VALE

Sustainability Report 2019

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Letter from the CEO

GRI 102-14

We believe the new coronavirus pandemic (Covid-19), which we face during the publication of this report, is one of the most critical challenges in the recent human history. At a time like this, everyone must do their part to combat the advance of the disease and, consequently, the crisis that impacts us all.

From the beginning, Vale has worked to make all possible efforts to live up to its responsibili-ties: we have adapted our work routine as a preventive measure to help ensure the safety of employees, partners and suppliers, adopting home office work in all eligible situations and interrupting operations in situations of greater risk, and donating five million fast tests to the Brazilian government to detect infection by the virus, hoping to considerably increase the capacity to map and isolate infected people.

We have also seek to provide more intensive support to our employees and suppliers to help them deal with the economic consequences of the crisis. For our employees, we have launched an extra credit on the food card so that they can cope with increased expenses at home. For suppliers, we have announced support measures during the crisis such as disbursing USD 160 million to be paid before maturity to more than a thousand suppliers who have performed services and delivered materials.

Although the scenario of the fight against Covid-19 is not the subject of this report, which instead focuses on our performance in 2019, it is also part of our commitment to fight the disease, to use every opportunity to seek collabouration from everyone in adopting measures advised by health agencies, so that we can move through this crisis as quickly as possible and with the least possible damage.

We know that we are at the beginning of the path and that there is still much to be done to achieve the change we need.

Until the Covid-19 crisis arose, the central reason for this message was to present our journey in 2019, the most difficult in the history of Vale and the community of Brumadinho, due to the rupture of Dam I at the Córrego do Feijão mine.

Since the occurrence of this tragedy, we have endeavored to dedicate ourselves to rethinking not only the way we work, but also our own vision of the world and of business. We have sought to repair as much as possible the impacts caused by the dam's rupture on people and the environment, and we are working to increase incident prevention, to make it our mission that this type of occurrence never happens again. At the end of this process, Vale needs to be a better company.

In all these aspects, we know that we are at the beginning of the path and that there is still much to be done to achieve the change we need. Throughout this report, we present what has been accomplished so far, our planning for the coming months and years, and the progress we have made in our process to review the most relevant aspects of our management and operation.

Among the issues we will address are priorities such as the already initiated decommissioning of dams upstream, and our initiatives targeted towards the more efficient monitoring of these structures and the training of teams in an effort to reinforce our operations' safety.

On the other hand, we have taken on new commitments and re-evaluated and re-signified existing ones to expand our environmental, social and governance goals, because we understand that our very existence is tied to being a sustainable company and a good citizen that is committed to respect for human rights throughout our entire value chain.

This is the basis of our new pact with society, one of the pillars of Vale's sustainability. Based on this pact, we have sought to adopt solid principles to manage safety, business conduct and social, environmental and economic activities on all fronts and stages of our operations. To this end, we monitor and seek to adopt the best practices in the mining sector, using them as a reference to continuously improve our strategies, policies and processes.

By doing so, we want to reduce as far as reasonably possible the negative impacts that our operations cause to communities and the environment. We will need to invest increasingly in dialogue with our stakeholders and in setting challenging objectives related to the main aspects of our operations.

One of these objectives is to become a carbon neutral company by 2050, reducing and neutralizing our emissions, in line with the principles of the Paris Agreement and in line with building a new economy.

Together with these changes and advances, Vale and its employees remain committed to creating value and delivering results that produce and share wealth with our stakeholders, as well as to the sustainable development of the territories where we operates. Among our guidelines is to resume production levels, volume and cost. In iron ore, we follow a "flight to quality" strategy, i.e. maximizing the quality of our product compared to market options. In the base metals, the achievement of financial sustainability opens excellent perspectives for the business.

Finally, I want to thank everyone who has supported us in this difficult journey. Our employees, shareholders, communities, associations, business partners, civil society and government entities have made it possible for us to get this far and will play a key role in the progress that still needs to be made.

Thank you very much.

Eduardo Bartolomeo

Vale's Chief Executive Officer

Letter from the Board of Directors

GRI 102-14

Throughout 2019, Vale's highest priority was to respond to the impacts caused by the rupture of Dam I at the Córrego do Feijão mine, in Brumadinho, Minas Gerais. This is also the concern of the company's shareholders, represented by this Board of Directors, all deeply committed to actions to receive and reparation damage to those affected and to the entire region of Brumadinho.

We are deeply connected to the victims and their families in a feeling of solidarity and sorrow for what happened. We understand the scale of the impact caused and our obligation to develop support and repair actions, while working to ensure that something like this never happens again. That is why, from the very beginning, we have committed ourselves to transparency, maintaining a constant dialogue with the entities involved in the recovery process and with the society in general.

This concern has extended to our governance as a whole. Vale has made adjustments and developed new models, especially in regards to its risk management, which we have reformulated and enhanced. Currently, four executive committees support the analysis of the inherent risks to the business and provide recommendations regarding practices and concepts.

At the same time, the Executive Board of Safety and Operational Excellence was created, directly subordinate to the Chief Executive Officer, to act across operations to with the goal of making our activities safer and more efficient.

Despite the difficulties, the seriousness with which we take our obligation to repair the damage caused by the rupture with the goal of making reaffirm the company's commitment to generate value linked to sustainability.

To this picture we can add the gravity of the Covid-19 pandemic, which has caused severe threats to global health in addition to the economies of countries. The company has worked to adapt this new scenario, by means of protocols aimed to protect the people who are part of its value chain and is aware of the necessary adjustments in response to the new economic context.

Finally, we would like to reinforce our confidence in the measures being taken to repair the damage caused by the rupture of the Brumadinho dam. This Report portrays the willingness of the company to act in a positive manner in all its circles of influence, while generating value for its shareholders and society as a whole.

Cordially,

José Maurício Pereira Coelho

Vale's President of the Board of Directors

About this Report

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Vale's Sustainability Report 2019 summarizes the company's actions and learning following the rupture of Dam I of the Córrego do Feijão mine, in Brumadinho (Minas Gerais State - MG), which resulted in the death of 270 people, on January 25th, 2019. The report also presents the ways this event has affected the company's management processes and its economic, environmental and social performance of the organization.

The first chapter is dedicated to the rupture and its consequences, describing the event's impact on the territory and the community, as well as the company's responses with the support of the Government and civil society, to help impacted people, give back access to their rights and repair the damage caused, as well as compensate society for damage that cannot be repaired.

The following chapters present Vale's main information communications[1], policies, company actions and reporting on its social, environmental and economic performance are discussed, always in context of the impacts caused by the rupture, with its materiality matrix and with the company's commitment to reviewing its processes, correcting mistakes and establishing a new pact with society.

