our operational units assessed in 2022, 47 (88.7%) required the development of biodiversity management plans either due to legal requirements or their association with areas of high biodiversity value. Among these units, 80.9% already have established management plans, while the remaining units have plans either in progress or in the planning stage.
In 2017, we formed a partnership with The Biodiversity Consultancy to develop Guidelines for the Preparation of Biodiversity Action Plans. This initiative aimed to enhance our processes, leading to the publication of our regulatory document in 2020. The document sets forth guidelines and processes for biodiversity management in new projects, expansions, and ongoing operations.
The management and action plans are dynamic documents subject to regular revisions.

Adjustments or new actions are implemented whenever the outcomes of existing programs and initiatives indicate the need for course corrections. The results of these actions are evaluated on an annual basis.

F-MM14.3/F-CO14.3

(F-MM14.3/F-CO14.3) Has your organization adopted avoidance and/or minimization as strategies to prevent or mitigate significant adverse impacts on biodiversity?

Yes

F-MM14.3a/F-CO14.3a

(F-MM14.3a/F-CO14.3a) Provide relevant company-specific examples of your implementation of avoidance and minimization actions to manage adverse impacts on biodiversity.

Mining project ID

Project 1

Approach

Avoidance

Type of measure

Project design

Description

The first stage of impact mitigation hierarchy (HMI, in Portuguese acronym para hierarquia de mitigação de impacto) is impact avoidance. Studying, knowing, and understanding important environmental attributes (species of interest for conservation, species and critical environments, and protected areas) is the basis for assessing risks and impacts on biodiversity in areas of interest for expansions and new projects.
It is essential to involve environmental teams along with engineering, planning, and project teams in short, medium, and long-term planning to avoid impacts within the scope of actions, such as "Working together with project engineering to minimize current and future areas of intervention" and the "Vegetation Suppression Minimization Subprogram," which are already implemented by the operational environmental teams.
Avoiding unnecessary interventions and specific impacts can directly affect licensing terms and costs with studies and programs related to licensing conditions.
Vale has been seeking to work with the Impact Mitigation Hierarchy (HMI) approach in pilot projects to develop adaptations, capture opportunities to prevent and mitigate impacts, and plan increasingly effective impact management and conservation actions for biodiversity.
Working with the biodiversity management strategy against the background of HMI is an opportunity to rethink the management process, focusing on organizing and improving performance, making it more effective and efficient to obtain a neutral or positive balance of impacts.

At the S11D Mine in Carajás, the collaboration between environmental, engineering, planning, and other agencies resulted in several changes to the master plan, which avoided impacts on over 1,100 hectares of natural habitat. The Project has committed not to disturb the habitat of a key plant species within the mine footprint until research in propagation and translocation techniques are proven to enable the project to achieve no net loss for the species.
In addition, Vale's Biodiversity Management Plan in Carajás has a team dedicated to collecting seeds and propagules from Serra Norte. This team has been systematically collecting seeds (twice a month) in N3 and sending them to the “Banco Ativo de Germplasma” from the National Center for Genetic Resources . This activity is expected to be continued in the N3 Plant Germplasm Saving Program.

Mining project ID

Project 1

Approach

Minimization

Type of measure

Operational controls

Description

Once efforts have been made to avoid impacts, it is necessary to identify, analyse, and evaluate any remaining effects. Control and mitigation actions are proposed and established to minimize impact on biodiversity during implementation and operation. Environmental controls must be installed, vegetation suppression must be monitored, and actions to drive away, rescue, and relocate fauna and flora specimens, among other mitigation measures, are also implemented.
The Carajás Complex Action Plan presents actions implemented or challenges related to impact mitigation.
Among these actions, environmental control measures are implemented to minimize the impacts of work and operations on natural environments. These measures include containment systems, effluent collection and treatment, drainage devices, solid waste collection and disposal, and sprinkler systems for access roads. Monitoring programs, such as effluent and surface water monitoring, are conducted to ensure the effectiveness of these control systems.
Additionally, impact mitigation actions like the Wildlife Management Program and fauna scaring tactics during vegetation suppression are implemented. These initiatives involve monitoring wildlife, bioindicators, and controlling changes in the wildlife community, among other measures.
Additionally, exclusive viaducts for animal passage (wildlife crossing) were constructed, a first in Brazil, to minimize the impact. Both viaducts were built by Vale in compliance with IBAMA's requirement for the implementation of the S11D Railway Branch. These viaducts are situated in the southeast region of Pará and are among the 32 fauna passages established along the 101kilometer branch line.
Rescuing flora is an essential mitigation measure, aiming to save individuals and seeds

for future area recovery and habitat restoration. This action helps preserve genetic heritage.
In 2022, the Subprogram for rescuing epiphytes and flora species of conservation interest in the S11D Mine saved 2,519 individuals across 83 species from 32 botanical families. Forests were the most successful environment, with 1,413 rescues, followed by Rupestrian grassland, which accounted for 1,019 rescues across 23 species. Species recovered in anthropized areas undergoing regeneration were unique to those locations, emphasizing the program's focus on restoring ecosystems and recovering degraded areas.

Mining project ID

Project 2

Approach

Avoidance

Type of measure

Site selection

Description

The study of locational alternatives is a mandatory step of the environmental impact study, which aims to evaluate different viable locations for setting up an enterprise to select the place with the most negligible socio-environmental impact.
For example, to continue the waste disposal activity at the Conceição Mine, there was a need to find a new area to dispose of the waste for the next few years.
Three areas were analysed, located within a radius of approximately 15 km from the project to meet this new demand for waste disposal.
The southeastern expansion alternative of the Canga Sterile Disposal Pile was found to be the most environmentally advantageous option because it offers the possibility of reusing the area already impacted by the existing pile (Canga Leste), and it requires the second smallest size for suppressing native vegetation. Additionally, it has the most negligible impact on drainages, and is entirely situated in an area owned by Vale.

Mining project ID

Project 2

Approach

Minimization

Type of measure

Abatement controls

Description

The Environmental Impact Statement has a series of Environmental Programs that work in conjunction with the project's control systems to minimize negative impacts and maximize positive ones:

Noise emissions: During the works, the noise will be restricted to that which arises from the machines and vehicles used in preparing the ground next to the new open areas. All the equipment and vehicles at the service of the enterprise pass preventive maintenance according to Vale standards, aiming at the proper operation that generates less noise and pollution.
Atmospheric Emissions: During the works, the primary sources of air pollution include dust generated mainly during earth handling, machinery and equipment movement, and civil works, as well as gases generated by vehicle exhaust and machines used in the results. Water trucks wet the roads and work fronts for the entire work period, in addition to the constant maintenance of equipment that uses fuels so that there is no excessive consumption and that it releases gases above the permitted limits.
Liquid Effluents: Chemical toilets are used in work and hydraulics at construction sites and on the main fronts of service. The effluents are transported to a plant sewage treatment of the mine in operation through sucking trucks. Regarding oily effluents, it is essential to note that the maintenance of the equipment is carried out in the workshops that the Mining Complex of Itabira has already licensed and dedicated systems for the treatment of these effluents properly.
Solid Waste: Solid waste is adequately managed according to the Waste Management Program Solids of the Mining Complex of Itabira. Thus, the mitigation of the impacts caused by the generation of waste will consist of implementing of a management program based on the establishment of management measures involving handling, packaging, transportation, temporary storage, and final destination.
Controlling of atmospheric emissions, liquid effluents, and solid waste reduces in the impact on biodiversity about the pollution of habitats. And noise control enables a reduction in scaring of fauna.

Mining project ID

Project 2

Approach

Minimization

Type of measure

Other minimization measure, please specify

Reducing the impact to fauna and flora species

Description

The suppression of vegetation and consequent loss/reduction of habitat will cause the spontaneous escape of fauna specimens or harm their dispersion. The Program for Monitoring the Suppression, scaring, and Eventual Rescue of Fauna is a vital tool that aims to remove and scare away the animals from the area to be suppressed, seeking to reduce the impacts on them. The program operates on two fronts: planning of activities and actions to accompany suppression and fauna management, including field visits, satellite image analysis, and regional maps to define the best action strategy and suppression direction, as well as the selection of release areas for rescued species. The second stage includes monitoring suppression and actions to scare away, rescue, and

relocate captured individuals.
The Flora Rescue Project is another essential tool that operates in the areas to be suppressed. This project saves the genetic heritage and enriches the recovery and restoration actions. Before the acts to suppress native vegetation, specimens, and seeds are rescued in the areas to be impacted, taken to the nursery and, later, the seedlings produced are used in actions to recover degraded areas and restore habitats and offset programs.

Mining project ID
Project 3

Approach
Avoidance

Type of measure
Project design

Description
Effective management of risks and impacts requires a comprehensive assessment from the initial entry into new territories to the final project design. During the planning stages of new projects and expansions, the environmental team and engineering department evaluate potential interferences in natural heritage areas, protected areas, and sensitive habitats and species. It is important to note that according to Brazilian legislation, areas designated as World Heritage Sites and protected areas falling under IUCN categories I to IV are strictly avoided, as they are considered incompatible with project implementation.

Mining project ID
Project 3

Approach
Minimization

Type of measure
Other minimization measure, please specify
Reducing the impact of vegetation suppression

Description
The proposed mitigating measures were aimed at reducing the actual or potential adverse environmental impacts resulting from the action of removing the vegetation necessary for the implementation of the project. Thus, it constitutes an element of planning, as well as guidance for the company's operations, in order to reduce its environmental impact. The preparation of mitigation measures was based on the impact matrix. In project implementation, the suppression of native and planted vegetation of different types is planned. All developments have a vegetation suppression program whose main objective is to ensure that only the strictly necessary areas will be

suppressed. To this end, the necessary and licensed areas are demarcated in the field, and the entire suppression process is monitored and directed.
The alteration of the natural environment with the removal of vegetation produces significant changes in the diversity and abundance of plants and animals, generating ecological and genetic effects. The main impact is the loss of biodiversity. Considering the importance of vegetation for the conservation of biodiversity, maintaining the integrity of the soil and water resources, in addition to the interaction with wildlife, it is considered pertinent to adopt measures to mitigate the impacts related to the reduction of local biodiversity in different types of vegetation, resulting from the suppression of vegetation necessary for the expansion of enterprises. The loss of genetic variability in plant populations could be mitigated through measures such as flora rescue and reintroduction of plant species, contemplated in the flora program through flora rescue and restoration projects.
Endangered species are prioritized in the flora rescue and later, these and other species are reintroduced during the implementation, operation and closure of the projects.

Mining project ID

Project 3

Approach

Minimization

Type of measure

Abatement controls

Description

Several environmental controls are implemented in order to avoid and reduce impacts related to the discharge of effluents, erosive processes, and waste generation, among others that may cause alterations in the physical environment that lead to impacts on biodiversity. The Mariana Complex mines undergo thorough environmental impact assessments and continuous monitoring to evaluate water quality and noise levels, aiming to mitigate potential negative environmental impacts. Neglecting water quality monitoring can lead to the loss of aquatic species or species dependent on the water source for drinking. And the noises, if not monitored, can in wildlife scaring away.
The impact of noise levels is generally minimized by preventive maintenance of equipment and vehicles. And through this, it also allows fewer gases to be emitted which results in better air quality.

Mining project ID

Project 3

Approach

Minimization

Type of measure

Other minimization measure, please specify

Reducing the impact to flora and fauna species

Description

The Rescue Flora Programs are initiated before the vegetation suppression actions, the rescue of seeds and specimens aiming the production of seedlings and germplasm conservation. The production of seedlings in nurseries favours the production of those rescued, focusing on the restoration of degraded areas and conservation of genetic variability. An example of this Program, in mining projects 4 and 5, in the preparation of the Protocol Cattleya milleri micropropagation in partnership with Vale Institute of Sustainable Development (ITV-DS). Cattleya milleri is an endemic species from the canga ecosystems (rupestrian grassland) of Quadrilátero Ferrífero (Minas Gerais, Brazil) that is currently classified as a critically endangered species because of its restricted occurrence and habitat loss and degradation. In this Protocol, the in vitro propagation technique proved to be a viable alternative for production in large-scale of seedlings for this species. A high number of seedlings were generated, later these seedlings were acclimatized and rustified successfully, which allowed the reintroduction of plants in a natural environment. The results obtained
provide subsidies for conservation programs and expansion of the production of seedlings and introduction into a natural environment.
The suppression of vegetation and consequent loss/reduction of habitat will cause the spontaneous escape of fauna specimens or harm their dispersion. The Program for Monitoring the Suppression, Disappearance and Eventual Rescue of Fauna is an extremely important tool that aims to remove and scare away the animals from the area to be suppressed, seeking to reduce the impacts on them. The program operates on two fronts: planning of activities and actions to accompany suppression and fauna management, including field visits, satellite image analysis, and regional maps to define the best action strategy and suppression direction, as well as the selection of release areas for rescued species. The second stage includes monitoring suppression and actions to scare away, rescue and relocate captured individuals.

Mining project ID

Project 4

Approach

Avoidance

Type of measure

Site selection

Description

Effective management of risks and impacts requires a thorough diagnosis from initial entry into new territories to final project design. In the planning stages of new projects and expansions, the environmental team, and engineering, evaluates possible interferences in natural heritage areas and protected areas, as well as sensitive habitats and species. According to Brazilian legislation, world Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal flaw of the projects. The risk analysis procedure prioritizes biodiversity features that can

be used as information for this analysis and location definition. It is one of the processes of biodiversity's internal normative standard.
The study of locational alternatives is a mandatory step of the environmental impact study, which aims to evaluate different viable locations for setting up an enterprise to select the location with the most negligible socio-environmental impact.

Mining project ID

Project 5

Approach

Avoidance

Type of measure

Site selection

Description

Effective management of risks and impacts requires a thorough diagnosis from initial entry into new territories to final project design. In the planning stages of new projects and expansions, the environmental team, and engineering, evaluates possible interferences in natural heritage areas and protected areas, as well as sensitive habitats and species. According to Brazilian legislation, world Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal flaw of the projects. The risk analysis procedure prioritizes biodiversity features that can be used as information for this analysis and location definition. It is one of the processes of biodiversity's internal normative standard.
The study of locational alternatives is a mandatory step of the environmental impact study, which aims to evaluate different viable locations for setting up an enterprise to select the location with the most negligible socio-environmental impact.

Mining project ID

Project 6

Approach

Avoidance

Type of measure

Project design

Description

Effective management of risks and impacts requires a thorough diagnosis that spans from initial entry into new territories to final project design. In the planning stages of new projects and expansions, the environmental team, together with engineering, evaluates possible interferences in natural heritage areas and protected areas, as well as sensitive habitats and species. World Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal failure of the projects, according to Brazilian legislation.

In the evaluation of locational alternatives for the expansion of the waste, rock dumps (PDE, in Portuguese, pilha de disposição de estéril) South and PDE 03 Far East, it was considered as a premise the prioritization of expansions in more altered areas about vegetation cover and within the limits of Vale's properties, avoiding the need for intervention in areas of higher quality native vegetation cover.

Mining project ID

Project 6

Approach

Minimization

Type of measure

Operational controls

Description

The mines, as well as their expansion projects, have environmental control systems in place to treat liquid effluents, contain sediments, dispose of generated solid residues, and control dust.

As part of these systems, sumps are built as basins in the ground to trap sediments carried by rainwater, an example of a control system implemented in the tailings pile and in the waste rock dump piles that minimize impacts on water courses and soil around the mine, reducing interference in the surrounding natural habitats.

The mines also have monitoring and measurement procedures, including visual checks, to evaluate the performance of environmental control systems.

Mining project ID

Project 6

Approach

Minimization

Type of measure

Other minimization measure, please specify

Minimizing impacts to flora and fauna

Description

The suppression of vegetation leads to the loss of flora individuals, as well as the reduction and loss of habitats for fauna. The Complex has flora rescue programs with actions carried out on all the necessary suppression fronts to reduce the loss of plant species and genetic diversity. Adult individuals, plantlets and seeds are rescued in the areas before suppression and taken to the nursery to produce seedlings that are later used to recovery of degraded areas and offset planting areas. In this way, the genetic material returns to compose new recovery areas.

In the Brucutu expansion areas that involved the suppression of native vegetation, more

than 10 thousand specimens (seeds and individuals) were rescued and taken to the nursery to produce seedlings.

Mining project ID

Project 7

Approach

Minimization

Type of measure

Operational controls

Description

PT Vale collects seeds before vegetation suppression actions are carried out to support the complete rehabilitation of the mined areas. The seeds are then taken to the nursery to produce seedlings for the subsequent recovery process of the mined areas.
Seedlings of various species are made, including endemic and endangered species. PT Vale has established a 2.5-hectare nursery operating since April 2006 to support full-land rehabilitation activities.
The nursery produces an average of 700,000 seedlings and rehabilitates more than 100 ha of post-mining land annually.
PT Vale's nursery also produces various native and endemic species of plants as part of the biodiversity conservation program. Local plants include betao, bitti, nyatoh, and forest mangosteen. While for the endemic plants, there are ebony and dengen fruit. The local plant seeds are collected from the land to be mined or in cooperation with the local community.
Besides that, PT Vale ensured no protected fauna or flora species were found at the mining site before mining activities.
To conserve biodiversity, PT Vale has a post-mining plan and biodiversity management for 100% of mining operation areas in the Sorowako block that refers to 2014 ESDM Minister Regulation No. 7 on Reclamation and Post-Mining.
We collaborate with the Indonesia Business Council for Sustainable Development (IBCSD) in compiling the Guide for Sustainable Biodiversity Management. The document was released in 2017 and became the first ever in the Indonesian mining business for biodiversity conservation activities.