1 Any differences in the total data and percentages in the graphs and tables must be attributed to the rounding of the values. Throughout the report, the amounts in reais were converted to USD at the rate of BRL 3.95. Due to the complexity of the activities, there is no single criterion for reporting a business unit. For this reason, some disclosure items are not shown as a percentage of the business unit.

This report has been prepared in accordance with the GRI Standards: Comprehensive Option and the Mining and Metals Sector Supplement. We actively participate in the International Council on Mining and Metals (ICMM) and commit to its 10 Principles of Sustainable Development. The information presented in this report also includes such guidelines and commitments. Disclosures cover the period between January 1 and December 31, 2019.

This document includes statements that present Vale's expectations about future events or results. All forwardlooking statements involve risks and uncertainties. Vale cannot guarantee that these statements will prove to be fully accurate. These risks and uncertainties include, among others, factors related to: (a) countries where Vale operates, especially Brazil and Canada; (b) the global economy; (c) capital markets; (d) mining and metals prices and their dependence on global industrial production, which is cyclical by nature; (e) the high degree of global competition in the markets where Vale operates; and (f) mining operations. Vale cautions to the fact that in all of Vale's operations and activities, actual results may differ materially from the plans, objectives, expectations, estimates and intentions expressed in this document. Vale undertakes no obligation to publicly update or revise any forward-looking statement, whether as a result of new information or future events or for any other reason. To obtain further information on factors that may lead to results different from those forecasted by Vale, please consult the reports that Vale files with the U.S. Securities and Exchange Commission (SEC), the Brazilian Comissão de Valores Mobiliários (CVM), the French Autorité des Marchés Financiers (AMF) and, in particular, the factors discussed under "Forward-Looking Statements" and "Risk Factors" in Vale's annual report on Form20-F. For questions, comments or suggestions, please use the Contact Us channel at www.vale.com.

Sheet piles installed next to the Alberto Flores bridge to prevent the carrying of solids for the Paraopeba River. Photo: Vale Archive.

Place the QR Code reader over this image and access the page www.vale.com/rs2019. Accessible site for the visually impaired and extra content.

Materiality

GRI 102-9 | 102-40 | 102-42 | 102-43 | 102-44 | 102-47 | 103-1

Vale's 2019 materiality process consisted of updating the previous year's matrix, with support from consulting stakeholders – executives, employees, shareholders, associations and class entities, communities, customers, suppliers, government, press, regulatory bodies, unions and universities and research centres – and in the survey of the most relevant sectorial topics and benchmarking of the main companies in the sector.

The items raised between the sectorial references and the benchmarking analysis were compared with our 2018 materiality matrix, generating a list of 21 pre-selected topics, submitted for stakeholder analysis. The consultation was applied on-line to most respondents and, for company executives, the virtual form was complemented by a face-to-face interview.

Ore train at Complex S11D - Eliezer Batista, in Canaã dos Carajás (PA). Photo: Vale Archive.

Each consulted person evaluated the items listed based on three criteria – probability, magnitude and relevance of the impact – and the intensity to which each of them occurs in each item: high, medium or low.

The results were tabulated and went through a prioritization process. The prioritized topics were grouped by affinity into the following themes:

Accident prevention and emergency response;

- Risk management

Management of mineral waste and dams;

Human rights;

Climate change;

- Energy efficiency
- Atmospheric emissions

Social investment and regional development;

Biodiversity;

Corporate governance;

- Ethics and transparency, combating corruption and Illicit practices

Human capital management.

Chapter 1

Brumadinho: the challenge of repairing and rebuilding

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Time line

2019

Jan

01.
25.
19

Rupture of Dam I at Córrego do Feijão Mine in Brumadinho (MG)

Creation of the Immediate Response and Humanitarian Aid Committee

Beginning of water and sediment monitoring in the Paraopeba River

Beginning of Emergency Works

Creation of Advisory Committees: Vale's Board of Directors creates two Independent Extraordinary Advisory Committees: Investigation; and Support and Reparation

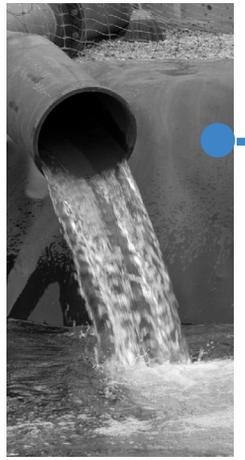


Photo: Vale Archive.

Construction of Alberto Flores Bridge re-establishing safe transit between Brumadinho and nearby communities

Beginning of operation of the River Water Treatment Station (ETAF in Portuguese), in the Ferro-Carvão Stream

May

Closing the sheet piling curtains in the Ferro-Carvão Stream

Creation of the Executive Office for Safety and Operational Excellence

Aug

Beginning of dredging commissioning in the Paraopeba River

Feb

Beginning of the mapping of riverine users and water supply

Financial support to Brumadinho City Hall, due to the interruptions of activities and for the expansion of humanitarian assistance in the municipality

Signature of Preliminary Agreement Term (TAP in Portuguese) for emergency indemnity payments for more than 106,000 people throughout 2019

Creation of Extraordinary Independent Committee on Dam Safety and Expert Panel on the Technical Causes of Rupture

Mar

Contribution of BRL 20 million to the Military Fire Brigade of Minas Gerais

Temporary dismissal of executives

Apr

AMIG's signature for financial contributions to companies and maintenance of services totaling BRL 100 million

Signature of the agreement for emergency payments to the Pataxó Indigenous community in São Joaquim das Bicas

Creation of Special Office for Reparation and Development

Sep

Beginning of the recovery of the Ferro-Carvão Stream at the confluence with the Paraopeba River

Oct

Cleaning of the affected area and recovery of the Dam VI's foot drain

Beginning of the Water Supply System works in Pará de Minas

Nov

Approved the extension, for a further 10 months from January 25, 2020, of the payment of emergency aid to those affected by the rupture of Dam I at Brumadinho

Completion of de-characterization at the first of the nine upstream dams

Hydraulic Barrier 0 (BH0) starts to operate

Dec

Completion of Hydraulic Barrier 1 (BH1)

Completion of Dike 2

Obtaining the Environmental Permit for disposal of tailings in the Córrego do Feijão pit

Hydraulic Barrier 1 (BH1). Photo: Vale Archive.

Brumadinho: the challenge of repairing and rebuilding

The rupture of Dam I of the Córrego do Feijão mine, on January 25, 2019, in Brumadinho – Minas Gerais State (MG), forever marked the history of Vale, its employees and the impacted people and communities. Vale apologizes to society and deeply regrets the 270 fatalities, of whom two were young pregnant women and 11 victims have not yet been located.

During this incident and in the period that followed, Vale recognizes the support, solidarity and dedication of several volunteers, community members, employees, and institutions such as the Fire Department, Civil Defense, Civil Police, Forensic Medicine Institute (IML) and other municipal, state and federal public agencies that have worked tirelessly on various fronts to assist all affected audiences. To them, we extend our deep respect and gratitude for all they have done for the victims and the community of Brumadinho.

2019 was marked by mourning and the concern to establish emergency actions to deal with the adversities caused by the rupture. The year also served as an important period for Vale begin to establish and improve the reparation processes in different territories as well as the company's internal procedures, including the understanding of issues related to community relationships, the safety of operations and risk management. However, there is still a long way to go to try to remedy the suffering of our communities, our employees and their families.

Vale recognizes its responsibility and reaffirms its total commitment to work towards promptly and fairly repairing the damage caused to families, community infrastructure and the environment.

Brumadinho and impacts on Human Rights

Vale understands that the consequences of the rupture of Dam I of the Córrego do Feijão Mine cannot be understood only in light of the survey of its impacts on the population and the environment. For the company, these situations impacted the human rights of the people affected, residents and local workers.

To deal with this perspective, Vale has as its main reference the "UN Guiding Principles on Business and Human Rights". This UN initiative is structured around three pillars, from which the defense of human rights should be built:

Protect - This is the responsibility mainly of the States, which must protect their citizens from human rights violations and establish, along with companies, the expectations that all activities will respect the rights of people involved.

Respect - Companies must develop, in their activities, mechanisms that guarantee respect for human rights.

Reparation - In cases where rights are violated by business activities despite companies' stated commitments, companies and states must take the necessary measures to effectively repair these violations.

These three axes unfold in 31 principles that detail and deepen them and that have been taken as a reference for Vale during the process of reparation and reformulation of its operations in the territories. Read more here.

Reception at the Estação Conhecimento, in Brumadinho (MG). Photo: Vale Archive

2019 was marked by mourning and the concern to establish emergency actions to deal with the adversities caused by the rupture.

Special Office for Reparation and Development

One of the first steps in our efforts to fully repair of the affected territory, after the dam rupture, was to create of the Special Office for Reparation and Development. Throughout 2019 and in the beginning of 2020, in view of the need to repair the damage, as well as to provide assistance to those affected, Vale has gradually been moving from an emergency action mode to the recovery of these territories. Its priority is to coordinate the socio-economic and environmental restoration actions of the impacted municipalities, with social engagement and transparent performance, also aspiring to act as a vector for improving Vale's policies and processes, through a close collabouration with the communities.

The program for the reparation and development of Brumadinho and the municipalities of the Paraopeba Basin was established, which includes structural actions to fully repair the damage caused to families, the environment and society in Brumadinho and the affected region by 2025. With the objective of guaranteeing respect for Human Rights, this program is based on three pillars: Socioeconomic, Environmental and Infrastructure.

To present Vale's actions in an updated way, showing the evolution of the work in Brumadinho and alongside the Paraopeba River, the Reparation Report was established. We know there is a lot to do. We will keep doing it and reporting back to society.

Access the latest Reparation Report.

Special Office for Reparation and Development

Created in April 2019 to ensure focus and agility for the reparation process.

Mission

To integrally repair the damage caused to people and territories with social engagement and transparency.

Vision

To repair, by 2025, all the damage caused to people and territories, considering the **environmental, social and economic aspects, with positive legacies, angreed with and embraced by** these territories.

Objectives

- Commit to the **framing of agreements** throught dialogue to ensure integral reparation for all the affected people and terriotories;
- Repair damage to those affected in a **dignified and respectful manner**;
- **Repair the environmental damage** caused to the affected territories;
- **Advance with the economic sustainability** of the affected terriotories;
- Influence the improvement os **Vale's internal policies and processes**;
- Influence the **minng industry** to adopt safer processes and practices.

Public Commitment to Integral Reparation

In the last fifty years, despite all the technological evolution, we have seen some tragedies with companies where human rights have been dramatically disregarded. Lives have been lost, families, communities and social relations have been broken. Environmental issues cause chronic and/or fatal diseases for many years after the disaster. Many of these tragedies, despite the passed time, leave open and deep wounds. Compensation, economic or otherwise are still discussed without building sustainable solutions for those affected. Consequently, the efforts and resources employed in the reparation are put to the test head-on. And with that the credibility of the reparative agent.

Vale has made a commitment to its stakeholders and society in general to implement Integral Reparation since the first drafts of its reparation plan for Brumadinho and the affected areas. The decision is consistent with the company's recognition of the United Nations' Guiding Principles on Business and Human Rights. The commitment implies great challenges and discipline in the implementation. It is not only a short-term decision to demonstrate adherence to best environmental, social and governance practices. It is a strategic decision of enormous relevance. It demands a cultural transformation, already underway, because it has to touch on how its employees, direct agents of Reparation, understand and deal, today and in the future, with the steps of Reparation in their daily lives. It opens a path that, if firmly followed, will create precedents both in the mining industry and in others, bringing new references to society.

And what else is key in this decision on how to repair? It is necessary to identify the parametres that will guide its implementation in order to provide greater assurance that the Reparation will be effective. These parametres include a public apology, a guarantee of non-repetition, participatory governance involving the different stakeholders, a commitment to return to the status quo ante, economic or otherwise compensation, among others. To en-sure that these parametres are being followed, concrete and tangible actions must be taken involving all levels of the company. To ensure this, the reparation plan must be monitored, evaluated and adjusted throughout its implementation in the short, medium and long term.

Integral Reparation is a long-term commitment. There will be moments of challenge and moments of recognition. And in order to be recognized as a whole, it needs continuous and resilient mobilization by all. Thus, Vale must improve existing channels of dialogue and be proactive in developing new ones. These channels must ensure that the losses of those affected are understood, evaluated, respected and compensated in a clear and unmotivated manner. This is what the company has committed to and has made public! And this is what will bring greater credibility and a new image!

Leonardo Pereira is a member of the Independent Supervision Advisory Committee of the World Health Organization (WHO-IEOAC), former President of CVM, is a member of the board of the Credit Guarantee Fund and several other publicly-held companies, and was coordinator of the Independent Advisory Committee for Extraordinary Support and Reparation (CIAEAR) of Vale, which acted between February 2019 and February 2020.

Service at the Estação Conhecimento, in Brumadinho (MG).
Photo: Vale Archive.