Mining project ID

Project 5

Approach

Minimization

Type of measure

Physical controls

Description

Vale takes environmental control measures seriously and implements them at all its undertakings. These measures focus on minimizing work and operations' impacts on natural environments. These measures consist of containment systems, collection and treatment of effluents, drainage devices, collection and disposal of solid waste, and sprinkler systems for access roads. In parallel, monitoring programs are conducted to monitor these measures, such as effluent monitoring, and surface water monitoring among others, to follow up and guarantee the effectiveness of the control systems.

Mining project ID

Project 5

Approach

Minimization

Type of measure

Operational controls

Description

All Vale mining projects have a fire brigade ready to act when necessary. A third party is contracted if the fire is not contained, even in partnership with environmental agencies and firefighters. Over time, Vale has continuously improved this system to ensure a rapid and well-coordinated response to fires, joining efforts to contain the fire as soon as possible. In this way, biodiversity and social impacts will be minimized.

Mining project ID

Project 2

Approach

Minimization

Type of measure

Operational controls

Description

All Vale mining projects have a fire brigade ready to act when necessary. A third party is contracted if the fire is not contained, even in partnership with environmental agencies and firefighters. Over time, Vale has continuously improved this system to ensure a rapid and well-coordinated response to fires, joining efforts to contain the fire as soon as possible. In this way, biodiversity and social impacts will be minimized.

Mining project ID

Project 3

Approach

Minimization

Type of measure

Operational controls

Description

All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID

Project 6

Approach

Minimization

Type of measure

Operational controls

Description

All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. Over time, Vale has continuously improved this system to ensure a rapid and well-coordinated response to fires, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID

Project 4

Approach

Minimization

Type of measure

Physical controls

Description

Vale takes environmental control measures seriously and implements them at all its undertakings. These measures focus on minimizing work and operations' impacts on natural environments. These measures consist of containment systems, collection and treatment of effluents, drainage devices, collection and disposal of solid waste, and sprinkler systems for access roads. In parallel, monitoring programs are conducted to monitor these measures, such as effluent monitoring, and surface water monitoring among others, to follow up and guarantee the effectiveness of the control systems.

Mining project ID

Project 4

Approach

Minimization

Type of measure

Operational controls

Description

All Vale mining projects have a fire brigade ready to act when necessary. A third party is contracted if the fire is not contained, even in partnership with environmental agencies and firefighters. Over time, Vale has continuously improved this system to ensure a rapid and well-coordinated response to fires, joining efforts to contain the fire as soon as possible. In this way, biodiversity and social impacts will be minimized.

Mining project ID

Project 4

Approach

Minimization

Type of measure

Other minimization measure, please specify

Reducing the impact to flora and fauna species

Description

The Flora Rescue Programs focus on rescuing seeds and specimens for seedling production and germplasm conservation before vegetation suppression actions. Seedling production in nurseries aids in restoring degraded areas and preserving genetic diversity. In projects 4 and 5, a micropropagation protocol in collaboration with Vale Institute for Sustainable Development was developed to propagate the critically endangered Cattleya milleri species from the ferruginous rupestrian grasslands in Minas Gerais, Brazil. This species is at high risk due to its limited occurrence and habitat loss. In vitro propagation proved successful for large-scale seedling production, enabling successful acclimatization and reintroduction. These efforts support conservation programs and expand seedling production and reintroduction initiatives.
Moreover, the planting of *C. milleri* seedlings took place in September 2021 among rock fragments in Serra da Calçada (Minas Gerais). Monthly monitoring has been conducted to quantify the number of surviving plants. One month after field planting, the plants exhibited high survival rates and environmental adaptation. After eight months (May 2022), a low mortality rate (<10%) was observed, and the seedlings displayed satisfactory growth. These preliminary findings suggest that in vitro propagated C. milleri plants have a high potential for establishment in natural conditions, enhancing the success of propagation and reintroduction processes.

The suppression of vegetation and the resulting loss or reduction of habitat can lead to the unintended dispersion of fauna or harm their dispersal capabilities. The Program for Monitoring Suppression, Disappearance, and Potential Fauna Rescue serves as a vital tool to remove and deter animals from the suppressed area, aiming to minimize impacts on wildlife. The program operates through two main stages: planning activities and actions to monitor suppression and fauna management. This includes field visits, satellite image analysis, regional mapping, and defining appropriate action strategies and suppression directions. Additionally, the program identifies suitable release areas for rescued species. The second stage involves monitoring suppression activities, implementing deterrence measures, rescuing captured individuals, and relocating them to appropriate locations.

Mining project ID

Project 5

Approach

Minimization

Type of measure

Other minimization measure, please specify

Reducing the impact to flora and fauna species

Description

The Flora Rescue Programs aim to rescue seeds and specimens before vegetation suppression actions, focusing on seedling production and germplasm conservation. Seedlings produced in nurseries are used for restoration and conservation purposes, preserving genetic variability. For instance, in mining projects 4 and 5, a micropropagation protocol was developed in partnership with ITV to propagate the critically endangered Cattleya milleri species from the Quadrilátero Ferrífero Region's ferruginous rupestrian grasslands in Minas Gerais, Brazil. This species is classified as critically endangered due to its limited occurrence and habitat degradation. The in vitro propagation technique proved to be a viable option for large-scale seedling production. A high number of seedlings were generated, later these seedlings were acclimatized and rustified successfully, which allowed the reintroduction of plants in a natural environment. The results obtained provide subsidies for conservation programs and expansion of the production of seedlings and introduction into a natural environment. In addition, the planting of C. milleri seedlings was carried out in September/2021 among rock fragments in Serra da Calçada (Minas Gerais, Brazil). The monitoring of the plants is carried out monthly, where the number of plants survivors is quantified. One month after planting in the field, the plants showed high survival and good environmental adaptation. At eight months of planting (May 2022) a low mortality rate was observed (<10%) and the seedlings showed satisfactory growth. The results obtained so far suggest that C. milleri plants propagated in vitro have a high potential for establishment under natural conditions, demarcating the success of the process of propagation and reintroduction.

The Vegetation Suppression Program is crucial for the operation but can impact fauna by causing habitat loss and disrupting their dispersion. To mitigate these impacts, the Program for Monitoring and Rescuing Fauna aims to remove and deter animals from the suppression area. It involves planning activities, analysing satellite images, and mapping to define the best strategies and release areas for rescued species. The program also includes monitoring suppression activities and taking action to minimize disturbance, rescue captured individuals, and relocate them if necessary.

Mining project ID

Project 1

Approach

Minimization

Type of measure

Operational controls

Description

The complexity of environmental licensing in Carajás poses a bottleneck for the company's strategic planning. The endemic and threatened species of the Carajás Flora have drawn the attention of regulatory bodies. The absence of studies and conservation measures for these species could limit future operational areas and negatively impact the company's environmental and sustainability agenda.
Vale Institute for Sustainable Development is undertaking the Rare, Endemic, and Threatened Plants of the Carajás National Forest initiative. This project focuses on ecological and evolutionary studies applied to conservation, exploring factors that influence the protection of populations of rare, endemic, and endangered plant species in the Carajás National Forest. The aim is to identify vulnerabilities in populations impacted directly or indirectly by mining and provide essential data to support licensing processes, monitoring, management, mitigation, and compensation actions.
Accurate information collected through this project contributes to the consolidation of biodiversity data in the company's influence areas, enhancing understanding of natural ecosystems. The findings will inform decision-makers about operational risks and guide efforts to manage endangered species, as well as identify alternatives for conserving and restoring priority areas. Ultimately, the results can contribute to cost reduction, optimize licensing processes, and ensure compliance with conditions set by Brazilian environmental agencies for Vale's mining activities.

F-MM14.4/F-CO14.4

(F-MM14.4/F-CO14.4) Have significant impacts on biodiversity been mitigated through restoration?

	Have significant impacts on biodiversity been mitigated through restoration?	Comment

Row 1	Yes	n.a.

F-MM14.4a/ F-CO14.4a

(F-MM14.4a/ F-CO14.4a) Provide details on restoration actions you have in place in your sites.

Mining project ID

Project 1

Description of the impact being mitigated by restoration

As the suppression of native vegetation often has an inevitable impact on the implementation of enterprises and expansions, mainly focused on structures that have locational rigidity, such as pits, it is necessary to apply actions and compensatory measures, such as the conservation and recovery of other areas or other activities agreed between the applicant and the competent environmental agency. The impact on biodiversity to be recovered is the suppression of vegetation, habitat loss/reduction, and loss of individuals of plant species.

Type of ecosystem restored

Other ecosystems

Total area restored to date (hectares)

5,417

Total area to be restored (hectares)

134.41

Target year

2022

Describe restoration actions

The restoration actions involve seed collection and production and acquisition of native seedlings of the Amazon in local cooperatives, the preparation of the area, planting of seedlings, induction of natural regeneration, and control of invasive alien species. Essential procedures used in the forest restoration process involve protecting the site with fencing to prevent cattle access, creating and maintaining firebreaks, promoting natural regeneration by creating patches of trees to attract dispersers and enriching the area by planting seedlings, transplanting seedlings from the soil seed bank, direct seeding, and natural regeneration. For monitoring the performance of actions, the extension of the restored area, the number of native species, the number of seedlings and the survival rate in the field, and the number of replanted species are used as indicators.

More than 500,000 seedlings of different native forest species with high floristic diversity have been planted in restoration projects. These areas have been systematically monitored. The actions work on two complementary fronts: re-establishing forest

connectivity by creating ecological corridors in the mine's area of influence and restoring supplementary forest patches on purchased properties near the mine site, which also form a part of the ecological corridors. The first front is part of an environmental offsets program required under the environmental license for the mine, in which land is being purchased to offset the disturbance of the natural environment caused by mining. Ecological corridors are being established surrounding the Complex through forest restoration on Vale-owned properties.
Some properties have been excluded from formal reporting of the total area recovered due to operational issues related to land ownership.

Mining project ID

Project 2

Description of the impact being mitigated by restoration

The project's impact occurs in the Atlantic Forest biome, related to reducing and suppressing forest and rupestrian grassland habitats. It generates intervention in threatened and immune-cutting species.
The restoration action is justified by the need to comply with legal provisions and, primarily, by the environmental importance concerning the adequate protection and restoration of environments, aiming to enhance connectivity between remnants of native vegetation through the establishment of ecological corridors, promote forest restoration, increase the local capacity to support fauna and flora, and foster environmental gains. Besides, the process of evaluating environmental impacts is based on prior knowledge of the environmental scenario where the suppression will take place, obtained through the development of an environmental diagnosis. It is an analytical process that aims to understand the environmental effects of suppression activities, considering the possibilities of avoiding, reducing, and controlling these effects at acceptable and sustainable levels. By doing so, it enables conclusions to be drawn regarding the feasibility of the project.

Type of ecosystem restored

Forest ecosystems

Total area restored to date (hectares)

301.81

Total area to be restored (hectares)

53,29

Target year

2022

Describe restoration actions

Under the operations of the Itabira Complex, two restoration mechanisms are used: Natural and artificial regeneration.
Natural regeneration: consists of the fact that the vegetation regenerates through

biological processes, through the germination of naturally dispersed seeds, and, to a lesser extent, by sprouting stumps and roots. This method depends on a viable seed source, a suitable environment for germination, and an appropriate environment for plant establishment and initial growth. It is a low-cost alternative, generally recommended for areas that present near remnants and already have some tree species, besides being characterized by high resilience.
Artificial regeneration: improves establishment conditions for species without relying on natural dispersal or seed sources. Success depends on planting models, species selection, soil preparation, and pest control.
Methodology for Recovery of degraded areas:
-Selection of species (native species. For offsetting for intervention in threatened and immune-cut species, those species that have undergone intervention are selected and planted).
-Planting model (composition, spacing, arrangement).
- Quality of the seedlings.
-Pre-planting (Isolation of the area, fire protection, control of leaf-cutting ants, soil preparation, pit opening, control of invasive species, segregation).
-Planting.
-Maintenance (insulation and protection against fire, ant control, cover fertilization, control of invasive species.
The unique flora of the Quadrilátero Ferrífero region harbors several endemic species and even some threatened with extinction. In this context, Law 12.651/2012 establishes the protection and compensation of directly impacted threatened species for the installation of new enterprises. Additionally, among the significant phytophysiognomies of this region, the Seasonal Semideciduous Forest (FES) and the Rupestrian Grassland (CR) stand out, both being part of the Mata Atlântica biome - considered a priority for conservation and protected by Law No. 11.428, dated December 22, 2006, regulated by Decree No. 6.660, dated December 21, 2008.
Besides, the compensation actions are monitored and evaluated by monthly reports of the activities made in the complex with results and goals; for example, the target for 2022 was 53.29ha and it was executed 69.87ha.

Mining project ID

Project 3

Description of the impact being mitigated by restoration

The project's impact occurs in the Atlantic Forest biome, related to reducing and suppressing forest and field habitats. It generates intervention in threatened and immune-cutting species.
The restoration action is justified by the need to comply with legal provisions and, primarily, by the environmental importance concerning the adequate protection and restoration of environments, aiming to enhance connectivity between remnants of native vegetation through the establishment of ecological corridors, promote forest restoration, increase the local capacity to support fauna and flora, and foster environmental gains.

Besides, the process of evaluating environmental impacts is based on prior knowledge of the environmental scenario where the suppression will take place, obtained through the development of an environmental diagnosis. It is an analytical process that aims to understand the environmental effects of suppression activities, considering the possibilities of avoiding, reducing, and controlling these effects at acceptable and sustainable levels. By doing so, it enables conclusions to be drawn regarding the feasibility of the project.

Type of ecosystem restored

Forest ecosystems

Total area restored to date (hectares)

750.74

Total area to be restored (hectares)

315.26

Target year

2022

Describe restoration actions

Natural regeneration involves the vegetation regrowing through biological processes, including the germination of naturally dispersed seeds and, to a lesser extent, the sprouting of stumps and roots. Its success relies on the availability of viable seeds, suitable germination conditions, and a conducive environment for plant establishment and initial growth. This method is a cost-effective option typically recommended for areas near existing remnants and characterized by high resilience.
In contrast, artificial regeneration is a restoration approach that provides optimal conditions for species introduced to the site, without relying solely on dispersers and seed sources. However, the success of this method depends on various factors, such as selecting appropriate species, implementing suitable planting models, preparing the soil, controlling pests and diseases, among others.
Priority is given to using seedlings from rescued specimens in suppressed areas to preserve genetic diversity during these actions. The methodology for restoration includes species selection (native species for compensation and intervention), planting models (composition, spacing, arrangement), seedling quality, pre-planting preparation (area isolation, fire protection, control of leaf-cutting ants, soil preparation, pit opening, invasive species control), planting, and maintenance (fire protection, ant control, cover fertilization, invasive species control).
In 2022, restoration actions were conducted on a total of 359.98 hectares.
Furthermore, the impact is being mitigated in accordance with the following legal and regulatory aspects:
Intervention in Permanent Preservation Areas (APP) under Resolution of the Brazilian National Environment Council No. 369/2007and Atlantic– Forest Intervention - Article 32 of Law No. 11.428/2006.

Besides, the actions are monitored and evaluated by monthly reports of the activities made in the complex with results, goals, and the relation of executed area to the proposed area. In addition, the monitoring is carried out through photographic records of the actions taken.

Mining project ID

Project 4

Description of the impact being mitigated by restoration

Iron ore mining, as well as the associated structures for processing and production, relies on land clearing and may lead to the suppression of native vegetation. The areas with ore occurrence have locational rigidity, and deforestation cannot be avoided entirely or minimized. However, suppression can significantly impact biodiversity, such as the loss and reduction of habitats for fauna species, loss of flora specimens (including rare, endemic, or threatened species), and destabilization of communities in the affected areas. Despite constantly working to avoid impacts and reduce as much as possible the impacts of its operations and new projects, the suppression of natural habitats is still necessary for implementing and expanding mining projects in our areas of operation. Therefore, restoration actions are essential for rehabilitating degraded areas and restoring habitats and populations of impacted species.

Besides, the process of evaluating environmental impacts is based on prior knowledge of the environmental scenario where the suppression will take place, obtained through the development of an environmental diagnosis. It is an analytical process that aims to understand the environmental effects of suppression activities, considering the possibilities of avoiding, reducing, and controlling these effects at acceptable and sustainable levels. By doing so, it enables conclusions to be drawn regarding the feasibility of the project.

Type of ecosystem restored

Forest ecosystems

Total area restored to date (hectares)

291.29

Total area to be restored (hectares)

100.22

Target year

2022

Describe restoration actions

Various techniques are used to restore degraded areas, which are chosen based on the characteristics of the site and the available resources. Generally, the following techniques are employed:

▪ Restoration in forest areas: isolation of the area that must be done before planting; selective manual weeding; ant control; initial planting that must be done with the direct opening of pits with adequate size and spacing; base fertilization; planting model in rows

of cover + diversity to be carried out in the rainy season; choice of plant species according to function;
▪ Restoration in rupestrian grassland areas: deposition of "topsoil" essential to creating a suitable substrate; planting seeds of rupestrian species; transplanting of rupestrian plants from the flora rescue program. In the first stage, the revegetation should use species grass and legume species should be used in the revegetation, aiming to provide coverage and improve soil characteristics. The grasses have a great capacity to cover the soil. At the same time, the legumes provide soil enrichment, thanks to their capacity to fix nitrogen, which contributes to the establishment of native species at a later stage. In the next step, the revegetation process will seek to meet other objectives, such as the landscaping of the area and the increase of biodiversity and faunal support. To this end, specific native species are used to take advantage of their adaptive characteristics to the region and favour natural succession. These species should be obtained from the flora rescue program and the nurseries. The rehabilitation actions of the degraded areas are periodically monitored to follow the events of colonization of the flora to adjust habitat management actions when necessary. These can maximize the processes of ecological succession and recovery of the areas being rehabilitated.
In addition, in 2022, restoration actions were carried out on 144.26 hectares. Besides, the restoration actions of the project meet the premises of Article 32 of the Atlantic Forest Law (No. 11,428/2006), in addition to presenting the methodology to be used to restore the altered areas. Furthermore, the compensations may follow Article 32 of Law No. 11,428/2006.

Mining project ID

Project 5

Description of the impact being mitigated by restoration

Vale recognises the utmost importance of biodiversity and its evaluation in its business operations. Biodiversity plays a vital role in sustaining life and ecosystem services, and its significance and value cannot be underestimated. Specific assessments are conducted as part of the risk and impact management process to evaluate potential interferences in areas of natural heritage, protected areas, and sensitive habitats and species. These assessments occur at various stages, from initial territory planning to final project design. Environmental impact studies are carried out prior to any expansion or new project, adhering to the regulations and guidelines of each country and region of operation.
The process of evaluating environmental impacts relies on prior knowledge of the environmental scenario where the suppression will take place, obtained through the development of an environmental diagnosis. It is an analytical process that aims to understand the environmental effects of suppression activities, considering the possibilities of avoiding, reducing, and controlling them at acceptable and sustainable levels. And so, it is possible to determine the feasibility of the project.
Iron ore mining activities, including associated processing and production structures, require land clearance, resulting in the suppression of native vegetation. The areas with ore deposits have inherent spatial constraints, making complete avoidance or minimalization of deforestation unfeasible. Vegetation suppression directly and indirectly

affects biodiversity, leading to habitat reduction and loss, decreased flora and fauna populations, dispersal to surrounding environments, and disruption of local communities. Despite striving to prevent and minimize impacts in operations and new projects, the suppression of natural habitats remains necessary for the implementation and expansion of mining projects in our operational areas. Hence, restoration measures are crucial for rehabilitating degraded areas and restoring habitats and populations of affected species.

In 2020, Vale actively engaged in restoration activities aimed at species conservation, creating ecological corridors, and restoring fauna habitats. These efforts demonstrate Vale's commitment to mitigating the impact of its operations on biodiversity and actively contributing to the conservation and restoration of ecosystems.

Type of ecosystem restored

Forest ecosystems

Total area restored to date (hectares)

10.06

Total area to be restored (hectares)

0

Target year

2022

Describe restoration actions

Various techniques are employed to restore ecosystems, which are selected based on site characteristics and available resources. The following techniques are commonly utilized:

▪ Restoration of forest areas: Before planting, the area is isolated. Selective manual weeding and ant control are performed. Initial planting involves opening pits of appropriate size and spacing. Base fertilization is carried out. Planting follows a model of rows with a cover + diversity, done during the rainy season. Plant species are chosen based on their intended function.

▪ Restoration of rupestrian grassland areas: "Topsoil" deposition is necessary to create a suitable substrate. Seeds of rupestrian species are planted, and rupestrian plants from the flora rescue program are transplanted. The first stage of revegetation focuses on grass and legume species, which provide soil coverage and enrichment. Grasses effectively cover the soil, while legumes enrich the soil through nitrogen fixation, facilitating the establishment of native species. Subsequent stages aim to enhance biodiversity and support fauna, utilizing specific native species known for their adaptability to the region and their ability to promote natural succession. These species are obtained from the flora rescue program and nurseries. The restoration areas is regularly monitored to adjust habitat management actions as needed, maximizing the processes of natural succession and recovery.

Periodic monitoring ensures that the colonization of flora is monitored, allowing for adjustments to habitat management actions when necessary. This approach enhances the natural succession and habitat restoration.

These actions are monitored and evaluated by monthly reports of the activities made in the complex with results, goals, and the relation of executed area to proposed area. In addition, the monitoring is carried out through photographic records of the actions taken.
Besides, the restoration actions of the project meet the premises of Article 32 of the Atlantic Forest Law (No. 11,428/2006), in addition to presenting the methodology to be used for the restoration of the altered areas. Furthermore, the compensations may also be in accordance with Article 5 of Resolution No. 365/2006.

Mining project ID

Project 6

Description of the impact being mitigated by restoration

The project's impact occurs in the Atlantic Forest biome, related to reducing and suppressing forest and field habitats. It generates intervention in threatened and immune-cutting species.
The restoration action is justified by the need to comply with legal provisions and, primarily, by the environmental importance concerning the adequate protection and restoration of environments, aiming to enhance connectivity between remnants of native vegetation through the establishment of ecological corridors, promote forest restoration, increase the local capacity to support fauna and flora, and foster environmental gains.
Besides, the process of evaluating environmental impacts is based on prior knowledge of the environmental scenario where the suppression will take place, obtained through the development of an environmental diagnosis. It is an analytical process that aims to understand the environmental effects of suppression activities, considering the possibilities of avoiding, reducing, and controlling these effects at acceptable and sustainable levels. By doing so, it enables conclusions to be drawn regarding the feasibility of the project.

Type of ecosystem restored

Forest ecosystems

Total area restored to date (hectares)

151.64

Total area to be restored (hectares)

148.71

Target year

2022

Describe restoration actions

Natural regeneration consists of the fact that the vegetation regenerates through natural processes, through the germination of naturally dispersed seeds, and, to a lesser extent, by sprouting stumps and roots. This method depends on a viable seed source, an appropriate environment for germination, and an appropriate environment for the establishment and initial growth of plants. It is a low-cost alternative, generally recommended for areas that present near remnants and already have some tree species, besides being characterized by high resilience.

On the other hand, artificial regeneration is a recovery process by providing better conditions of establishment for the species that are brought to the site and not initially relying on dispersers and seed sources. The success of this method, however, depends on the definition of several aspects, such as planting models; selection of appropriate species; methods of soil preparation and planting; methods of pest and disease control, among others.
The methodology for restoration consists of these actions: Selection of species; (native species) for compensation for intervention in threatened and immune cut species (those species that have undergone intervention are selected and planted); Planting model (composition, spacing, arrangement); Quality of the seedlings; Pre-planting; (Isolation of the area, fire protection, control of leaf-cutting ants, soil preparation, pit opening, control of invasive species, segregation); Planting and Maintenance. (Isolation and protection against fire, ant control, cover fertilization, control of invasive species.
Some relevant legal/regulatory aspects are included in these actions, such as Intervention in APPs (Areas of Permanent Preservation) – as regulated by Resolution of the Brazilian National Environment Council No. 369/2007, Intervention in the Atlantic Forest – as governed by Article 32 of Law No.11.428/06, and Intervention in threatened and protected species through cutting or removal.
Besides, the actions are monitored and evaluated by monthly reports of the activities made in the complex with results, goals, and the relation of executed area to the proposed area. In addition, the monitoring is carried out through photographic records of the actions taken.
In addition, in 2022 restoration actions were carried out on a total of 136.10 hectares.

Mining project ID

Project 7

Description of the impact being mitigated by restoration

It is not always possible to avoid or mitigate all impacts, especially for structures that have locational rigidity according to the occurrence of the mineral, such as pits. Restoration and reclamation actions are essential for these residual impacts, related to the loss and reduction of habitats, including habitats of endemic and threatened species, changes in communities, and loss of flora individuals .
Typically post-mining reclamation measures involve several steps, including:
-Recontouring/landscaping to get a stable landform which conducive to the growth of vegetation
- Planting of cover crops/ground cover to minimize erosion and enhance soil fertility
- Planting of pioneer trees to provide an initial trees canopy to accommodate the local trees species
- Planting of native/local trees species under the pioneer trees canopy
Some fertilizer is applied to the soil to support the growth of the planted vegetation.
Vegetation maintenance is carried out for up to three years to ensure a consistent increase. After three years, the natural soil regeneration is reestablished and allows self-sustained vegetation grows.
The monitoring program was carried out to measure the reclamation success rate.
Some additional vegetation maintenance activities took place if required.

Probably after 4 -5 years, the natural forest recolonization will be established.

Type of ecosystem restored

Forest ecosystems

Total area restored to date (hectares)

3,249.1

Total area to be restored (hectares)

0

Target year

2025

Describe restoration actions

As part of Vale's commitment to environmental sustainability, we are dedicated to rehabilitating post-mining and cross-border lands, particularly in critical areas. PT Vale Indonesia (PTVAI) actively participates in post-mining rehabilitation efforts, implementing a gradual revegetation process.
The PTVI restoration program includes a sequential approach to revegetation. The initial stage involves restoring pioneer vegetation, followed by enrichment planting using local and endemic species, typically carried out two years after the pioneer planting.
Reclamation activities are closely monitored and reported to the relevant authorities. Upon completion, the reclaimed land is handed back to the Government for evaluation based on the key performance indicators set by the Department of Environment and Permit Management (EPM).
In 2022, the total post-mining rehabilitation land reached 293.44 hectares, contributing to a cumulative total of 3,542.32 hectares.
The reclamation activities involve various stakeholders, including Vale's employees, as well as the central government's Ministry of Energy and Mineral Resources (ESDM), Ministry of Environment and Forestry (LHK), local governments, communities, and non-governmental organizations.
The (ESDM, LHK, and local governments play a vital role in providing technical guidance, establishing a supervisory framework, and assessing the success of post-mining reclamation and revegetation activities.

F-MM14.5/F-CO14.5

(F-MM14.5/F-CO14.5) Have significant residual impacts of your projects been compensated through biodiversity offsets?

	Have residual impacts been compensated through biodiversity offsets?	Comment
Row 1	Yes	n.a.

F-MM14.5a/F-CO14.5a

(F-MM14.5a/F-CO14.5a) Provide details on the biodiversity offsets you have in place.

Mining project ID

Project 1

Description of the impact being offset

The removal of vegetation cover is an impact that is often unavoidable in structural projects.
To quantify this impact, we monitor the total area of vegetation that has been removed. Avoiding the impacts of natural habitat conversion was only possible for some of the structure projects. However, depreciation is likely through monitoring suppression, installing control measures, and rescue of flora and fauna. Recovery and restoration measures are essential to establish ecological corridors not only to compensate for the habitat loss but the fragmentation of habits too, and to reestablish populations of animal and plant species impacted by the implementation of the projects.
The impact is characterized in environmental impact studies, and its magnitude is quantified based on the size of the suppressed area, the type of vegetation, and the successional stage (habitat quality).

Motivation

Legal requirements

Type of offset

Restoration offset (forests)

Area (hectares)

1,451.85

Describe the offset

On March 13, 2017, Vale and the Chico Mendes Institute for Biodiversity Conservation (ICMBio) signed a Term of Commitment for the execution of the project called “Ecosystem Restoration Project in Preservation Areas in the vicinity of the Mosaic of Protected Area of Carajás”. This program includes the restoration of 1,451.85 ha of Permanent Preservation Areas. The initiative aims to comply with current legislation and meet the environmental conditions of the Vegetation Suppression Authorizations (In Portuguese, Autorização de Supressão de Vegetação - ASV) issued by the competent environmental agency, within the Carajás National Forest, in the Carajás Mining Complex.
The area to be offset is based on the Vegetation Authorizations. The offset is done by the ecological restoration technique, mainly by planting seedlings.
But also, for natural regeneration, in this context, means applying mechanical methods that aim to eliminate or control unwanted plant species (example: exotic grasses) and simultaneously favour the development of native species of interest in forest restoration.
Another way also used is planting enrichment, which consists of introducing species from the final succession stages in the forest restoration's target areas. This method is used when the vegetation in the region has low species diversity.
For these plantations, methods such as introducing seedlings and seeds and

introducing individuals produced from sources of species already present in the area, collected in other regional fragments - genetic enrichment are most used.
And one way to control the netting area is by using a fence, which is an object of isolation to prevent the entry of bovine and equine animals into the areas under restoration. Brackets are placed strategically along the perimeter of the fence, allowing teams to enter to carry out the work.
According to the Environmental Compensation Plan, the history of quantitative forest planting areas in the S11D Complex is approximately 807,952 hectares of planted areas and more than one million seedlings native to the Amazon inserted in the surrounding areas of the undertaking, which can contribute to the connectivity between the forest fragments, which is the main objective of this Program.

Mining project ID

Project 1

Description of the impact being offset

Implementing of the S11D Complex resulted in the direct intervention of 2,610.80 hectares, with approximately 1,725.33 hectares a being natural areas. It has led to significant losses in forest habitats and ferruginous rocky outcrops and has also impacted caves and the plant and animal species associated with these ecosystems. By Art. 36 of the Federal Law No. 9.985/2000 and provided for in the Basic Environmental Plan Carajás Iron Ore Project, the Program for the Creation of a Protected Area in the Bocaina and Tarzan Mountains, where occur remnants of forest and ferruginous rupestrian grassland. This area is relevant regarding location to expand conservation and connection between representative environments of the Carajás National Forest. The impact is characterized in environmental impact studies, and its magnitude is quantified based on size of the suppressed area, type of vegetation and successional stage (habitat quality).

Motivation

Legal requirements

Type of offset

Compensation agreements

Area (hectares)

79,000

Describe the offset

The priority area for the UC's creation was determined based on the provisions outlined in Decree No. 99,556/1990, per the objectives of Law 9.985/2000. The priority was given to areas of speleological interest, covering forest habitats and ferruginous rocky outcrops (ferruginous rupestrian grassland) whenever possible in the project region. Since 2013, Vale in partnership with the Instituto Chico Mendes de Conservação da Biodiversidade ICMBIO, has been designing the creation of the Campos Ferruginosos National Park by the legal requirements in the definition of priority area for conservation.

In this context, on July 5, 2017, the PARNA was officially created through a specific decree.
The park is formed mainly by portions of land of the Carajás National Forest - Flona Carajás (Tarzan Mountain) and adjacent areas in the Bocaina Mountains. This protected area (IUCN Category II) has been established to manage and safeguard Bocaina and Tarzan rocky outcrops, as well as forest and cavities habitats, as well as guaranteeing the continuity of ecosystem services, ensuring the protection of the speleological heritage of ferruginous formation, of the vegetation of rustic rupestrian grassland, contributing to the environmental stability of the region. Vale has forgone exploration rights to enable the long-term protection of these essential habitats for endemic species. Today this protected area is managed for ICMBio with Vale support for ecosystem protection, fire prevention and fighting, landholding regularization, research, and education actions. These support actions are recorded in an agreement between Vale and ICMBio to protect all the protected areas in Carajás, revalidated every two years.

Mining project ID

Project 2

Description of the impact being offset

As the suppression of native vegetation is often an unavoidable impact, for the implementation of the enterprise and expansions, it is necessary to apply compensatory actions and measures such as the reforestation of other areas or other activities agreed upon between the applicant and the competent environmental agency.
The impact is characterized in environmental impact studies, and its magnitude is quantified based on the size of the suppressed area, the type of vegetation, and the successional stage (habitat quality).
An example of selected area is the Itabiruçu Dam, that is part of the Itabira Mining Complex, owned by Vale S.A., inserted in the central portion of the municipality of Itabira, northeast of the Quadrilátero Ferrífero (QF), in the main part of the state of Minas Gerais.
From an ecological point of view, the Quadrilátero Ferrífero is located south of the Espinhaço mountain range, within the perimeter of the Espinhaço Biosphere Reserve, which aims to prioritize the conservation of biodiversity, sustainable development, and scientific knowledge. In addition, all of it is indicated as a Priority Area for the Conservation of Flora and Fauna, situations that influence the State's decision regarding the granting of environmental licensing, currently regulated by the Ecological Economic Zoning, established by Decree 4,297/02, strengthening the measures of controls aimed at the conservation and recovery of biodiversity. Therefore, it is a region of extreme ecological importance due to the lithological variety found in it, which shelters different ecosystems close to each other, leading researchers to classify it as having great biological diversity.
The impact is characterized in environmental impact studies, and its magnitude is quantified based on the size of the suppressed area, the type of vegetation, and the successional stage (habitat quality).