Read more about the Extraordinary Independent Consulting Committees created by Vale's Board of Directors after the rupture of Dam I, on page 48.

Socioeconomic reparation

Since the first hours after the rupture of Dam I of the Córrego do Feijão mine, Vale has sought to apply considerable human, financial, technological and material resources to align the reparation actions are aligned with the expectations of those affected.

Focused on rebuilding people's lives and the territory, the company has been developing assistance programs, aiming to contribute so that communities can deal with the new reality, resume their routines and plan for the future.

In an effort to optimize the reparation and compensation process with the communities, Vale also created the Social Engagement Plan (SEP), implemented both in Brumadinho and the Paraopeba River canal, areas affected by the rupture of Dam I of the Córrego do Feijão mine, and evacuated territories due to alerts related to other dams of the company. The SEP is divided into five stages: organization of the process; understanding of the current situation; strengthening the basis of community relationships; participatory implementation; and knowledge management.

In 2019, Vale focused on organizing the reparation and compensation process with the communities to understand the situation caused by the disruption and the evacuations. The company's challenge, since then, consists of implementing actions where community participation has been essential to mitigate the impacts of the disruption and evacuations. The open, transparent and clear dialogue was and continues to be a guide for performance within a continuous learning cycle.

In the last quarter of 2019, two external evaluations were carried out in order to seek references that would contribute to the mission of repairing the damage to the people and territories affected. One of them, carried out by Fundação Dom Cabral, resulted in a study on qualifying the reparation process, considering the dimensions of governance, social participation, prevention and mitigation of social and economic impacts and risks in the evacuated territories and those affected by the dam rupture. Following the recommendations of the Independent Support and Reparation Extraordinary Advisory Committee (CIAEAR), another assessment was also carried out on providing specialized technical advisory services in Mental Health and Psychosocial Support (SMAPS acronym in Portuguese). Focused on the victims' families and evacuated populations, the methodology used involved interviews with stakeholders, among family members of the victims and Vale employees, in addition to documentary analysis provided by the company. Throughout 2020, Vale plans to analyze the survey results and use them to influence the planning and actions related to the theme.

Social Workshop Comfio: social project with women from Córrego do Feijão. Photo: Vale Archive.

In 2019, Vale focused on organizing the reparation and compensation process with the communities.

Relationship building and engagement with communities

To establish and consolidate the relationship between Vale and the residents of the impacted territories, a team of company professionals, which includes the leadership of the Reparation department, has been working locally to maintain the dialogue and facilitate the construction of agreements that make the reparation feasible, including by mapping stakeholders in the impacted regions.

The stakeholder management and mapping work has been carried out by the Reparation Board team using a methodology that begins with the development of a specific matrix, with the main stakeholders. Thus far, this information has been fed into a tool, where they are centralized, enabling the generation of qualified knowledge about stakeholders and the definition of appropriate planning to reach the reparation focus, with each relationship group.

To hear the voices of the territories, meetings are generally held weekly with affected communities, impacted families, community leaders, residents and representatives of the Fire Department, prosecutors and other public entities involved. Throughout 2019, more than 50 weekly hearings and meetings were held. Among the institutions that have participated in the dialogues is the Association of Family Members of Victims and Affected People of the rupture of the Córrego Feijão Mine Brumadinho Dam (Avabrum acronym in Portuguese), official representative of the victims' families.

In order to keep all communities informed, the company has used different means of communication, such as radio and sound car, informative by messaging application, media at commercial points and through mass communication vehicles (newspapers, radio and TVs), vale.com/brumadinho website and digital media, in addition to serving the press.

Vale Service Center: 0800 031 0831

Indemnification Channel: 0800 888 1182

Humanitarian and psychological assistance and reception

Immediately after the rupture of the dam, Vale started serving the population of Brumadinho and the region. One of the first steps was to open physical service stations (PAs acronym in Portuguese) in the main communities, where specialized teams still work to welcome and deal with the demands of those affected.

To speed up actions, on the day of the dam rupture, the company created an Immediate Response Group, responsible for consolidating all emergency actions. Subsequently, a Humanitarian Aid Committee was set up, with a team of social workers and psychologists to provide assistance to victims and families.

The top priority at that time was to welcome families, support the rescue and, thus, assist our own employees, third parties and the local population. For this, we mobilized all necessary resources. Vale provided approximately 40 ambulances, backhoes, a helicopter to support rescue, communication radios, 15 lighting towers, and balloons equipped with infrared technology and wi-fi for aerial monitoring. Partnership with hospitals in the region resulted in approximately 800 beds and medical and psychological care being made available.

The company also provided telephone service channels so that the affected population could request emergency support, report on missing persons, request data from survivors found, clarify doubts, register complaints and deal with matters relating to damages and donations. Indemnity requests could also be made in person at the Indemnity Registration Posts (IRP), spaces created by the company in the first months after the rupture.

The analysis of meeting the demands received by these communication channels has been carried out according to the "General Guidelines on Emergency Humanitarian Assistance", an internal document that defines and establishes criteria for meeting all demands, built in conjunction with the service fronts and considering the differentiated context of the impacts of each territory. To ensure that this set of service guidelines is in line with the political and sociocultural dynamics of the affected communities, the evolving reparation process itself, and the agreements established with the institutions of justice, the guidelines have undergone constant reviews.

By the end of the year, more than 69,000 demands had been received through these service channels. Out of these, 98% were answered.

Vale's Service Station in Brumadinho (MG).
Photo: Vale Archive.

Despite efforts to continuously improve the toll free telephone numbers, we still register complaints from those affected that clarifications provided by that channel are not satisfactory enough.

We have sought to take advantage of these situations to performance responsive actions to continuously improve the service channel or even to revise our policies to assist those affected.

Service Stations (PAs in Portuguese)

Vale has structured the following service stations, with a team of social workers and psychologists, in Brumadinho and Belo Horizonte: Knowledge Station, Córrego do Feijão Community Center, Carmela Caruso Aluotto Municipal School, Multisport Gymnasium, Parque da Cachoeira Community Association, Forensic Medicine Institute of Belo Horizonte (IML acronym in Portuguese) and Intercity Hotel.

The spaces were designed to offer the following services: reception for families, registration, screening and referral of homeless people to hotels; registration of family members to receive donations from Vale; deliveries of cell phone chips by the Civil Defense to families; care and psychological support; and distribution of free food to families.

A Demand Management System was created, which generally has given Vale had 48 hours or 24 hours, depending on the nature of the topic presented, to take a first action in relation to the topics.

In December 2019, the Central PA remained active in Brumadinho, at Aurora Tennis Club, and Parque da Cachoeira PA, in addition to the compensation offices in Brumadinho. By the end of the year, more than 69,000 demands had been received through these service channels (including Service Stations and 0800 telephone lines). Out of these, 98% were answered.