Motivation

Legal requirements

Type of offset

Compensation agreements

Area (hectares)

2,983.79

Describe the offset

To recompose the native flora vegetation suppressed in the projects that had their licenses granted in this complex, the company seeks to delimit compensation/conservation based on landscape analysis, taking into consideration the formation of ecological corridors by promoting connectivity between the fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover.
The company owns some areas in the Iron Quadrangle region, including Private Natural Heritage Reserves (RPPN), areas inside protected areas, properties for conservation/ restoration, and future compensation. These areas are essential witnesses of regional biodiversity, constituting remnants for conserving sensitive habitats and endemic and endangered species of flora and fauna. The areas selected for the compensation of APP and endangered species are called Fazenda Caieiros and Sítio Córrego das Cobras, located in the municipality of Itabira-MG. The compensation in these Permanent Preservation Areas (APP) will allow the resumption of environmental functions, contributing to the preservation of water resources, landscape, geological stability, and biodiversity, ease of gene flow of fauna and flora, and soil protection.
In the Itabira complex, the environmental agency approved 2,983.79 hectares of protected areas, including RPPNs and compensation proposals from enterprises.
The offset was predicted in compliance with Article 32 of the Atlantic Forest Law No.11,428 / 2006, Resolution of the Brazilian National Environment Council No. 369, of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I of the Normative Instruction Ministry of the Environment No. 06 of September 23, 2008.
In addition, the delimitation of compensation/conservation/recovery areas is carried out based on landscape analysis, considering connectivity between fragments of natural areas, allowing the free movement of animals, seed dispersal, and increased vegetation cover.
In addition, the area considers the approved compensation proposals and the approved RPPN, disregarding overlaps. And, in 2022, at the Itabira Complex, 69.86 hectares of compensatory planting were carried out, and maintenance was conducted on 482.818 hectares throughout the year.

Mining project ID

Project 3

Description of the impact being offset

As suppression of native vegetation often inevitably impacts the implementation of enterprises and expansions, it is necessary to apply actions and compensatory measures, such as the conservation and recovery of other areas or other activities agreed upon between the applicant and the competent environmental agency. Due to the locational rigidity of the ore to be exploited, the suppression of vegetation is an impact that often cannot be avoided.
The implementation of the mines that make up the Mariana Complex triggered habitat fragmentation due to vegetation suppression in the region that had the Atlantic Forest. This biome is characterized by high biodiversity levels and species' gene flow. Therefore, any fragmentation of this biome significantly impacts the reproduction and locomotion of species, especially those already threatened with extinction in the region. Thus, species threatened with extinction in the area have an even greater risk of losing individuals and populations.
There are threatened flora species, like Brazilian sassafras (*Ocotea odorifera*), and for the fauna, the following threatened species were found: cougar (*Puma concolor*), Chaco eagle (*Urubitinga coronata*), ocelot (*Leopardus pardalis*) and black hawk-eagle (*Spizaetus tyrannus*).
Environmental impact studies and scientific literature characterized the impact. And the species were quantified through fieldwork and a scientific bibliography as well.

Motivation

Legal requirements

Type of offset

Compensation agreements

Area (hectares)

2,610.09

Describe the offset

To restore the native vegetation of flora suppressed from the projects that had their licenses granted in this Complex, the company seeks to delimit areas of compensation/conservation/recovery based on landscape analysis, taking into account the formation of ecological corridors through the promotion of connectivity between the fragments of natural areas, allowing the free displacement of animals, seed dispersal and increased vegetation cover.
The company owns some of the areas in the Quadrilátero Ferrífero region, including Private Natural Heritage Reserves (In Portuguese: Reserva Particular do Patrimônio Natural – RPPN), areas within the protected area, conservation/recovery properties, and future compensation. These areas are essential witnesses of regional biodiversity, constituting remnants for conserving sensitive habitats and endemic and endangered species of flora and fauna. Besides, the compensation actions are monitored and evaluated by monthly reports of the activities made in the complex with results and goals.
In the Mariana complex, there is 2,610.09 hectares of preserved areas approved by the environmental agency that include RPPN and proposals for compensation of the projects.

The compensation for the Complex was foreseen following Articles 17 and 32 of the Atlantic Forest Law No.11,428/2006), Resolution of the Brazilian National Environment Council No. 369 of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I to Normative Instruction of the Ministry of the Environment No. 06 of September 23, 2008, Article 75 of State Law No. 20.922/2013, State Decree 47.749/2019 and National System of Protected Areas Law No. 9,985/2000.
In addition, the delimitation of compensation/conservation/recovery areas is carried out based on landscape analysis, considering connectivity between fragments of natural areas, allowing the free movement of wildlife, seed dispersal, and increased vegetation cover.
In addition, the area considers the approved compensation proposals and the approved RPPN, disregarding overlaps.

Mining project ID

Project 4

Description of the impact being offset

A range of compensatory measures have been implemented to mitigate the impacts of the complex. These include creating compensatory planting areas to restore habitats and populations of endangered and legally protected species in compliance with legal requirements. Additionally, Vale has established protected areas to conserve habitats and associated endangered and endemic species.
The main residual impacts offset relates to the loss of forest and rupestrian grassland habitats and populations of endemic and threatened species associated with these habitats.
Besides, the impact is characterized in environmental impact studies and quantified from the size of the suppressed area, type of vegetation, and successional stage.

Motivation

Legal requirements

Type of offset

Compensation agreements

Area (hectares)

2,216.29

Describe the offset

To restore the suppressed native flora in the licensed projects within this complex, the company adopts a landscape-based approach for compensation and conservation. This approach aims to create ecological corridors that connect fragmented natural areas, facilitating animal movement, seed dispersal, and the establishment of a more extensive vegetation cover.

Within the Quadrilátero Ferrífero region, the company owns various areas that play a vital role in preserving regional biodiversity. These include Private Natural Heritage Reserves (RPPN), areas within protected areas, properties designated for conservation and restoration, and future compensation sites. These areas serve as important refuges for sensitive habitats and endemic and endangered species of flora and fauna.
The Vargem Grande complex, for instance, has 2,216.29 hectares a of approved protected areas, including RPPNs and compensation proposals from other projects. In 2022 alone, 69.82 ha were approved for compensation. The compensation efforts in the complex adhere to the guidelines outlined in the Atlantic Forest Law (11.428/2006), Resolution of the Brazilian National Environment Council Resolution No. 369 (March 28, 2006), Compensation for Intervention in Endangered Species (Annex I of Normative Instruction of the Ministry of Environment No. 06, September 23, 2008), Article 75 of State Law No. 20.922/2013, State Decree No. 47.749/2019, and Protected Area National System Law No. 9.985/2000.
The progress of compensation actions in the complex is monitored and evaluated through monthly reports, which document the implemented actions and their corresponding results and objectives.
The delimitation of compensation, conservation, and recovery areas takes into account landscape analysis, with a focus on ensuring connectivity between natural fragments, enabling the movement of animals, seed dispersal, and the establishment of increased vegetation cover.
Furthermore, the approved compensation proposals and RPPNs are considered during the area delimitation process, with any overlaps disregarded.

Mining project ID

Project 5

Description of the impact being offset

As the suppression of native vegetation is often an unavoidable impact, for the implementation of the enterprise and expansions, it is necessary to apply compensatory actions and measures such as the reforestation of other areas or other actions agreed upon between the applicant and the competent environmental agency.
The impact is characterized in environmental impact studies, and its magnitude is quantified based on the size of suppressed area, type of vegetation, and successional stage (habitat quality).

Motivation

Legal requirements

Type of offset

Compensation agreements

Area (hectares)

2,558.73

Describe the offset

To restore the native vegetation that has been suppressed in the licensed projects within this complex, the company implements compensation and conservation measures based on landscape analysis. The goal is to establish ecological corridors that promote connectivity between natural fragments, facilitating the movement of animals, seed dispersal, and the expansion of vegetation cover.
Vale owns various areas in the Quadrilatéro Ferrífero region, including Private Natural Heritage Reserves (RPPN), areas within protected areas, properties designated for conservation and restoration, and future compensation sites. These areas play a crucial role in preserving regional biodiversity, acting as important refuges for sensitive habitats and endemic and endangered species of flora and fauna.
An illustrative example related to the Fábrica Mine is the Stephanopodium engleri, an herbaceous plant endemic to Minas Gerais found in Seasonal Forests. Its population was negatively affected by the implementation of a waste rock dump, but Vale rescued its seeds and produced seedlings, which were used to restore the impacted areas. Additionally, Vale has established protected populations of this species in its RPPNs, such as Andaime.
The protected areas within the Paraopeba complex cover an area of 2,558.73 hectares, approved by the environmental agency, including RPPNs and compensation proposals from the projects.
The compensatory measures for the complex comply with relevant regulations, including the Atlantic Forest Law (11.428/2006), CONAMA resolution no. 369 of March 28, 2006, Compensation for Intervention in Endangered Species - Annex I of the Normative Instruction of the Ministry of Environment No. 06 of September 23, 2008, Article 75 of State Law 20.922/2013, State Decree 47.749/2019, and SNUC Law 9.985/2000.
The delimitation of compensation, conservation, and recovery areas is carried out through landscape analysis, considering connectivity between natural fragments to facilitate animal movement, seed dispersal, and the establishment of enhanced vegetation cover. The approved compensation proposals and RPPNs are taken into account, disregarding any overlaps.

Mining project ID

Project 6

Description of the impact being offset

As the suppression of native vegetation is often an unavoidable impact, for the implementation of the enterprise and expansions, it is necessary to apply compensatory actions and measures such as the reforestation of other areas or other actions agreed upon between the applicant and the competent environmental agency.
The impact is characterized in environmental impact studies, and its magnitude is quantified based on the size of the suppressed area, the type of vegetation, and the successional stage (habitat quality).
Besides, the impact is characterized in environmental impact studies and quantified from the size of the suppressed area, type of vegetation and successional stage.

Motivation

Legal requirements

Type of offset

Compensation agreements

Area (hectares)

5,821.12

Describe the offset

In order to recompose the native flora vegetation suppressed in the projects that had their licenses granted in this complex, the company seeks to delimit compensation/conservation/recovery areas, based on landscape analysis, taking into consideration the formation of ecological corridors by promoting connectivity between the fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover.
The company owns some of these areas in the Iron Quadrangle region, including Private Natural Heritage Reserves (RPPN), areas inside Protected areas, properties for conservation/ restoration and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endemic and endangered species of flora and fauna.
In the Brucutu/ Água Limpa complex, there is 5,821.12 ha of preserved areas approved by the environmental agency that includes RPPNs and compensation proposals from the enterprises, and of this total, 22.70 ha were approved in 2021 and 661.49 ha in 2022.
Furthermore, the compensations for the Complex were provided in accordance with Articles 17 and 32 of the Atlantic Forest Law (11.428 / 2006), CONAMA resolution No. 369 of March 28, 2006, and Compensation for Intervention in Endangered Species – Annex I of the Normative Instruction of the Ministry of Environment No. 06 of September 23, 2008, Article 75 of State Law 20.922/2013, State Decree 47.749/2019 and SNUC Law 9.985/2000.
In addition, the delimitation of compensation/conservation/recovery areas is carried out based on landscape analysis, considering connectivity between fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover.
In addition, the area considers the approved compensation proposals and the approved RPPN, disregarding overlaps.

Mining project ID

Project 7

Description of the impact being offset

It is not always possible to avoid or mitigate all impacts, especially for structures that have locational rigidity according to the occurrence of the mineral, such as pits. However, after recovery and reclamation actions,

it's crucial to address any residual impacts resulting from the loss or reduction of habitats, including those of endemic and endangered species, changes in communities, and loss of individual flora.
PTVI maintains vegetation after pioneer planting and Plant enrichment until the percentage grows to 80%.
Besides, the impact is characterized in environmental impact studies and quantified from the size of the suppressed area, type of vegetation, and successional stage.

Motivation

Legal requirements

Type of offset

Averted loss offset (forests)

Area (hectares)

90

Describe the offset

Land reclamation after mining activities is crucial in restoring and improving land ecosystems. It helps conserve and protect both protected and endemic flora and fauna species and is also a way of fulfilling legal obligations.
We are committed to limiting the open land areas for mining operations and implementing biodiversity management in the mining operation areas following Approval Letter No.188.4/66/II/ BAPEDALDA. We also perform land rehabilitation and transboundary reforestation outside the mining operation areas, especially in critical land and watersheds (DAS).

F-MM14.6/F-CO14.6

(F-MM14.6/F-CO14.6) Is your organization implementing or supporting additional conservation actions?

	Implementing or supporting additional conservation actions?	Comment
Row 1	Yes	n.a.

F-MM14.6a/F-CO14.6a

(F-MM14.6a/F-CO14.6a) Provide details on the main additional conservation actions you are implementing or supporting.

Project title

Conservation of Quadrilátero Ferrífero Region Species

Project theme

Threatened species

Country/Area

Brazil

Location

In the area of influence of mining project

Primary motivation

Voluntary

Timeframe

Defined

Start year

2016

End year

2022

Description of project

This project began in 2016 and since then has been developed in partnership with consultants and researchers from all over Brazil. The main focus is to increase the knowledge about the plant species of the rupestrian grassland of the Quadrilátero Ferrífero region, Minas Gerais state (Brazil) in Vale's protected areas and other public protected areas. The project actions involved modelling and predictive mapping of species considered rare, endemic, and/or threatened in protected areas of the state until the in-depth study of populations and occurrence.
After mapping and field campaigns, the species were collected and forwarded for taxonomic confirmation. New campaigns were scheduled for the study of these populations and the collection of genetic material and propagules aimed at the development of propagation protocols.
Legal or regulatory aspects do not apply to this project, as it is a voluntary initiative.

Description of outcome to date

In the Iron Quadrangle region, in Minas Gerais (Brazil) which is home to the Brazilian Savanah (Cerrado) and Atlantic Forest biome, there are approximately 61,000 hectares of protected areas as a result of Vale's environmental offset actions, legal reserves and voluntary initiatives. These protected spaces are established in order to create a mosaic of connectivity between legal reserves and protected areas, resulting in significant ecological corridors that play their role in maintaining biodiversity.
To share and disseminate the results of this project, three books have been published. In 2021 we published Volume II of the Plant Guide, bringing, in a didactic way, a little more knowledge about this rich flora, with information about some of the most representative families of the rupestrian grassland, approaching and detailing common parts and characteristics that allow their identification by anyone.

Project title

Forest Goal – Support and protection of areas in Atlantic Forest

Project theme

Protected areas

Country/Area

Brazil

Location

Outside area of influence of mining project

Primary motivation

Voluntary

Timeframe

Defined

Start year

2020

End year

2026

Description of project

In 2019, during Vale Day at the New York Stock Exchange, Vale announced its "New Pact with Society", aiming to lead the transition to net zero (scope 1 and 2) mining by 2050. This aligns with UN Sustainable Development Goal 15 (Life on Land), as well as global biodiversity strategies, with a focus on Aichi's targets. One of the pillars within the "New Pact with Society" is the Forest Goal – to recover and protect 500,000 hectares of land by 2030, extending beyond our own borders. Out of these 500,000 hectares, 400,000 are devoted to protection, mainly through partnerships with protected areas via Cooperation Agreements. These include donations of goods/materials and the provision of services to support effective biodiversity conservation in these areas. No legal or regulatory aspects apply to this project as it is a voluntary initiative.

Description of outcome to date

By 2022, Vale had already helped to protect more than 115,000 hectares through signed agreements with seven public protected areas. In addition, Vale acquired its first REDD+ Carbon Credits through a partnership between Fundo Vale and Grupo Algar, thereby protecting an equivalent of 50,000 hectares of forests. Among the actions carried out throughout 2022, over 45 environmental education events were held. These were aimed at raising awareness and training visitors, residents, and communities surrounding the areas. These events saw participation from more than 17,000 people. Moreover, the protected areas received several materials and equipment to support conservation and research efforts, such as drones for aerial monitoring and Eco-Counters, advanced technology sensor equipment that measures people's access on the trails, thus generating data that can inform decision-making regarding conservation

actions. Environmental monitors were also hired to oversee the areas and support environmental education and research.

Project title

Vale and ICMBio Cooperation Agreement - Sooretama Biological Reserve

Project theme

Forest conservation

Country/Area

Brazil

Location

Outside area of influence of mining project

Primary motivation

Voluntary

Timeframe

Defined

Start year

1999

End year

2026

Description of project

The Biological Reserve of Sooretama (Rebio), covers the municipalities of Linhares, Sooretama, Jaguaré, and Vila Valério, State of Espírito Santo. Rebio, together with the Vale Natural Reserve, and two Private Reserves of Natural Heritage (RPPNs) of Suzano S/A, make up the largest forest complex in the North of Espírito Santo, totaling 50,000 hectares of Atlantic Forest of Tabuleiro. The protected area is also part of the Atlantic Forest Reserves of the Discovery Coast, housing great biodiversity, including rare and endangered species, among them the tapir (Tapirus terrestres), jaguar (Panthera onca) and tatu canastra (Priodontes maximus). For all its importance for biodiversity conservation, Vale has been supporting the protection and conservation of the Sooretama Biological Reserve for 23 years through a Cooperation Agreement signed with ICMBio, the environmental agency responsible for the protected area management. In December 2021 the Agreement was renewed again between the parties, to continue to act in support of the actions of ecosystem protection and conservation. In this scenario, the actions are developed without the direct transfer of any financial resources, and the investment is made through donations of goods/materials and the provision of service.
Legal or regulatory aspects do not apply to this project, as it is of voluntary origin.
In addition, a Vale team is responsible for the daily monitoring of the Biological Reserve of Sooretama, performing an active search for traces and hunting gear scans through

the displacement on roads and fire breaks and walks inside the forest, passing on the information obtained in the field the Environmental Police and ICMBio agents. Besides, all records obtained in the field during monitoring are inserted in the Integrated Management System of Protected Areas (SGIAP), which consists of a system approved by Vale.

Description of outcome to date

Throughout 2021, Vale made available through hiring, an Ecosystem Protection team, composed of 08 members, among Vale employees and outsourced employees. SGIAP aims to store, organize and integrate important data for the management of this area. Within this system, there is the Ecosystem Protection module where records of hunting, fire and various occurrences related to environmental crimes are inserted. This SGIAP module has been used as a tool to monitor threats to the fauna and flora of the Sooretama Biological Reserve. In addition, the Ecosystem Protection team carried out 139 educational and preventive blitzes together with the Environmental Military Police in the region around Rebio, in order to sensitize the community about the importance of its conservation. Also in this context, an integrated action was developed with the Federal Highway Police, ICMBio and the Department of Environment of Linhares/ES, in which environmental guidance and education activities were carried out with drivers who transited the highway that cuts through the protected area addressing topics such as conservation of natural resources and biodiversity of the forest, waste disposal, forest fires, wildlife trafficking and hunting. Another action developed was the Global Big Day event, where birdwatchers endeavoured to record the largest number of bird species during a field day, with 112 species recorded in the Rebio, contributing to the knowledge about the biodiversity existing in the Unit and citizen science.

Project title

Environmental Education Projects - Vale Natural Reserve

Project theme

Protected areas

Country/Area

Brazil

Location

Outside area of influence of mining project

Primary motivation

Voluntary

Timeframe

Undefined

Start year

2000

End year

Description of project

The Vale Natural Reserve opened its Public Use area in 2000 years, and since then has been working on the development of environmental education projects and actions, to bring the RNV closer to its neighbouring communities and visitors, promoting the awareness of social actors, converging to the common goal of social and environmental sustainability and biodiversity conservation. In this scenario, the projects “Atitude Ambiental” and “Eu Pesquisador” have been developed. The “Atitude Ambiental” Project aims to form information replicators for sustainable development, through presentations with videos, music, and dynamics addressing environmental issues such as water, air, biodiversity, energy, and waste, with students from elementary schools located around the Reserve. The “Eu Pesquisador” Project is developed in partnership with researchers from research and teaching institutions and aims to arouse interest in scientific knowledge about biodiversity, expanding socio-environmental awareness, with children and young people from schools located around the Vale and Biological Reserve of Sooretama Natural Reserve. The Sustainable Reserve Project aims to bring environmental themes for reflection and, possibly, possible promotion in the actions worked for the community. It is developed with its team and each year has different themes to meet the demands of the region. Also in this context, the Vale Natural Reserve promotes environmental education events, involving lectures, workshops, and dynamics, addressing topics such as environmental preservation and its biodiversity, conscious use of natural resources, health, and well-being.
Legal or regulatory aspects do not apply to this project, as it is a voluntary initiative.

Description of outcome to date

Throughout 2022, 44 environmental education events were held, among courses, workshops, and lectures, on topics such as the preservation of the environment and its biodiversity, the conscious use of natural resources, health, and well-being, fostering a change in sustainable attitudes, with the participation of more than 11,926 people. In its 11th edition, the Environmental Attitude Program received more than 170 people, among students and teachers from the municipal schools in Sooretama-ES. The project approaches concepts about water, air, biodiversity, energy, and waste, aiming to make them multipliers of good practices in the environment where they live. The "I’m the Researcher" project, in 2022, had the participation of 150 students and teachers from the Elementary School. The project was divided into five modules, with four meetings covering relevant topics about the fauna of the Vale Natural Reserve (Mammals, Invertebrates, Herpetofauna, and Birds), and the fifth closing module. In the Sustainable Reserve project, short courses were held for adults from neighbouring communities and academics. Throughout the year, more than 60 people were trained and participated in mini courses on the introduction to agroforestry systems and the production of handmade soaps, in order to contribute to income generation.

Project title

Vale Amazon BioPark

Project theme
Threatened species

Country/Area
Brazil

Location
In the area of influence of mining project

Primary motivation
Voluntary

Timeframe
Undefined

Start year
1985

End year

Description of project

Created in 1985, maintained and administered by Vale, the Vale Amazon BioPark exclusively houses native species of Amazonian fauna and flora. It is located within the Carajás National Forest, in a Federal protected area, and occupies an area of 30 forest preserved hectares, which allows the free movement of bird, agoutis and monkey species in the visitation areas, offering a unique experience of immersion in the Amazon rainforest every tour.
With free entrance and open to the public daily, the Biopark has a zoo, veterinary hospital, orchid, herbarium, collection room, auditorium, exhibition area and environmental education room. The space receives about 100,000 visitors a year.
In addition, we support several studies, research and environmental projects aimed at protecting local biodiversity, exposing, and conserving species of Amazonian fauna and flora. In addition, the park receives animals seized by government enforcement agencies. The animals received are treated, rehabilitated, and monitored by a team of specialists. The park also takes part in exchange programs between zoos, as part of species conservation actions.
Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
Approximately 243 animals are cared for on-site, distributed in more than 57 species of birds, mammals, and reptiles, including some rare or endangered, such as the hawk, macaw, jaguar, suçuarana, white-fronted spider monkey, and cuxiú monkey. In 2022 the park received more than 164,000 visitors. Among the main activities developed at the Biopark is the Reproductive Management Program for the Conservation of Endangered and Biologically Relevant Species, aimed at the captive reproduction of endangered species from the Amazon biome. Important results have already been achieved, such as the birth of baby macaws, jaguars, and harpy eagles. The space contributes to the

conservation of the species, serving as a genetic stock and training specialized professionals to work for the benefit of preserving the fauna and flora of the Amazon.

Project title

Vale Natural Reserve

Project theme

Threatened species

Country/Area

Brazil

Location

Outside area of influence of mining project

Primary motivation

Voluntary

Timeframe

Undefined

Start year

1978

End year

Description of project

Vale Natural Reserve (RNV, Portuguese acronym for Reserva Natual Vale) is one of the main protected areas maintained by Vale. It is located in Linhares, in the North region of Espírito Santo, and has approximately 23 thousand hectares that, together with the 27,000-hectare Sooretama Biological Reserve, are the largest continuous remnant of the Atlantic Forest in the Southeast tablelands of the country, especially in the Central Area of the Atlantic Forest. Acknowledged in 2008 as an Advanced Station of the Atlantic Forest Biosphere Reserve of UNESCO's Man and Biosphere Programme, it is an important area intended for conservation of flora and fauna of the biome.
This area plays an important role in the conservation of biodiversity, sheltering 3,000 plant species and 1.5 thousand insect morphospecies, 27 fish species, 56 amphibian species, 64 reptile species, 401bird species and 103 mammal species, including rare, endemic and endangered species. Playing a key role in ex situ conservation, the Reserve has an herbarium comprising more than17 thousand samples of species from the Atlantic Forest. Reinforcing this role, it has one of the largest seedling nurseries in Brazil, a reference in the cultivation of species from the Atlantic Forest, with a production capacity of up to three million seedlings/year, acting in environmental recovery projects in the State. The area also has partnerships for the development of scientific research and an area of public use that receives more than 30 thousand visitors per year.
Bringing people closer to RNV through public use activities benefits the local population

while raising awareness of the importance of conserving the rich biodiversity of the Atlantic Forest.
Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date

Vale Natural Reserve has 43 years dedicated to conservation, with more than 250 research projects developed, 117 new species of flora described, environmental education projects with researchers in partnership with the Reserve, discovery, and monitoring of new nests of the harpy eagle, a critically endangered species.
The Reserve protects about five thousand species of plants and animals from the Atlantic Forest, including more than 190 endangered species (2022 data evaluation). Preserving this unique heritage and taking care of its maintenance, reducing threats that put pressure on RNV, has been Vale's goal while maintaining the area.
In addition, it has public open areas for greater integration of communities and the general public with nature, including trails, exhibitions, an event venue.
The Reserve has a tree nursery established in the early 1970s that has since supported the restoration and reintroduction of species across a variety of projects. One of the nursery's objectives is to support the conservation of Atlantic Forest genetic heritage, with a primary focus on threatened species. These initiatives support the reintroduction of these species in their original habitats and can, in the long term, help to reestablish populations and even generate a positive change in the face of threats. In addition to forest restoration initiatives, seedlings have also been used for urban tree planting and environmental awareness campaigns. These campaigns help communities to feel they are a part of the species conservation process, which can be a first step in sparking environmental awareness. In 2021 new partnerships with conservation and research projects were signed, such as the partnership with the Marcos Daniel Institute to support the Saíra-Apunhalada (*Nemosia rourei*) Conservation Program. With an expected duration of three years, its objective is to increase knowledge and develop conservation actions for this critically endangered bird species, found only in the mountainous region of Espírito Santo.

Project title

The Private Natural Heritage Reserve (RPPN) Mata do Jambreiro

Project theme

Protected areas

Country/Area

Brazil

Location

In the area of influence of mining project

Primary motivation

Voluntary

Timeframe

Undefined

Start year

1998

End year

Description of project

The Private Natural Heritage Reserve (RPPN, Portuguese acronym for Reserva Particular do Patrimônio Natural) Mata do Jambreiro is the largest private protected area in the Metropolitan Region of Belo Horizonte, State of Minas Gerais, Brazil. Created in 1998, it covers 912 hectares of forests and rupestrian grassland in the transition between two biomes considered of global importance for conservation: Atlantic Forest and Cerrado (tropical savanna in eastern Brazil).
The work started by Vale two decades ago proves that economic development can happen in harmony with the preservation of our green areas. The ecosystem of this RPPN is home to 33 springs, 180 species of birds, 62 species of mammals and more than 100 species of plants.
Legal or regulatory aspects are not applicable to this project, as it is a voluntary initiative.

Description of outcome to date

The area protects essential ecosystem services for the surrounding communities, contributing to the climate balance in the region, preserving 33 springs and watercourses, and contributing to the formation of ecological corridors. Several research projects have registered 180 bird species, 62 mammal species, and more than 100 plant species protected in the area, including endemic and endangered species.

Project title

Lake Matano Rehabilitation Project

Project theme

Restoration (other)

Country/Area

Indonesia

Location

In the area of influence of mining project

Primary motivation

Legal requirements

Timeframe

Defined

Start year

2021

End year

2023

Description of project

Tembeuwa (Kjellbergiodendron celebicum) is a type of vegetation often found on the shores of Lake Matano and is endemic to Sulawesi, Indonesia. Previously, 1,200 tembeuwa seedlings from PT Vale's nursery facilities had been planted in Soluro, on the west shore of Lake Matano. Tembeuwa has a similar function to mangrove and can withstand abrasion, ensuring the lake water quality is maintained. Post-planting, activities will include monitoring and evaluations over the next two years.

Description of outcome to date

PT Vale together with the Government and the communities planted 1,000 tembeuwa seedlings in Muara Tapolemo, on the shores of Lake Matano, East Luwu Regency, to rehabilitate and maintain the lake ecosystem, especially on the shoreline.

Project title

Biomas Project

Project theme

Forest conservation

Country/Area

Brazil

Location

Outside area of influence of mining project

Primary motivation

Voluntary

Timeframe

Defined

Start year

2022

End year

2042

Description of project

Vale is a founding partner of Biomas, a company dedicated to the restoration and conservation of Brazil's native forests. Biomas aims to restore and protect 4 million hectares of forest in biomes such as the Amazon, Atlantic Forest, and Cerrado (tropical savanna in eastern Brazil tropical savanna in eastern Brazil), over a 20-year period. The

initial investment of US$ 3,9 million will be used to restore 2 million hectares of degraded areas by planting approximately 2 billion native trees, employing a large-scale business model. Biomas also intends to conserve and preserve another 2 million hectares. The alliance, announced in December of 2022 at COP27, seeks to reduce approximately 900 million tons of carbon dioxide equivalent emissions over the span of two decades. Vale is confident that the initiatives undertaken by Biomas will generate long-term value for our stakeholders and contribute towards a more sustainable future for everyone.

Description of outcome to date

The foundation of Biomas was launched in 2022 and aims to reduce approximately 900 million tons of carbon dioxide equivalent emissions over a two-decade period, as well as contribute to the protection of over 4,000 species of animals and plants.
As of 2023, the company will still be being structured, and because of this, we will not have concrete results.

Project title

Environmental DNA Project

Project theme

Forest conservation

Country/Area

Brazil

Location

Outside area of influence of mining project

Primary motivation

Voluntary

Timeframe

Defined

Start year

2022

End year

2027

Description of project

The Instituto Tecnológico Vale Desenvolvimento Sustentável (ITV-DS) and the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) signed a partnership to launch the Environmental DNA (eDNA), a project to develop genetic and genomic mapping of endangered and exotic fauna and flora species or that have the potential to generate income for those involved with bioeconomy projects, especially in the Amazon. The announcement was made at the UN Conference on Biodiversity, COP 15, in

Montreal, Canada.
With investments of R$ 111 million over the next five years, Environmental DNA will carry out its research in Federal protected area under the responsibility of ICMBio throughout the country. Species that have already had their genome sequenced by ITV-DS, such as the harpy eagle (*Harpia harpyja*) and the jaguar (*Panthera onca*), will be part of the project. The Institute is a reference in studies of molecular analysis of biodiversity. In five years, it produced 12,000 genetic markers of the fauna and flora of Amazon Forest.
The partnership between the two institutes will make it possible to use techniques for molecular studies involving genetic or genomic analyses, which will generate important information for monitoring environmental quality. The refinement of available data will contribute to the conservation of species and increased productivity in bioeconomy projects.
Using the revolutionary technique of analysis of eDNA, biologists identified around 1,106 plant species, almost six times more than the previous survey, which identified only 200 species. eDNA analysis is performed by computers and artificial intelligence systems, which makes the process faster and more accurate, reducing the need for observations and sample collections in the field.
It is worth noting that this opportunity is not related to any specific mining projects. However, its promotion and activities take place within Brazilian territory, which is why there is a connection between this initiative and mining projects in Brazil. It operates independently of these projects, and being a recent partnership, there are no measurable results to report at this time.

Description of outcome to date

The Environmental DNA (eDNA) project, a collaboration between the Vale Technological Institute for Sustainable Development (ITV-DS) and the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), is currently in its structuring phase. It is anticipated that the initial results of this initiative will begin to be released towards the end of 2023, at which point the preliminary data from the research will be available for analysis and dissemination. This collaboration promises to be a ground-breaking effort in the conservation of biodiversity, and the scientific community, as well as the general public, eagerly await the insights that will emerge from this research.

F-MM14.7/F-CO14.7

(F-MM14.7/F-CO14.7) Do your mining projects have closure plans in place?

	Are there closure plans in place?	Comment
Row 1	Yes	The process of planning for asset closure should occur simultaneously with operations to minimize risks and maximize opportunities, thus generating value for the territories. Currently, we operate on an annual cycle to plan and execute the progressive closure of assets while studying the aptitudes and potential of our territories. All projects in the mining title application phase, or those already granted but not initiated by Vale, have closure plans. Provisions totalling

		approximately US$ 3,466 million have been made. These plans align with the best practices adopted by the ICMM and national legislation.

F-MM14.7a/F-CO14.7a

(F-MM14.7a/F-CO14.7a) Please provide details on mines with closure plans.

Row 1

Percentage of mines with closure plans

100

Percentage of closure plans that take biodiversity aspects into consideration

100

Is there a financial provision for mine closure expenditure?

Yes, for all mines

Frequency closure plans are reviewed

Occasionally (all projects)

Please explain

The guidelines for asset decommissioning and mine closure incorporate good corporate practices and procedures, which include the establishment of provisions for asset decommissioning. This is in accordance with the guidelines of both the Brazilian Securities and Exchange Commission (CVM) and the U.S. Securities and Exchange Commission (SEC), complying with IAS 37 and the Sarbanes-Oxley Act, and is implemented throughout the project's life cycle. The future use of each unit is determined in the Mine Closure Plan, taking into account environmental, social, and economic aspects, in accordance with specific operational procedures. Every Vale operation has a Mine Closure Plan.
A provision is set aside for the anticipated costs of mine closures and deactivating related mining assets. In 2022, due to changes in discount rates and updates to the mine closure plans, which take into account new legal requirements related to decommissioning, the provision stood at US$ 3.466 billion.
Regarding Closure Plans, they are prognostic and conceptual during the implementation and early stages of an operational unit. As operations continue and the closure timeline is defined, studies and designs develop into more detailed stages.
Thus, as the project progresses through its lifecycle, varying degrees of knowledge and control become available, reducing risks and uncertainties related to Mine Closure. This process details future usage vocations and contributes to the value chain. In addition, all closure plans undergo a routine update every five years.

F-MM14.8/F-CO14.8

(F-MM14.8/F-CO14.8) Can you disclose the area rehabilitated (in total and in the reporting year) for each of your mining projects?

	Disclosing area rehabilitated (in total and in the reporting year)?	Comment
Row 1	Yes	n.a.

F-MM14.8a/F-CO14.8a

(F-MM14.8a/F-CO14.8a) Provide details on the area rehabilitated (total/reporting year) for each of your mining projects, including post-mining land use.

Mining project ID

Project 1

Total area rehabilitated (hectares)

1,669.19

Area rehabilitated in the reporting year (hectares)

182.4

Describe post-mining land use

Due to the insertion of a large part of the project (excavations, piles of waste, and sediment containment dikes) in the Flona de Carajás, the future use of environmental conservation was considered for these areas. The areas of the pits, waste piles, and sediment containment dikes should be subjected to rehabilitation aiming at integration with the local environment based on measures that will initially be developed within the scope of the Degraded Area Recovery Plan.