The Environmental Central Brumadinho, created especially to meet requests from public agencies, carried out more than 2,000 calls in 2019.

Main demands received by service channels and PAs

- Reception with psychosocial support and emergency medical care;
- Accommodation of displaced persons and families of victims in hotels, inns and temporary housing;
- Logistical support for travel and transportation in Brumadinho;
- Supply of food, personal hygiene and necessities, medicines, clothing and transport;
- Registration of families to receive donations and resources.

Supply of water for human and animal supply

In addition to the humanitarian actions that are still in progress, Vale has been providing water to rural properties and residences that depended on collecting water directly from the Paraopeba River or underground water (wells and cisterns located up to 100 metrers from the Paraopeba River bank). By December 2019, more than 500 million litres of water had been distributed for human, animal and agricultural use. Vale also built 24 artesian wells in cities supplied by the Paraopeba Basin in an effort to supply of drinking water to the communities. The water supplied by Vale has come from COPASA (Sanitation Company of Minas Gerais) sources in Juatuba, Pompeu and Três Marias. Water quality monitoring is carried out by the concessionaire and the results are available on its website.

In addition, the company continues to make water filtration equipment available to rural producers using wells and cisterns near the Ferro-Carvão stream and the Paraopeba River. The forecast is that by June 2020, about 250 systems will be available in 20 municipalities, from Brumadinho to Três Marias. The filters have the objective to make the water drinkable, complying with the drinking water regulations. The different treatment technologies have been selected for each property, according to the level of water quality in wells and/or cisterns, in order to promote user's safety.

Regarding water supply in the affected regions, Vale signed two Terms of Commitment[2]. The first one signed, in March 2019, was to proceed with works for new supply systems for

2 All these signed terms were legally approved by the Judge of the 2nd Court of Public Finance and Municipalities of Belo Horizonte - MG, where the Public Civil Action is being processed, brought against the Vale after the rupture of Dam I of the Córrego do Feijão Mine.

the population of Pará de Minas, signed jointly with the Public Prosecutor's Office of Minas Gerais with the intervention of the municipality of Pará de Minas and the concessionaire Águas de Pará de Minas S/A (Capam), for the construction of a water collection system on the Pará River and a 47 km water pipeline to guarantee the municipality's water supply. The second Term of Commitment, signed in July 2019, also with the Public Prosecution Service of Minas Gerais with the intervention of the State of Minas Gerais, the Federal Prosecution Service and COPASA, was for the construction of a new water collection system on the Paraopeba River and a pipeline of approximately 14 km, in a stretch located 12 km above the current collection structure in an unaffected area of Brumadinho. Subsequently, changes were made to this term, including the intervention of CEMIG (Energy Company of Minas Gerais) to include the construction of a distribution line that will feed the new collection system, in addition to the inclusion of works related to the connecting the Paraopeba River Basin water supply systems and the Velhas River Basin.

With an investment of approximately BRL 577 million, the goal of these works, (the Pará de Minas Pipeline, expected completion July 2020; the Brumadinho Pipeline to connect the Velhas and Paraopeba River systems, expected completion September/October 2020; the Carlos Prates Pipeline, which is linked to the interconnection works, expected completion April 2020) is to guarantee the water supply for the municipality of Pará de Minas and the metropolitan region of Belo Horizonte.

Beginning of the pipeline works in Pará de Minas (MG). Photo: Vale Archive.

Provisional housing

The company has provided extensive support to help minimize the impact on the lives of people who have lost or had to leave their homes due to the rupture of the dam. From the first moment, when approximately 360 affected people were hosted in hotels, inns and the houses of friends and relatives, until they had temporary housing, Vale has aimed to carry out the process with respect, care and agility. In Brumadinho, 98 families are already in temporary housing, and their rent paid is by Vale.

The process of providing temporary housing includes the involvement of families in the choice, with respect to their profile and way of life, in order to minimize the inevitable impacts generated by the process of change. The benefit constitutes a package that includes payment of rent, IPTU, water and electricity bills; gas assistance; basic food basket proportional to the number of residents in the house of origin at the time of removal; complementation of furniture and trousseau, when necessary; transportation to move goods of interest; and adjustments that ensure animal welfare, in the case of families that have domestic animals. These families are also eligible for a one-time donation in the amount of BRL 5,000 and the payment of compensation for material and moral damages.

During and after the moving process, the families are accompanied by professionals - psychologists and social workers - linked to the Family Reference Program, who offer them psychosocial support.

The full assistance to the affected person, however, does not end with the compensation process. For the recovery, the families also need support in planning their future. This is made possible through the Comprehensive Assistance to the Affected Program (PAIA from the acronym in Portuguese), which includes five lines of support: planning and financial education, support for the purchase of residential, rural or commercial properties, support for the resumption of

farming activities and rural technical assistance, support for the resumption of small business activities and assistance for microentrepreneurs and income supplement activities.

Funeral assistance

Funeral assistance was provided to representatives of the deceased. This assistance included notary expenses, transfer of bodies, urns, ornaments, graves, burial and other funeral provisions.

Team of professionals from the Family Reference Program working in Brumadinho and region. Photo: Vale Archive.

Health and psychosocial support

One of Vale's main concerns after the dam rupture has been the health of workers, family members and the population of Brumadinho. To strengthen this assistance, the company signed a cooperation agreement with the Municipality for transfers that already total BRL 32 million destined exclusively to the expansion of health and psychosocial assistance in the region. By the beginning of November 2019, more than 18,000 medical consultations and psychosocial health care services were provided to the population[3].

Regarding epidemiological surveillance, the company mapped and treated potential breeding sites for the Aedes aegypti mosquito in 34 neighbourhoods in Brumadinho – 1,198 hectares and 1,883 breeding sites were mapped, with drones that launched insecticides, in addition to smokers; carried out an inspection of the emergency works area to identify potential breeding grounds for vector mosquitoes; conducted epidemiological monitoring of dengue and other arboviruses in Brumadinho and in the Paraopeba River Basin. Health education actions were also carried out: in nine schools in the municipality of Mário Campos, with lectures were given on diseases transmitted by Aedes aegypti; theaters and information folders were provided from the Ministry of Health, and a gymkhana was held, among other activities.

Family Reference Program

This program was created to guarantee assistance to people and families directly affected by the rupture in a humane and fair manner. It brings together a team of almost 70 specialized professionals to assist families and respond to their demands in a systematically and continuously manner. In 2019, about 840 families from Brumadinho and evacuated territories (Barão de Cocais, Nova Lima and Itabirito) were monitored and approximately 37,000 visits were made. For more details on the impacts generated by evacuation and key mitigation actions, see "Territories evacuated by dam security measures" on page 35.