For the areas of the project located outside of Flona, such as the processing plant and part of the administrative structures, agrosilvo-pastoral use is proposed as the current land use.

It is indicated that in future revisions/updates of the conceptual closure plan, a study of alternatives for future, more in-depth use will be carried out. This study should also consider stakeholders ‘s expectations (surrounding communities, environmental agencies) about the end of the area.

The proposed future use necessitates that the industrial areas will be dismantled and removed, and the remaining space will be rehabilitated. Some structures may remain if they do not represent environmental risks. However, as the definition of the remaining structures will only be carried out at a time close to the closure of the mine, in this conceptual closure plan, it was considered that all administrative structures would be removed.

Finally, the total rehabilitated area was calculated from the reporting of the last seven years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary restoration.

Mining project ID

Project 2

Total area rehabilitated (hectares)

11,678.47

Area rehabilitated in the reporting year (hectares)

67.31

Describe post-mining land use

Itabira is Vale's birthplace, where was founded in 1942. To responsibly and sustainably wind down operations in the area, Vale is beginning a gradual closure process and transitioning to post-mining activities.
The total rehabilitated area was calculated from the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation. The directorate makes these reports,
the figures presented here cover the Mariana, Itabira, and Brucutu/Agua Limpa complexes and represent the rehabilitated area in hectares.
To improve environmental quality and meet the conditions, Vale carries out rehabilitation actions in degraded areas in the Mining Complex of Itabira to make these areas suitable for new uses in conditions of environmental balance. For the rehabilitation to occur, agronomic techniques and practices are used that promote the vegetation cover, aiming at restoring and stabilizing the relief and improving the productive potential.
In addition to planting techniques for rehabilitating degraded areas, these were also used in implementing the physical barriers and tree curtains in the Mining Complex of Itabira. These green belts have several environmental functions, such as:
- Protecting the area of the enterprise by blocking the access of people in risk areas;
-Softening the visual impact of the landscape and noise on the surrounding communities, and;
- Reducing the spread of dust and wind to the city and public roads.
The rehabilitation of degraded areas and the installation and maintenance of the green curtain sought to meet the conditions stipulated by the environmental agency.
The Environmental Mine Closure Plan, which will contemplate the future use of the rehabilitated area, will be presented by Vale to the competent bodies, as determined by DN No. 127/2008 in its article 5: "At least two years before the closure of the mine, the entrepreneur must file the Environmental Mine Closure Plan at the unit of the environmental agency responsible for licensing the project.

Mining project ID

Project 3

Total area rehabilitated (hectares)

1,774.59

Area rehabilitated in the reporting year (hectares)

163.43

Describe post-mining land use

The Environmental Rehabilitation services are a crucial stage of Vale's Environmental Rehabilitation Program, which includes approved rehabilitation plans from the environmental licensing processes of its projects. The planning process involves identifying stable surfaces with proper drainage for re-vegetation. The rehabilitation planning aligns with the company's internal normative standard to promote re-vegetation in all areas cleared by mining activities, including land structures unchanged for six months or more. Environmental rehabilitation services are performed by contracted and specialized companies with technically qualified professionals. The execution methods are communicated to the contractors through technical recommendations and specifications, including the required quantities of seeds, fertilizers, and corrective measures for planting.

The rehabilitation process consists of sowing forages, planting tree species, and reintroducing plants rescued from the native flora. The total rehabilitated area is calculated based on the reporting of the past 5-6 years, specifically related to the GRI indicator MM1. In this report, the Mariana, Itabira, and Brucutu/Agua Limpa complexes are considered together, representing the rehabilitated area in hectares.

Similarly, the area rehabilitated in the reporting year corresponds to the data reported for the GRI indicator MM1, specifically referring to permanent and temporary rehabilitation in the Mariana Complex.

Mining project ID

Project 4

Total area rehabilitated (hectares)

2,865.5

Area rehabilitated in the reporting year (hectares)

119.87

Describe post-mining land use

The total area rehabilitated over the past six years has been calculated based on the GRI indicator MM1, which includes both permanent and temporary rehabilitation of mined areas. The reported area corresponds to the same indicator and encompasses both permanent and temporary rehabilitation. These reports are compiled by the directorate, and the figures presented here represent the combined rehabilitated area in hectares for the Paraopeba and Vargem Grande complexes.

The actions undertaken to rehabilitate degraded areas, which have resulted in these figures, encompass efforts to restore physical stability in temporary rehabilitation areas as well as permanent actions aimed at reestablishing the physical, chemical, and biological conditions necessary for habitat recovery. The main objective of permanent rehabilitation is to reintegrate these habitats into the natural landscape, allowing them to regain their primary ecological functions.

The restoration of degraded areas is an inherent process in mining operations and is planned by Vale throughout the various stages of its ventures, from initial planning and ongoing operations to the eventual closure of activities.

Mining project ID

Project 5

Total area rehabilitated (hectares)

2,806.43

Area rehabilitated in the reporting year (hectares)

60.80

Describe post-mining land use

The total area rehabilitated over the past six years has been calculated based on the reporting of GRI indicator MM1, which includes both permanent and temporary rehabilitation of mined areas. The reported area rehabilitated in the current year corresponds to the same indicator and encompasses both permanent and temporary rehabilitation. These reports are compiled by the directorate, and the figures presented here represent the combined rehabilitated area in hectares for the Paraopebas and Vargem Grande complexes.

The actions undertaken to rehabilitate degraded areas, which resulted in these figures, include efforts to restore physical stability in temporary rehabilitation areas and implement permanent measures to reestablish physical, chemical, and biological conditions. The objective of permanently rehabilitating these areas is to reintegrate them into the natural landscape, allowing for the reestablishment of their primary ecological functions.

The recovery of degraded areas is an integral part of mining activities and is planned by Vale across various phases of its operations, from initial planning to ongoing operations and ultimately the closure of activities.

Mining project ID

Project 6

Total area rehabilitated (hectares)

1,647.64

Area rehabilitated in the reporting year (hectares)

36.48

Describe post-mining land use

Alternatives for the future use of the area will be presented in accordance with the Normative Deliberation of State Council for Environmental Policy (in Portuguese, Conselho Estadual de Política Ambiental - COPAM) No. 127/2008, at least two years before the deactivation of the enterprise. These alternatives will be reported in the Mine Closure Plan.

It should be noted that, due to possible changes in legislation and/or in the estimated useful life of the project, the referred plan may be anticipated or extended. However, Vale has been carrying out environmental rehabilitation actions in its mining projects, as

the company believes that the execution of environmental rehabilitation works concurrently with the operation of the project contributes to the complex process of closing the mine. Since taking over the operation of the Brucutu Mine in 1994, Vale has been carrying out environmental rehabilitation work in its areas, from the moment they are released by the operation. The environmental rehabilitation actions of the Brucutu mine pit are aimed at stabilizing the banks of the Waste Rock Pile and minimizing the carrying of sediments. The finished banks have been stabilized, reconfigured and restored. As the banks are finalized and stabilized, the process of environmental rehabilitation of the pile takes place through the revegetation procedures of these banks. At the end of the disposition in a given bank, erosions and irregularities are reconfigured; liming is carried out by incorporating dolomitic limestone into the soil and then digging holes over the entire surface, which provides the soil with sufficient roughness
to allow the fixation of agricultural inputs. After digging, the input cocktail is prepared, consisting of fertilizers and grass and legume seeds, to be applied in the area.
The total rehabilitated area has been calculated based on the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation. These reports are made by directorate, and the figures presented here refer to the Mariana, Itabira and Brucutu/Agua Limpa complexes together, representing the rehabilitated area in hectares.

Mining project ID

Project 7

Total area rehabilitated (hectares)

3,542.32

Area rehabilitated in the reporting year (hectares)

293.22

Describe post-mining land use

The project brings the concept of land rehabilitation and reclamation simultaneously to the opening of new areas as the mining areas are cleared. The stages of land rehabilitation in the post-mining area include land surface arrangement/formation with standard slope rehabilitation terrain, topsoil restoration using collected topsoil, erosion control, drainage construction, revegetation road construction, reforestation, plant maintenance - including weed clearing, pest control, manipulation of stunted plant roots, and fertilization - until they can grow naturally in a sustainable manner.
PT Vale has a post-mining plan and biodiversity management for 100% of mining operation areas in the Sorowako block to conserve biodiversity.
PT Vale aims to restore 15,000 hectares of land to become forest by 2025 through Vale's post-mining rehabilitation activities, as well as the rehabilitation of critical land and watersheds.
By the end of 2022, the accumulated land area rehabilitated was 3,544.54 hectares,

which included 295.43 hectares of land rehabilitated during 2022. In addition, PT Vale will plant another 425 hectares in 2023. For the remainder, we are targeting more than 10,000 ha of land for reclamation and rehabilitation by 2024.

F15 Engagement

F-MM15.1/F-CO15.1

(F-MM15.1/F-CO15.1) Do you participate in or endorse any of the following global initiatives?

	Participate or endorse?	Comment
Extractive Industries Transparency Initiative	Yes	Vale participates in the Extractive Industries Transparency Initiative (EITI), as well as other sector entities such as the International Council on Mining and Metals (ICMM).
UN Global Compact	No	Vale is committed to the UN Global Compact. Vale was a member of the UN Global Compact since 2007 and part of the LEAD group between 2011 and 2018. Due to the tragedy of the Brumadinho tailings dam rupture, out of respect for the institution and its members, Vale requested to be delisted in May 2019. Since then, Vale has committed to the full reparation of the impacts caused and focused on stepping up its governance, sustainability commitments, operational excellence (operational risks and asset management), and health & safety, amongst others. The company has diligently implemented the 10 UN Global Compact Principles and engaged with the Global Compact secretariat annually.
Natural Capital Coalition	No	Vale does not participate directly in the Natural Capital Coalition but participates in discussions from the CEBDS Technical Biodiversity Chamber, which is a member and representative of the coalition in Brazil.
Business and Biodiversity Pledge	Yes	Vale is a member of the Brazilian Business Council for Sustainable Development (CEBDS) and actively participates in the Biodiversity Technical Chamber. In 2020, it joined the Brazilian Business Commitment to Biodiversity 2030 launched by CEBDS. Vale is committed to goals addressing the pillars of the impact mitigation hierarchy and is devoted to generating and sharing knowledge on biodiversity, integrating this topic into its business strategy, and promoting and strengthening best practices for the rational use of biodiversity resources. Additionally, Vale is involved in the Business Movement for the Amazon and, in 2021, signed the Business Sector Positioning on

		the Amazon. This was a result of a partnership between CEBDS and Initiative A Concert for the Amazon, supporting six pillars aimed at combating illegal deforestation and fostering an inclusive and regenerative economy. Vale has also signed the Business for Nature Call to Action. Business for Nature is a global coalition of influential organizations and forward-thinking businesses. The Call to Action represents a commitment by businesses to work towards preserving nature. It utilizes the collective voice of the business community to urge governments to implement policies aimed at reversing nature loss within this decade. In October 2022, Vale, along with 300 other global companies from over 50 countries, joined a campaign coordinated by Business for Nature (BfN) to support Target 15 of the Global Biodiversity Framework of the Convention on Biological Diversity, which was discussed and agreed upon at COP15. The campaign aimed to encourage governments to enhance transparency and mandate the reporting of impacts and dependencies of large companies' and financial institutions' activities on natural resources use and the consequent loss of biodiversity.
New York Declaration on Forests	No	n.a.

F-MM15.2/F-CO15.2

(F-MM15.2/F-CO15.2) Do you participate in or support industry-led and/or standards-setting initiatives and organizations promoting sustainability in the mining sector?

	Participating or supporting industry-led and/or standards-setting initiatives?	Comment
Row 1	Yes	Vale is committed to integrating sustainability into its business by building a strong and positive economic, social, and environmental legacy and mitigating the impacts of its operations. Therefore, we seek to build strong and lasting relationships with our stakeholders, invest in mitigating the effects of our activities, work with high ethical standards, have transparent management, and actively contribute to advances related to the environment, biodiversity, and sustainable development. We associate with various entities and associations reinforcing our commitments to sustainability and society, focusing on best practices for sustainable mining.

F-MM15.2a/F-CO15.2a

(F-MM15.2a/F-CO15.2a) Indicate the initiatives and/or organizations you took part in or supported during the reporting year.

Activities	Initiatives	Comment
Industry-led mining sustainability initiative/organization	ICMM Towards Sustainable Mining - TSM (Mining Association of Canada) Other industry-led initiative, please specify IGF, IMA, AFMA, IBRAM	Vale is a member of the International Council on Mining and Metals - ICMM. The ICMM members recognize that they have a responsibility to promote and support sustainable development wherever they work. As a member of the ICMM, Vale is expected to implement the ICMM's Mining Principles and Performance Expectations as a condition of membership. We support and endorse these, and the ICMM's efforts at the international level to enhance the sustainable mine and transparency. Vale is actively engaged in the ICMM Nature Working Group. Vale is an active member of the Mining Association of Canada (MAC) and a voluntary participant in the association's initiative called Towards Sustainable Mining (TSM). This initiative aims to improve the industry's performance by aligning its actions with the priorities and values of Canadians. TSM provides a way of finding common ground with communities of interest to build a better mining industry, today and in the future. TSM is based on a set of guiding principles that are, in turn, supported by performance elements and indicators. Vale is also a member of IBRAM (Brazilian Mining Institute) which represents the companies and institutions that operate in the mineral sector in search of establishing a favourable environment for business, competitiveness, and sustainable development. In addition, The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) is a voluntary initiative supporting more than

		75 nations committed to leveraging mining for sustainable development to ensure negative impacts are limited and financial benefits are shared. The Indonesian Mining Association is a non-governmental, non-political, non-profit organization established by the laws of the Republic of Indonesia. The headquarters and registered office of the association shall be situated within Jakarta. The association serves as a link between government and the mining industry, organizing lectures, seminars, and training activities for the members, organizing a periodic conference on mining in Indonesia, publishing proceedings and mining information, and representing the Indonesian mining industry at national and international meetings. IMA is a founding member of the Asean Federation of Mining Association (AFMA) and currently provides the secretariat for the Federation (see more in 2022 Integrated Report, p. 80).
Standard-setting initiative/organization	Other standard-setting initiative, please specify World Business Council for Sustainable Development (WBCSD); Brazilian Business Council for Sustainable Development (CEBDS); Task Force on Climate-related Financial Disclosure (TCFD), Taskforce on Nature-related Financial Disclosures (TNFD).	Vale is a member of the World Business Council for Sustainable Development (WBCSD), a global organization comprising more than 200 leading companies working collaboratively to expedite the transition to a sustainable world. As a member, Vale adheres to the principles and approaches proposed by the Council to advocate for sustainable business practices and a sustainable future. These principles, aligned with the Sustainable Development Goals (SDGs), are addressed in various work programs focused on the Circular Economy, Cities & Mobility, Climate & Energy, Food, Nature, and People. Vale is an active participant in the Nature Working Group. Vale is also a member of the Brazilian Business Council for Sustainable Development (CEBDS), the WBCSD's affiliate in Brazil. Vale actively engages in

		the Biodiversity Technical Chamber and, since 2020, has participated in the Brazilian Business Commitment to Biodiversity 2030, an initiative launched by the Council. In 2017, Vale adopted the recommendations of the Task Force on Climate-related Financial Disclosure (TCFD). Led by the Financial Stability Board, the TCFD provides guidelines for companies and financial institutions to report financial risks related to climate change. Vale became a member of the TNFD Forum in 2022 and joined the TNFD's Pilot Program Partners, led by ICMM, and the Brazilian Advisory Group, led by CEBDS. These affiliations aim to support recommendations based on sector and geographical location. Vale has completed a desktop review pilot and is currently developing a more in-depth pilot using the Locate, Evaluate, Assess and Prepare (LEAP) approach.

F-MM15.3/F-CO15.3

(F-MM15.3/F-CO15.3) Do you collaborate or engage in partnerships with non-governmental organizations to promote the implementation of your biodiversity-related goals and commitments?

	Collaborating or partnering with non-governmental organizations?	Comment
Row 1	Yes	Vale's ambition is to promote sustainable mining and to become a global reference in practices that minimise negative impacts and maximize positive results for nature and people. Vale cannot achieve this alone; partnerships are essential to collectively shape the future we want for mining and nature. Keeping this in mind, we have established partnerships with various organizations to improve our management, leverage innovative actions, and support us in achieving the goals of the 2030 Agenda, including our Forest Goal. The Vale Fund is spearheading the implementation of our Forest Goal, with support from the Vale Natural Reserve and the Vale Institute of Technology. The Vale Fund's mission is to promote solutions that have positive social and environmental impacts, and

		that strengthen a sustainable, fair, and inclusive economy. It works closely with organizations and businesses across different territories to maintain standing forests while promoting development and strengthening businesses. Partnerships established by the Fund with various NGOs contribute to achieving strategic goals and expected results. Some examples are presented below, with a notable highlight being the Acceleration Program, in partnership with the CERTI Foundation. The Vale Natural Reserve undertakes various projects related to the conservation and management of protected areas and endangered species, in partnership with different institutions. The Vale Institute of Technology (ITV-DS) establishes multi-sector partnerships that mobilize and maintain knowledge, expertise, technology, and financial resources for research development. Examples of these partnerships will be presented below.

F-MM15.3a/F-CO15.3a

(F-MM15.3a/F-CO15.3a) Provide details on main collaborations and/or partnerships with non-governmental organizations that were active during the reporting year.

Organization

AMDA - Associação Mineira de Defesa do Ambiente

Scope of collaboration

Specific mining project(s)

Mining project ID

Project 2
Project 3
Project 4
Project 5
Project 6

Areas of collaborations

Other, please specify

Fire prevention and combat

Describe the nature of the collaboration

One of the greatest threats to the protection of biodiversity in the region that encompasses municipalities located in the Quadrilátero Ferrífero Region is forest fires that, annually, degrade extensive areas of natural vegetation in the dry months. The forest types in the valley and slopes are certainly the most impacted due to the lower resilience of their species than those of rural and savanna formations. In the stretches where the fires were more severe, the forest vegetation was fragmented, leaving isolated capons with highly negative consequences for the function of ecological corridors and fauna recolonization.

Due to their operational characteristics, the Brigades Amda/Sindiextra/Vale play a crucial role in protecting the area's biodiversity. They are directly involved in combatting forest fires and work to prevent and mitigate the damage caused by these events. Their efforts are essential for the conservation of biodiversity in the region.
In addition, in 2022, more than 35,000 personal protective equipment and other materials were donated by our company as part of the actions to prevent and fight fires, provided for in the term signed with the State Institute of Forests (IEF). Totalling 118 forest brigades benefited and US$ 1,3 million in investments.
For example, in Southeast Corridor (Mariana, Itabira, Brucutu/Água Limpa), in 2022 were made the following actions were:
- Rounds and preventive monitoring of areas;
- Participation in forest fire fighting simulation;
- Environmental Education Activities;
- Updating of Vale's fire watches .
Furthermore, in 2022, the Brigades AMDA/Vale acted in combating 214 occurrences of fire, which reached an area of 4,210.7688 hectares.

Duration (until)

2021-2025

Organization

COEX - (Carajás National Forest Extractive Cooperative)

Scope of collaboration

Specific mining project(s)

Mining project ID

Project 1

Areas of collaborations

Protected areas
Endangered species
Restoration

Describe the nature of the collaboration

Vale's partnership with the Carajás National Forest Extractive Cooperative (in Portuguese Cooperativa de Extrativistas de Carajás - COEX) has resulted in the direct purchase of native plant seeds for use in seedling development, area recovery, and species conservation. This purchase mechanism generates income for local communities during months when collecting jaborandi leaves is impossible. The partnership is also vital for species diversity and the preservation of endangered species.
Sustainable collection techniques have been adopted to mitigate the risks that extractive activities pose to the conservation of jaborandi (*Pilocarpus microphyllus*). One of the main techniques is pruning plants instead of uprooting them, as used to happen. The collectors received training and learned to handle it correctly.

And this partnership is not limited to COEX but also involves an environmental governmental agency (ICMBio), the Federal Rural University of the Amazon, and ITV-DS, thus composing the Jaborandi Project. Therefore, research is carried out to produce knowledge about the plant's ecosystem, and the leaf collectors themselves become allies of the project and guardians of the species. Therefore, it will be possible to conserve the species and its sustainable use.
In the last six years, more than 22 tons of seeds of 120 different species were collected, which generated about US$ 598 thousand in income for the families. In 2022 alone, more than 4,500 kg of seeds were purchased. With this, more than 200,000 seedlings are produced yearly and planted in compensation and restoration areas. Among the sources collected are mahogany, mimosa, açaí, Brazil nut, and jaborandi.

Duration (until)

2021-2025

Organization

IDESAM – (Instituto de Conservação e Desenvolvimento Sustentável da Amazônia) – Amaz Impact Business Accelerator

Scope of collaboration

Company-wide

Mining project ID

Areas of collaborations

Other, please specify

Acceleration of socio environmental impact businesses in the Amazon.

Describe the nature of the collaboration

Amaz is a startup accelerator created by Idesam (Instituto de Conservação e Desenvolvimento Sustentável da Amazônia) to support entrepreneurs working in the Amazon region, and building on the success of the Acceleration and Investment Program of the Partners for the Amazon Platform, which accelerated 30 startups and was recognized as the top acceleration program in northern Brazil.
In 2022, the Vale Fund promoted the second cycle of AMAZ Impact Accelerator, which aims to invest, accelerate and drive disruptive impact businesses that seek permanent solutions to reduce deforestation and promote forest conservation in the Amazon, with the involvement of local populations. AMAZ will invest US$ 4,9 million and guarantee the management and monitoring of these businesses for the next 10 years. In this way, AMAZ plans to catalyse social and environmental impact businesses, build capacity, and provide and unlock financial capital to strengthen the Amazon bioeconomy.
In addition, the Vale Fund sponsored several events that reaffirmed its performance in the social ecosystem, to act in territories where there are opportunities to fulfil its mission (to drive positive social and environmental impact solutions that strengthen a sustainable, fair, and inclusive economy), with special attention to the Amazon Region.

One of them was the 2nd Festival of Sustainable Business and Investment in the Amazon (FIINSA, In Portuguese acronym for Festival de Investimentos e Negócios Sustentáveis da Amazônia); the Festival aims to consolidate the event as a meeting point for impact investments and sustainable business development in the Amazon. Another sponsorship for Idesam was “Chamada Elos da Amazônia 2022” - Forest Restoration Edition, this edition - the third - aimed at finding and recognizing solutions for forest restoration, focused on the Brazil nut and vegetable oil chains in the first half of 2022, and the açaí chain in its first edition. More than 130 applications were received from 50 cities all over Brazil. The proposals submitted ranged from theoretical models to prototypes of technologies or even in the market validation phase.

Duration (until)

>2030

Organization

Sustainable Connections Institute (Conexsus) – Impact Finance: unlocking the socio-bioeconomy that generates income and conserves biomes

Scope of collaboration

Company-wide

Mining project ID

Areas of collaborations

Other, please specify

Technical assistance and support for the financial structuring of community businesses (associations and cooperatives) in the Amazon region.

Describe the nature of the collaboration

In this project, Conexsus will address the main gaps that prevent the development of the socio-bioeconomy: 1) the lack of a mature support system that helps community businesses to develop (incubators, accelerators, and other intermediaries), 2) the absence of financial mechanisms associated with development approaches suited to the stage of maturity of impact businesses, especially community ones, 3) the lack of correct incentives that led rural credit to finance almost exclusively livestock and grain production, and 4) the deficiency in the adoption of technologies that improve competitiveness in these value chains. The interventions proposed will enable fundamental changes by 2025 for the following reasons: a) post-covid economic recovery needs to reinforce the interruption of native vegetation conversion through the expansion of an inclusive low-carbon bioeconomy, b) the acceleration of sustainable land use must take place in the next three years to generate tangible benefits by 2030 in terms of climate and emissions, and c) Markets are looking for opportunities and community enterprises still fall short of the minimum requirement to participate in value chains. The main goal is to consolidate financing mechanisms that are perennial and profitable, offering scalable solutions for investors, buyers, and community businesses

with socio-environmental impact, which allow the development of socio-bioeconomy in the Amazon and Brazil.

Duration (until)

2021-2025

Organization

Imazon (Instituto do Homem e Meio Ambiente da Amazônia) – Previsia.

Scope of collaboration

Company-wide

Mining project ID

Areas of collaborations

Deforestation and /or forest degradation

Describe the nature of the collaboration

An innovative artificial intelligence tool has been developed to analyse diverse data sources, including topography, land cover, urban infrastructure, official and unofficial roads, and socioeconomic data, to predict deforestation in the Brazilian Legal Amazon. This tool identifies areas at risk of deforestation in the next 12 months.
Facing complex issues such as deforestation in the Amazon demands coordinated and synergistic, multisectoral, multi-institutional actions involving actors from different geographic scales, such as those successfully implemented up to 2012, within the scope of the Action Plan for Prevention and Control Deforestation in the Legal Amazon (PPCDAm), also highlighting, in Pará, the actions of the Green Municipalities Program (PMV, Portuguese acronym for Programa Municípios Verdes -).
Imazon actively supported both programs, which are still in place, but weakened by a series of measures that made environmental and land regulatory frameworks more flexible, reduced the budgets of research/monitoring/inspection bodies, among others that favoured impunity and, consequently, the escalation of illegal and predatory activities in the region.
In 2022, the focus was on strengthening the actions of the Public Prosecution Service of the State of Pará and environmental agencies in preventing and combating illegal deforestation and encouraging sustainable practices, subsidizing them in the use of information and technologies from the PrevisIA platform, an innovative platform that uses artificial intelligence to indicate areas under deforestation risk in the Amazon, and Imazon's Deforestation Alert System , as well as making strategic information available to the private sector and civil society in support actions to combat deforestation.

Duration (until)

2021-2025

Organization

Certi Foundation – Jornada Amazônia's Bioeconomy Business Innovation Platform.

Scope of collaboration

Company-wide

Mining project ID

Areas of collaborations

Other, please specify

Economic competitiveness of the forest standing through biodiversity and innovation.

Describe the nature of the collaboration

This Initiative intends to create and scale a comprehensive bioeconomy business innovation platform in the Amazon, based on the previous experience of Jornada Amazônia - an initiative to promote the entrepreneurial ecosystem within the Amazon region. The project understands that innovative startups within the intermediate links of production chains have the potential to diversify demands, reduce dependencies, can overcome challenges of scale and logistics, and promote competitiveness for the conserved forest in a systemic and geographically distributed process, adding value locally and connecting with global chains. In this context,
actively connecting the chain’s base with innovative startups can diversify demand and generate new business opportunities for local communities. Also, reducing the risk and vulnerability caused by the dependency on fewer customers or intermediaries. The value distribution will reach the forest through fair, productive inclusion in diversified innovative chains promoted by startups and conservation constraints for integration into business opportunities. The focus will be driven by demand from industry segments (B2B market) with more significant potential for forest regenerative and conservative practices.

Duration (until)

2021-2025

Organization

Chico Mendes Institute for Biodiversity Conservation - ICMBio

Scope of collaboration

Specific mining project(s)

Mining project ID

Project 1

Areas of collaborations

Protected areas
Endangered species

Describe the nature of the collaboration

Molecular techniques such as the use of environmental DNA (eDNA) and the generation of specific genetic or genomic markers for the species of interest are a great advance for the knowledge and conservation of biodiversity. Among the competences of ICMBio are to promote, coordinate and carry out scientific research programs applied to biodiversity conservation. Thus, initiatives are needed to train its servers in sample collection techniques, definition of protocols and execution of projects using molecular techniques, in addition to the development of projects aimed at the application of such techniques for conservation. Instituto Tecnológico Vale Desenvolvimento Sustentável (ITV-DS) 's partnership with ICMBio, through the Molecular Research as a Tool for Biodiversity Conservation project, it is an opportunity to support ICMBio's strategic initiatives, establishing an important forum for dialogue with the main regulatory agent of federal protected areas in the country and manager for the national biodiversity conservation policy.

Duration (until)

2026-2030

Organization

Indonesia Business Council for Sustainable Development (IBCSD)

Scope of collaboration

Specific mining project(s)

Mining project ID

Project 7

Areas of collaborations

Protected areas
Endangered species
Restoration

Describe the nature of the collaboration

Vale collaborates with the Indonesia Business Council for Sustainable Development (IBCSD) in compiling the Guide for Sustainable Biodiversity Management. The document, released in 2017, becomes the first in the Indonesian mining business for biodiversity conservation activities. This project will encourage mining companies to implement best practices to manage biodiversity in the site of the mining area.

Duration (until)

2021-2025

Organization
Museu Paraense Emílio Goeldi (MPEG)

Scope of collaboration
Specific mining project(s)

Mining project ID
Project 1

Areas of collaborations
Biodiversity Action Plans
Protected areas
Endangered species

Describe the nature of the collaboration
Partnership established within the scope of the Herpetofauna project, whose scope is to expand knowledge of the herpetofauna of the south-eastern region of Pará, more specifically, in the surroundings of the mosaic of protected areas of Serra dos Carajás through the generation of genetic and taxonomic knowledge about amphibians and Squamata reptiles (snakes, lizards and amphisbaenians) and making information available in public databases, filling knowledge gaps that can support biodiversity conservation actions. The expertise of MPEG herpetofauna taxonomists is essential for the correct identification of specimens of amphibians and Squamates reptiles collected during the project, and conduction of studies in systematics and taxonomy, in addition to establishing standardized and adequate collection protocols for comparison of areas sampled.

Duration (until)

2021-2025

Organization
The Rockefeller University

Scope of collaboration
Specific mining project(s)

Mining project ID
Project 1

Areas of collaborations
Protected areas

Describe the nature of the collaboration
The partnership with Rockefeller University also started the Amazoomics project, which produced high-quality genomes for 29 endangered species of Brazilian fauna. Genomic information is currently an important knowledge base for understanding physiology and genetics, these data are also essential for studies on the evolution of species of

Brazilian biodiversity. As the project evolves into the Molecular Research as a Tool in Biodiversity Conservation project, the partnership will contribute to genome studies of emblematic species of birds and mammals to facilitate future fine-scale genomic assessments and thus help to identify possible biotechnological applications that can involve the development of patents, in addition to generating baseline information, focusing on the threatened biodiversity of the Amazon. This partnership will also strengthen the role of BioPark Vale Amazonia and Botanical Parks as an important research and education centres concerned with the conservation of Amazonian biodiversity.

Duration (until)

2026-2030

Organization

The Marcos Daniel Institute is a private non-profit association qualified as Civil Society Organization of Public Interest in Vitória, Espírito Santo, Brazil. IMD's activities focus on developing biodiversity conservation projects and forming multipliers for nature conservation.

Scope of collaboration

Company-wide

Mining project ID

Areas of collaborations

Biodiversity Action Plans
Protected areas
Endangered species
Restoration

Describe the nature of the collaboration

Vale provides technical support to the cherry-throated tanager (*Nemosia rourei*) Conservation Program through a cooperation agreement. Vale is lending its experts from the Vale Natural Reserve to conduct floristic surveys, evaluate reports on the recovery of degraded areas, monitor the ecology of the species, and search for nests, which contributes to the imminent understanding of biology, needs, and threats to the stabbing in the Atlantic Forest, to prevent its extinction and ensure its long-term survival. These activities align with objectives of the action plan for conserving *Nemosia rourei*, in which Vale contributed to the discussions during the workshop for its construction.

Duration (until)

2021-2025

Organization

Hasanuddin University

Scope of collaboration

Specific mining project(s)

Mining project ID

Project 7

Areas of collaborations

Deforestation and /or forest degradation
Biodiversity Action Plans
Protected areas
Endangered species
Restoration

Describe the nature of the collaboration

In early January 2023, PT Vale Indonesia signed a Memorandum of Understanding (MoU) with Hasanuddin University, continuing the partnership, and the scope of this MoU includes:
1. Human Resources capacity building program.
2. Study and research programs in agriculture, forestry, engineering, environmental and biodiversity conservation, protection, etc.
3. Community development and service programs.
4. Independent Campus Learning Program (MBKM).
The partnership between PT. Vale and Hasanuddin University were carried out to update the Biodiversity Baseline in the Contract of the Work area of PT. Vale with the scope of activities:
1. Information Monitoring on the Diversity of Flora, Fauna, and Their Genetics.
2. Development of a Biodiversity Database System.
3. Training and Assistance for Monitoring Biodiversity
Post Mining Habitat Assessment.

Duration (until)

2021-2025

F-MM15.5/F-CO15.5

(F-MM15.5/F-CO15.5) Do you engage with other stakeholders to further the implementation of your policies concerning biodiversity?

Yes

F-MM15.5a/F-CO15.5a

(F-MM15.5a/F-CO15.5a) Provide relevant examples of other biodiversity-related engagement activities that happened during the reporting year.

Activities

Funding research organizations

Mining project ID

Project 2
Project 3
Project 4
Project 5
Project 6

Please explain

During 2022, the project for Research and Conservation of Species of Interest for the Conservation of the Quadrilátero Ferrífero was continued. The network of taxonomists was expanded to include 27 botanical families, 27 taxonomists from 16 Brazilian institutions, and another 6 autonomous taxonomists who benefited from terms of cooperation and agreements.
This network aimed to accurately identify botanical samples of taxonomic complexity that often needed to be determined by the botanists of the consultancies, given the need for specialization. With this work, it was possible to ratify the identification of species that had not been recorded for a long time, in addition to confirming the discovery of 10 new species for science and starting in their process of description and publication.
As the main results, we had increments in all network numbers:
• 1,787 samples determined by the Network's taxonomists, deposited (or in the process of being deposited) in herbariums;
• 65 endangered species (MMA, 2022);
• 49 rare species (Giulietti et al., 2009);
• 16 species almost threatened with extinction (CNCFlora, 2023);
• 17 data-deficient species (CNCFlora, 2023);
• 330 endemic species of MG (Flora and Funga do Brasil, 2023);
• 10 species with increased knowledge about geographic distribution;
• 5 species confirmed as new to science - 2 published (Bromeliaceae and Polygalaceae); and 1 (Asteraceae) in the process of being published;
• 11 possible new species for science from the Asteraceae families (2); Eriocaulaceae (2); Myrtaceae (5); Solanaceae (1); Velloziaceae (3); Xyridaceae (1).