For 2020, the program plans to the expand efforts to develop collective practices.

The territories are evacuated when the dam reaches level 2 for risk of rupture and emergency actions are taken. (Read more on the page 93 and here. Plans and methodologies were established to support the achievement of the program's objectives, and the monitoring follows a matrix: Welcoming, Articulating and Accompanying.

The challenges related to the evacuation of communities are diverse, given the specificities of each territory – Macacos, Barão de Cocais and Itabirito. For this reason, the company has allocated specialized multidisciplinary teams to ensure assistance to families, which means dealing daily with objective demands related to access to medicines and special food, as well as subjective issues, resulting from the loss of community living and links with the locality and its traditions. This situation

3 This agreement was homologated in court, by the Judge of the Second Court of Public Finance and Municipalities of Belo Horizonte - MG, where the Public Civil Action is being processed, filed against Vale, after the rupture of Córrego do Feijão Dam I.

results, among other effects, in an increase in alcoholism, depression, a feeling of temporary life and resentment towards the company. It is also important to establish extrajudicial agreements that aim to recompose, in a fair manner, the individual and family losses.

For 2020, the program plans to the expand efforts to develop collective practices to build a psychosocial support strategy that helps to the reframe grief, loss and the families' own lives.

Health Cycle Program

To support the strengthening of the Primary Care network in Brumadinho and nearby municipalities, Vale is implementing the Health Cycle Program, a social technology developed by the Vale Foundation and already implemented in over 30 Brazilian municipalities. Its main objective is to contribute to improving working conditions in Basic Health Care, strengthening the teams' work with the community and contributing to increasing the effectiveness of the care offered in Basic Health Care Units. The program promotes training for teams from basic health units, training of young people for health topics, consultancy to improve municipal Primary Care management, among other activities.

Throughout 2019, the Health Cycle Program worked in the territories of Brumadinho, Mário Campos and Sarzedo following the axes of "Health Promotion and Education" and "Equipping", which Vale hopes will continue to be developed in 2020 together with new fronts: "Young Health Builders", "Community Cycle" and "Support for Primary Care Management".

- "Health Promotion and Education" - 16 basic workshops training 604 health professionals from 50 Basic Health Unit (BHUs) in the cities of Brumadinho, Mário Campos and Sarzedo;
- "Equipping" - On December 19 and 20, 2019, the first delivery of equipment to help increase the effectiveness of health care took place. A total of 689 pieces of equipment, furniture and an information system, were delivered. The next two deliveries are scheduled to take place by June 2020.

Vale employees support program

In August 2019, Vale implemented the Emotional Health Program for emotional and mental health screening, diagnosis, therapeutic intervention, guidance and training. This program was developed by the Occupational Health area and is being implemented by a third-party specializing in the subject – GATTAZHR. They are assisting employees of the paralyzed operations of Jangada and Córrego do Feijão and their dependents, as well as employees of the Special Office for Reparation and Development.

The activities begin with an introdution to educational work to inform the participants about the program, presentating general topics on mental health. A diagnosis is made via a confidential on-line form to identify disorders such as burnout, stress, anxiety, alcohol and drug abuse and post-traumatic stress disorder (PTSD in Portuguese), and referrals are made to individual psychiatric care providers who can prescribe treatment, when necessary. Specific training was also carried out for leaders on how to lead teams in sensitive situations and with cases of mental illness.

The initiative, with an investment of BRL 1.8 million in the last year, has already sensitized approximately 850 of its own employees. Of these workers, many have already benefited from the actions developed, participating directly in the activities: 434 of own employees, approximately 230 third parties and 161 community members.

Social programs, culture and education

Education

In 2019, Vale presented to the Brumadinho Municipal Education Secretariat, programs aimed at training professionals in the network and the education secretariat on structuring the Pedagogical Political Projects, equipping the early childhood schools and structuring reading room. Vale aldo donated a litreary collection.

During the year, the company also engaged in dialogue with state schools in the Brumadinho region, to meet the needs of affected students, teachers and employees, and, in partnership with the Knowledge Station, transported students impacted by the fall of the Alberto Flores Bridge. In addition, the company accompanied the evacuated families to help ensure their children's access to schools after the dam rupture.

Our intention is to help people resume normal life, have positive visions of the future, regain their self-esteem.

Congado, cultural manifestation of quilombola communities. Representatives of the communities of Sapé, Marinhos and Rodrigues, from Brumadinho (MG), participate in this group called Guarda de Moçambique. Photo: Vale Archive

Culture

In partnership with social institutions, Vale aims to promote cultural activities and local vocations. Our intention is to help people resume normal life, have positive visions of the future, regain their self-esteem, and strengthening their communities' collective and productive potential. An example of such initiatives is the support we provide to the Yara Tupynambá Institute, which promotes professional apprenticeship courses in gardening and civil construction officers in Córrego do Feijão and Parque da Cachoeira.

Social projects supported by Vale in the Brumadinho region

Novo Rumo

Vale has carried out the Novo Rumo Project since 2015 in partnership with the Kairós Institute. After the dam rupture, it was strengthened to help the residents of Córrego do Feijão to identify opportunities and recovering self-esteem. More than 60 residents of the approximately 1,000 residents have participated in activities that enhance local vocations, such as building productive backyards and community gardens and creating handicrafts.

Comfio

The Social Workshop Comfio is also currently held in partnership with the Kairós Institute. In the handicraft workshops, the sheltered residents share experiences and feelings to promote the notion of belonging and recovering self-esteem. While creating plots and shapes, the participants strengthen their confidence in the collective and its productive potential.

Semeando Esperança

The Semeando Esperança (Seeding Hope) project is sponsored by the Vale Foundation through a partnership between the Knowledge Station of Brumadinho and the Matizes Dumont Group, a group of plastic artists, which focuses on contributing to the strengthening of the group of people affected by the dam failure through art of embroidery. The project started in August 2019 and has the participation of 44 women. In the workshops, the exchanges and experiences made among them on overcoming pain are valued, with lines, needles and desires of human transformation through art. In November, the Knowledge Station held an exhibition of the participants' embroidery.

Batucabrum

The Batucabrum Project, which previously aimed only at children from the Córrego do Feijão community, was extended to include adults so that they could also participate in singing, choir and guitar classes. The activities take place outside school hours and help children and young people to deal with their losses and process the reality they have experienced. The project currently has the participation of about 120 students, including children, youth and adults, and 17 teachers who held 18 workshops throughout the year. In addition, the project offers tutoring and support for healthy eating.

Support for Indigenous peoples and traditional communities

Vale signed an agreement with the Federal Public Prosecutor's Office, the National Indigenous Foundation (Funai) and chiefs of the Pataxó Indigenous community located in the city of São Joaquim de Bicas for emergency payments to 150 Indigenous people from 46 nuclear families. The company's support also extends to the Quilombola communities Marinhos, Sapé, Ribeirão and Rodrigues, in Brumadinho, where more than 600 residents are being assisted. In addition to supporting health and providing independent socio-economic consultation to assess possible impacts on the environment, the agreement also provides for technical assistance to Indigenous people.

Re-signification

One of the most important aspects of the reparation process takes place in the symbolic field, that is, in respect for the feelings and memories aroused in people impacted by the dam rupture.

Vale's teams involved have endeavored to confer human character and exercise empathy in all aspects of the relationship, being available to provide emotional support to those who seek it and responding to requests related to symbols or procedures that arouse negative feelings, such as changing the colour of uniforms or the visual identity of vehicles, and altering bus routes to prevent people from traveling on streets where relatives of victims live, and the visual identity of the vehicles.

This concern is also demonstrated through dialogue maintained with the community, through joint projects to the re-signify of the impacted territories, in particular the Córrego do Feijão community. One of these initiatives will be a memorial in honour of the victims of the disruption, to be built on land near the village headquarters.

Percussion class of the Batucabrum Social Project, in Brumadinho (MG). Photo: Vale Archive.

The memorial will be a way of affirming the company's commitment to "never forget Brumadinho" and never to repeat what happened. Until December 2019, the parties involved in implementing this project - Vale, Avabrum and the Pró Brumadinho Committee - were looking for alignment on the site's architectural concept. The forecast is that, throughout 2020, validation of the memorial's architectural project will occur and its construction will begin.

Another project that has been developed with the community is the construction of a community center in which residents can practice activities that help them overcome their grief. At the same time, the Memórias Project, in partnership with Museu da Pessoa, will showcase a collection of testimonies to transform the oral history of the community and the families of the victims into a form of tribute to those who died.

Território Parque

The Território Parque Project, in Córrego do Feijão, presented by Vale in December 2019, aims to requalify the region through infrastructure improvement. It involves renovating, paving and urbanizing streets, houses and structures, economic reactivation and development of local tourism, in addition to memorial initiatives to honour victims of the rupture.

To make the region a socio-environmentally sustainable destination, the company is in the process of implementing an Urbanization Plan for the central area, which ideally will adding value to its potential as a tourist destination and improving its public facilities and road intrastructure. The forecast is that the works will be completed and delivered to the community in 2021.

Financial support, agreements and decisions

To provide immediate assistance to family members and others directly affected by the rupture, Vale decided to make financial donations to those affected that are not linked to the indemnities that would be paid to them. In 2019:

- Approximately 270 families of fatal victims received a donation of BRL 100,000;
- Approximately 100 residents of the Self-Rescue Zone (ZAS) received a donation of BRL 50,000;
- Approximately 95 people whose had their businesses or rural productions were impacted by the disruption received a donation of BRL 15,000.

Emergency indemnities

The emergency indemnities aimed to promote agile solutions to critical issues. To this end, Vale signed an agreement[4] with the Federal and State Public Prosecutor Offices, the Public Defender's Offices of the Union and the State and the State and Union Public Attorneys' Offices that allowed emergency compensation payments to all residents of Brumadinho and residents within one km of the Paraopeba River canal. Sixteen Registration Posts were opened in Brumadinho, and another 22 Registration Posts in other locations. At the end of 2019, nine service stations were still open.

From January 25, 2019, with a fixed term of one year, a minimum monthly wage was paid for each adult, half a monthly minimum wage for each teenager and a quarter of a minimum monthly wage for each child from families living in regions located up to one kilometre from the shore of the Paraopeba River, from Brumadinho to the city of Pompéu, in the Retiro Baixo Dam. More than 48,000 families received payments throughout 2019, covering more than 106,000 people.

In November 2019, the Preliminary Agreement Term (PAT) was renewed to pay of emergency aid until October 2020, to those affected by the rupture of Dam I, in Brumadinho.

The new agreement[5] established:

- Emergency payment will continue for another 10 months, beginning from January 25, 2020, in the same parametres established in the previous PAT:
    - For people who lived, on the date of the rupture, in the communities of Córrego do Feijão, Parque da Cachoeira, Alberto Flores, Cantagalo, Pires and on the margins of the Ferro-Carvão stream on the date of the rupture;
    - For affected people, including those residing in locations other than those mentioned, who are currently participating in the support programs developed by Vale: housing, social assistance, agricultural assistance and assistance to local producers assistance;
- For other people, not covered by the previous criteria and who currently receive the emergency payment, continued the payment will be equivalent to the amount of 50% of the values established in the previous PAT;
- The extension reaches people who are already registered as eligible in the emergency indemnity database and those who were registered by the date of the term approval (November 28, 2019), whose process is under analysis and who will be recognized as eligible;
- The amounts mentioned will be paid as a new emergency indemnity and will be discounted and considered as a future collective indemnity;
- Communities may be included or excluded by agreement between the parties or by the initiation of their own procedural incident.

Up to April 2020, on the date of closing this report, the payment of emergency aid relating to this TAP totaled BRL 1,292 million.

The payment of emergency aid is an issue that gives rise to many discussions and complaints in the territory, as many affected people question the criteria defined and declare that the solution made available to the collective does not meet their individual demands. Vale believes that emergency payment is only one of the elements that make up its reparation to the affected parties and its function should be analyzed in an integrated manner that includes consideration of the other mechanisms and actions implemented.

4 Judicial homologation, by the Judge of the Second Court of Public Finance and Municipalities of Belo Horizonte - MG, where the Public Civil Action is being processed, filed against Vale, after the rupture of the Córrego do Feijão Dam.
5 Also homologated judicially by the Judge of the 2nd Circuit Court of Belo Horizonte - MG

TJMG Decision

The Second Court of Public Finance and Municipalities of Belo Horizonte issued in July 2019, a decision declaring Vale's responsibility for repairing the damages resulting from the rupture of the tailings dam of the Córrego do Feijão Mine, which may occur either at the initiative of the company (maintenance of the reparation actions) as for compliance with the reparation plan to be prepared by the court expert.