Activities

Engaging with local communities

Mining project ID

Project 1

Please explain

Vale signed an agreement to accelerate the Carajás Extractive Cooperative (COEX) to develop of sustainable extractive activities of the Jaborandi, which included the participation of the Instituto de Socioeconomia Solidária .
Located Parauapebas (Pará, Brazil), COEX's primary activity is extracting and

commercializing of jaborandi leaf, which produces of remedies for glaucoma and cancer. The work contributes to the preservation of the Amazon Forest, generates income for local communities, reduces deforestation rates, and prevents the loss of biodiversity of native species.
The Jaborandi (Pilocarpus microphyllus) is an endangered species native to hot and humid climate regions and found in Pará, Maranhão, and Piauí in partnership with COEX Carajás, the Vale Technological Institute for Sustainable Development (ITV-DS) carried out, for the first time, the DNA sequencing of the plant. It will allow researchers to map the genetic diversity of Jaborandi and understand how pilocarpine is produced, helping to ensure the species' long-term survival. On the business side, one of COEX's main clients is Carajás's Vale Seedling Nursery, the region where the mining company's largest mine is located. Today it is the only local extraction cooperative based on environmental conservation. It has authorization from ICMBio (the federal agency responsible for managing the protected area) to carry out this collection sustainably within National Forest.
In addition, as the collection of jaborandi leaf is an activity that occurs only in three months of the year, there was a need to create income generation mechanisms for local communities in the other months.
During 2022, 4,707 kilograms of native seeds of native species were acquired from COEX.
The Vale Fund supports mechanisms to promote and strengthen the business; Vale's operations provide training and are the largest purchasers of seeds used for habitat restoration, while the ITV carries out research focused on improving collection, maintenance, and recovery techniques for the cooperative's target species.

Activities

Engaging with local communities

Mining project ID

Project 1

Please explain

Biodiversity is an essential and intrinsic theme to the business, from its wealth, breadth, and value. Maintaining life and ecosystem services is vital for Vale.
Among the additional and voluntary actions related to the conservation of biodiversity:
The Vale Amazon BioPark serves as a breeding centre for 57 species of Amazonian fauna, housing over 243 individuals. The BioPark is dedicated to the ex-situ conservation of endemic and threatened species, including animals rescued from the company's operations, and those seized and saved by environmental agencies.
The BioPark works with crucial environmental education and conservation awareness actions. In 2022, the park's visitation average is around 164 thousand visitors, including families, schools, universities, and research institutions. In addition, BioPark developed a program for reproducing threatened species, such as the golden parakeet (*Guaruba guarouba*), endemic to the Brazilian Amazon and considered vulnerable to extinction.

Activities

Engaging with local communities

Mining project ID

Project 1

Please explain

Since 2009, Vale has maintained the Vale Technological Institute - Mining and Sustainable Development (ITV DS) in Belém, a non-profit institution for postgraduate research and teaching. This non-profit institution is dedicated to postgraduate research and education, with a group of researchers focused on studying biodiversity and ecosystem services, especially in the Carajás National Forest.
The network of collaborators and partners aggregates expertise and fosters capacity building, enhancing the performance of research and development on essential topics to reduce regional disparities. ITV-DS establishes multi-sector partnerships that mobilise and share research development knowledge, expertise, technology, and financial resources. Networking takes place both through collaboration among researchers and institutional affiliations. Among the partner institutions are meaningful local partnerships, institutions in several states of the country, government institutions, and research institutions abroad. The Institute's agenda focuses on biodiversity, environmental services, water resources, environmental genomics, reforestation with native species, recovery of degraded areas, climate change, occupation and land use, and socioeconomics.
ITV DS is also actively training young researchers through the Professional Master in Sustainable Use of Natural Resources in Tropical Regions. In addition, we offer research scholarships and project subsidies to young residents in Pará who are working on dissertations that align with the United Nations Sustainable Development Goals (SDGs).

Activities

Engaging with local communities

Mining project ID

Project 7

Please explain

In 2019, PTVI signed an MoU (Memorandum of Understanding) with Mompotuo Mio Adio (MMA's) local community cooperative to conduct biodiversity conservation activities on 50 ha reclaimed post-mining areas.
The Cooperative will supply and planting of native tree species seedlings and some healthy trees, which will produce non-wood forest products such as fruits, sap, etc. The selection of tree species is based on the Cooperative aspiration aligned with the closure plan. One of the objectives of this initiative is to provide alternative economic sources before the closure of the mine.
Almost all reclamation activities involve local communities and are divided into several vendors. Each week will be assessed by each target given. In the scope of the contract, the vendor will be prepared all equipment to support land preparation activities. In the

range, the warranty is emphasized regarding the percent of plant growth for six months, and if the percent grows less than 80% before planting local plants, then the vendor is obliged to re-enrich.

Activities

Participating in government-led initiatives

Mining project ID

Project 7

Please explain

Since 2018, we have implemented our Community Development and Empowerment Program (PPM) patterns and schemes based on our Independent Rural Development Program (PKPM) within the four areas in Blok Sorowako, East Luwu Regency, and South Sulawesi.
It's five years (2018-2023) partnership program between the community, local government, and PT Vale.
Through this PPM-PKPM program, PT Vale gives the community stimulant funds to develop their regions and top products.
PT Vale has been operating in the region for five decades, and during this time, the company has brought significant changes to the local community. It includes creating job opportunities and developing various public infrastructure such as health, education, transportation facilities, and other infrastructure that drives the local economy. PT Vale also implements multiple community development programs. Entering 2013, PT Vale changed its approach to community development programs implemented through the Integrated Community Development Program (PTPM).
PTPM planning, and implementation aligned with East Luwu Regency Government's road map and long-term development program that prioritizes transparency and accountability. In 2018, the transformation was carried out. When villages in one area join and develop their best potential, it also leads economic growth to community independence faster. PKPM was born as an innovation to continue the previous program. Villages no longer run individually but are connected and move forward together in one area. PKPM, It's five years (2018-2023) partnership program between the community, local government, and PT Vale. PKPM is to increase production and competitiveness, to give added value and economical independence to the community in mining operation-affected areas. PKPM provides the community with stimulant funds to develop it superior region products. The scope of cooperation involves empowering communities and rural areas, implementing PPM and PKPM, enhancing government institutions' capacity in villages, strengthening the capacity of Inter-Village Cooperation Bodies, and improving Owned Enterprises in Village.

Activities

Funding research organizations

Mining project ID

Project 7

Please explain

The scope of work on the MoU (Memorandum of Understanding) with the University includes several items to determine the proper steps in the future.
PT Vale is committed to completing its biodiversity management plan, covering the entire mining operation areas in the Sorowako Block. By the end of the reporting period, the management has been implemented 100%.
The main stakeholders involved are Vale employees, specialists from research programs in conducting environmental studies and programs and the surrounding communities.
In 2022, we continued the study of protected species in collaboration with Hasanuddin University, building on the efforts from 2020. The study revealed that several species of flora and fauna are currently covered or threatened with extinction, highlighting the need for conservation efforts to maintain their sustainability. The list of protected species is based on the IUCN red list, and we are committed to implementing appropriate measures to protect and conserve these species.

Activities

Other, please specify

Fauna monitoring in partnership with university

Mining project ID

Project 3
Project 5

Please explain

Investing in research is crucial to expand our understanding of the areas and to develop new methods and technologies that contribute to the knowledge and conservation of species and their habitats.
One ongoing study titled "Surveying and Monitoring of Threatened Medium and Large Mammals using Drone Imagery" is being conducted in partnership with the Federal University of Viçosa within Vale's protected areas in the Quadrilátero Ferrífero region. The primary objective of this study is to assess the effectiveness of camera traps, linear transects, and thermal drone methodologies in estimating species richness and diversity. Additionally, the research aims to deepen our knowledge of medium and large mammal species in four Private Natural Heritage Reserves (RPPNs) located in the Mariana and Paraopeba Complex. The project has a duration of four years, and thus far, thirty species have been recorded, adding to the results obtained in 2021. Through the use of thermal cameras attached to drones, the scanning method has captured images of *Tamandua tetradactyla, Sapajus nigritus, and Eira barbara*.

Activities

Engaging with local communities

Mining project ID

Project 5

Please explain

Vale maintains an open and transparent communication channel with the public regarding its operations. To facilitate this dialogue, the company has established Community Relations teams in each operational area, serving as official representatives of Vale in the local community.
In partnership with local communities, various actions have been developed to promote sustainable development, enhance infrastructure, mitigate operational impacts, and preserve the environment. The Relationship and Social Investment Plan was created based on community dialogue, taking into account the discussions held by the Social Committee and the notes regarding operational impacts in the area. Ongoing activities from previous years were also continued in 2022. Since the onset of the pandemic, meetings have been conducted online.
The execution of the Relationship and Social Investment Plan is monitored through Vale's internal system, SDI (Stakeholders, Demands, and Problems).

Activities

Engaging with local communities

Mining project ID

Project 6

Please explain

One of Vale's activities related to the Brucutu Água Limpa Complex is the Environmental Attitude Program. The program aims to promote behaviour change, cultural transformation, and the acquisition of new values that prioritize the conservation and maintenance of natural resources and the environment. The primary focus is to create awareness among the stakeholders about their crucial role in the transformation of society. Its activities are aimed at both the internal (employees, employees, and contractors) and external audiences and its main strategy is to invest in education. This program seeks to spread the principles of environmental, social, and sustainable development responsibility in the communities of which it is an integral part. The Program has as partners the Municipal Departments of Education and Environment, the Schools of the Public Teaching Network, their students, employees, and educators, in addition to leaders and representatives of the Communities. In the area covered by the Brucutu Mine, the Program operates in the following locations: Barão de Cocais, Santa Bárbara, Rio Piracicaba, and São Gonçalo do Rio Abaixo. In addition, the company carries out several awareness campaigns to publicize World Water Day, World Environment Day, among others.

Activities

Engaging with local communities

Mining project ID

Project 2

Please explain

Vale prioritizes engagement with local communities through the Environmental Education Program. This program is designed to develop projects and actions for Vale employees, contracted companies, and the wider community to increase awareness and understanding of our enterprise and encourage greater participation from the public.
The Program offers a range of educational activities for both Vale employees and the communities where our operations are located, providing opportunities to present and discuss environmental impacts and to raise awareness about the importance and role of each person in caring for the environment.

Activities

Engaging with local communities

Mining project ID

Project 2

Please explain

The Itabira City Hall, University of Itajubá (a local university), and Vale signed a partnership in 2019 with the goal that the city becomes a hub of education, innovation, and technology. Vale invested approximately US$ 19,9 million in the initiative to strengthen educational practices, promote technology-based research and entrepreneurship, and construct new buildings as part of the University's Technology Park. The choice to invest in the education area results from a series of discussions and studies by the Working Group led by the Itabira City Hall to seek alternatives for economic diversification. According to Unifei's studies, the expansion of the university, with the construction of three new buildings, will increase the supply of courses and quadruple the number of vacancies in undergraduate courses.

Activities

Engaging with local communities

Mining project ID

Project 2

Please explain

Fazer Ciência (Doing Science) is a partnership between the Vale Foundation, the Itabira Municipal Secretariat of Education, and the CEDAC Educational Community to promote science and mathematics teaching in schools, encouraging students' autonomy in problem-solving.
Fazer Ciência provides for the systematic training of elementary school teachers and other professionals, such as the Itabira Municipal Secretariat of Education staff, school managers, and pedagogical coordinators. Besides the educators' training, it is equally

essential that the students have access to situations and materials to investigate, think, and systematize new knowledge. In this way, the project also provides content and materials for schools, contributing to developing investigative activities of real problem situations with students in Natural Sciences and Mathematics.
In addition, 234 educators out of 22 schools participated in the project in 2022.

Activities

Engaging with local communities

Mining project ID

Project 4

Please explain

Vale has an open, transparent relationship channel with the public around its operations, and to facilitate this dialogue, the company has established Community Relations teams in each area of operation, which serve as official representatives of Vale in the local community.
Various actions have been developed in partnership with local communities to promote sustainable development, improve infrastructure, mitigate the impact of operations, and preserve the environment.
Other activities already underway from previous years were maintained in 2022. Since the beginning of the pandemic, meetings have been held through online meetings.
The actions being implemented involve support for social projects and local associations, environmental education actions, implementation and monitoring of environmental controls related to dust and noise (tree curtains, road sprinkling), and improvements in the paving and safety infrastructure, among others.
The monitoring of the execution of the Relationship and Social Investment Plan is carried out through Vale's internal system, SDI (Stakeholders, Demands, and Issues).

Activities

Funding research organizations

Mining project ID

Project 4

Please explain

Since 2017, Vale has supported the Federal University of Viçosa (UFV) in Minas Gerais in developing research projects on the recovery of areas and habitat restoration. These projects are currently being executed within the area of influence of the Vargem Grande and Paraopeba Complexes and aim to develop specialized methodologies for assessing areas undergoing recovery and refining the recovery processes themselves. And the work continued in progress with the UFV in 2022.

Activities

Funding research organizations

Mining project ID

Project 2
Project 3
Project 4
Project 5
Project 6

Please explain

In 2022, Vale signed an agreement with Agencia Paulista de Tecnologia e Abastecimento (Rede Propagar) to enhance knowledge of species through propagation processes, seed storage, live collections, and reintroduction tests. The partnership, titled "Rede Propagar: Development of propagation protocols and genomic characterization of plant species endemic to the Iron Quadrangle of Minas Gerais," aims to develop innovative protocols for producing seedlings of endemic, rare, and threatened plant species. The project takes place from 2022 to 2027 at the APTA Regional Research and Development Unit of Piracicaba (São Paulo, Brazil).
The initiative establishes a network of researchers from São Paulo, Minas Gerais, and Bahia to study germination processes and establishment techniques for these plants. The findings will support restoration actions and species survival in their natural habitats. The agreement reaffirms Vale's commitment to supporting national science through research grants and knowledge sharing. The Propagar Network aims to build technical-scientific knowledge, publish articles in high-impact journals, and share propagation protocols for conservation agencies, research institutes, NGOs, and seedling production companies.
Seedling production started in October 2022, with promising results as plants acclimate in a greenhouse. The international launch of the Propagator Network took place at Harvard University on March 24, 2023.In addition to conducting applied research for flora conservation in Vale's operating territories, the agreement also provides research grants at different levels to address the shortage of specialized labour in this field. As part of the project, protected areas across the state were explored, leading to the discovery of new populations of species of conservation interest. These populations are mapped, georeferenced, and monitored for propagule collection and genetic material study. In 2022, the visited protected areas included Capanema RPPNs, Cata Branca, Capitão do Mato, Capivari I and II, Córrego Seco, Horto Alegria, Caraça, Rio de Peixe, Trovões, Poço Fundo, Ibitipoca State Park, Serra do Rola Moça State Park, Itacolomi State Park, Serra do Gandarela National Park, Serra do Cipó National Park, Serra da Calçada Natural Monument, Serra da Piedade Natural Monument, and Serra Serrinhas (an area for offset).

Activities

Funding research organizations

Mining project ID

Project 2

Project 3
Project 4
Project 5
Project 6

Please explain

In 2022, an agreement was signed with the Foundation of Municipal Parks and Zoobotany (FPMZB, Portuguese acronym for Fundaçao Zoobotanica de Belo Horizonte) to deepen knowledge about the species, this time working on propagation processes, seed storage, live collections, and substrate/reintroduction tests.
The agreement with the - FPMZB was signed at the end of 2022, and therefore the actions are still being initiated. The scope of this agreement provides for the expansion of the Herbarium, the installation of greenhouses, the adaptation of the seed storage structure, and the maintenance of a living collection of endemic species of the Quadrilátero Ferrífero region.
The agreement, in addition to developing applied research on very relevant topics for the conservation of flora in the territories where Vale operates, also includes research grants at different levels in a topic where there is still a significant shortage of specialized labour.

F16 Verification

F-MM16.1/F-CO16.1

(F-MM16.1/F-CO16.1) Do you verify any biodiversity-related information reported in your CDP disclosure?

Yes

F-MM16.1a/F-CO16.1a

(F-MM16.1a/F-CO16.1a) Which data points within your CDP disclosure have been verified, and which standards were used?

Disclosure module

F1. Introduction

Data points verified

Operations, number of employees, expenses with social actions, repairs, related to waste management, atmospheric emissions, water resources and biodiversity.

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2022 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate

their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module

F9. Current state

Data points verified

Significant impacts of activities, products and services on biodiversity

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2022 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

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Disclosure module

F10. Procedures

Data points verified

Reputation and markets: Deforestation

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2022 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module

F12. Governance

Data points verified

Incentives for executive employees or board members to manage biodiversity-related issues

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2022 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module

F14. Implementation

Data points verified

Number of projects analysed regarding their need for management plans.

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2022 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module

Other, please specify

F15. Engagement

Data points verified

Engagement approach to artisanal and small-scale mining (ASM)

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2022 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

F17 Signoff

F-FI

(F-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

F17.1

(F17.1) Provide the following information for the person that has signed off (approved) your CDP forests response.

	Job Title	Corresponding job category
Row 1	CEO	

Submit your response

In which language are you submitting your response?

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options		Public

Please confirm below