Labour agreement

Vale and the Public Labour Prosecutor's Office of Minas Gerais signed in July 2019, an agreement[6] through which the phase of knowledge of the Public Civil Action was ended, establishing the following compensation parameters for the families of the deceased workers, victims of the rupture of Dam I: parents, spouses or partners and children will receive, individually, BRL 500,000 for moral damages and also the payment of an additional insurance for work accidents in the amount of BRL 200,000. Siblings will receive BRL 150,000. There will also be the payment of material damage to the nucleus of dependents, the minimum amount of which is BRL 800,000. There will be the benefit of day-care assistance in the amount of BRL 920 per month for children up to the age of 3, and education assistance in the amount of BRL 998 per month for children between the ages of 3 and 25. A lifetime health plan will be granted for spouses or partners and for children up to 25 years of age and, by Vale's own decision, the lifetime health plan has also been extended to parents.

The agreement also provides stability to the own and outsourced workers, who were crowded into the Córrego do Feijão Mine on the day of the rupture, and to the survivors who were working at the time of the rupture, for a period of three years, starting on January 25, 2019, and can be converted into cash benefits. In August 2019, Vale deposited in court the amount of BRL 400 million as payment of collective moral damages, due to the signing of the agreement.

As a result of this payment, the Judiciary ordered the release of the amount of BRL 1.6 billion, initially blocked from Vale.

By the first week of April 2020, 624 agreements had been entered into, including 1,591 family members of 244 workers, out of a total of 250 deceased. The total value of the agreements entered until the beginning of April 2020 was approximately BRL 1 billion.

Vale is also making individual agreements with the surviving workers, being those who were working at the Córrego do Feijão Mine at the time of the dam's rupture, as well as with the workers who were linked to Córrego do Feijão and Jangada Mines on the day of the rupture. By the beginning of April 91 agreements had been signed, including 109 beneficiaries, worth approximately BRL 28 million.

Individual agreements

In addition to emergency compensation, Vale and the Public Defender's Office of the State of Minas Gerais signed a Term of Commitment establishing parametres by which those affected can receive compensation individually or by family group, through formalizing extrajudicial agreements, taken to court, with an average processing time of 60 days. The community can look for the indemnity offices in Brumadinho, Barão de Cocais, Nova Lima and Belo Horizonte. By April 2020, at least 4,866 out-of-court civil settlements had been signed, of which 4,105 have been ratified; of these, 62 are in in the process of being paid and 4,043 had already been paid, totaling approximately BRL 843 million. In relation to the 20 deceased of the community, as a result of the rupture of Dam I, 7 agreements have already been made with relatives.

Comprehensive Assistance Program for Affected People

To support and guide people in resuming routine and planning for the future, Vale structured the Comprehensive Assistance Program for Affected People. Participation is voluntary and aimed at people who are already receiving individual compensation. Assistance and consultancy is focused on financial planning and education; purchase of residential, rural or commercial properties; resumption of agricultural activities and rural technical assistance; resumption of small business activities; assistance to microentrepreneurs and complementary income activities; and social monitoring, all carried out by technical teams. In 2019, the program obtained 1,009 adhesions, which represents 34.7% of those eligible, and each individual/family can join more than one support front.

In addition to the individual agreements, labour compensations and related emergency aid, approximately BRL 3 billion have already been paid by April 2020.

Financial support for maintaining the service offer and support to institutions

Vale made an agreement with the Association of Mining Municipalities of Minas Gerais and Brazil (AMIG) to make financial contributions in order to support the cities where the company's operations were paralyzed and contribute to the maintaining the provision of essential services to the municipalities' populations. Such contributions were equivalent to:

- BRL 80 million in financial compensation for the city of Brumadinho, due to the interruption of productive activities, to be transferred within two years after the agreement;
- BRL 14.5 million transferred to the Brumadinho Tourism Association to support the advertising campaign to encourage tourism;

6 Homologated by the Judge of the Fifth Labour Court of Betim - MG

- BRL 2.6 million transferred to the City of Brumadinho to purchase of emergency equipment and hire health and psychosocial professionals, among others;
- BRL 30 million for Social Assistance and Health to those affected by the rupture of the dam, via agreement with the City Hall;
- A contribution of BRL 5 million to the Civil Defense of Minas Gerais and BRL 4 million to the Military Police of Minas Gerais to purchase equipment, structural improvement and professional training for the corporation;
- A BRL 20 million contribution to the Military Fire Brigade of Minas Gerais, to acquire of more than 7,000 pieces of equipment, make structural improvements and provide professional training, in recognition of corporation's work and heroism;
- An investment of BRL 70 million to acquire 77 operational vehicles delivered to the public security agencies of Minas Gerais: 50 vehicles for the Military Police; 13 vehicles for the Fire Department (buses, trucks and vans); two vehicles for the Civil Police and 12 vehicles for the Civil Defense (automobiles, vans and trucks);
- BRL 258.7 million, only in 2019, in financial contributions to support the cities covered by the agreement with AMIG, where operations were halted, covering 10 municipalities in addition to Brumadinho (Barão de Cocais, Belo Vale, Congonhas, Itabirito, Mariana, Nova Lima, Ouro Preto, Rio Acima, São Gonçalo do Rio Below and Sarzedo).
- An additional BRL 107 million per year, transferred to the State Government, in ICMS taxes on the sale of Vale's ore to steel companies in another state.
- The company imported and donated DNA recognition equipment (Illumina) to the Belo Horizonte Forensic Medicine Institute (IML), which contributes to the work and speeds up the process of identifying the victims of the rupture. In addition the company purchased BRL 6.5 million worth of equipment to donated to the Institute.

Economic Recovery

One of the objectives of the measures Vale adopted to repair the affected territories was to boost economic diversification and the expand of productive capacity to generate jobs and income, considering territorial dynamics. In this context, Vale has performed actions to qualify and strengthen the existing production chains, as well as studying new business opportunities and attracting investments. To strengthen tourism, the company held meetings with the Tourism Association of Brumadinho and Region (ATBR in Portuguese) to build a strategic plan. Participatory workshops were held in Encosta da Serra, Casa Branca and Brumadinho with the participation of 82 individuals whose work involves tourism.

The National Institute of Science and Technology Program (INCT in Portuguese), with the participation of a group of researchers linked to the National Council for Scientific and Technological Development (CNPq), was hired to develop proposals that allow socio-economic development of the municipality, reducing its dependence on mining and creating tools that enable the transformation of the local reality of Brumadinho, involving the communities

The actions suggested by the INCT ranges from urban upgrading of public spaces, monitoring the health of the population to promoting economic activity to investments in urban drainage, collection and treatment of sewage and drinking water in the municipality.

In Brumadinho, initiatives are already underway in the areas of education, tourism, health, job and income generation, urban mobility, infrastructure and sanitation. For the Paraopeba basin, Vale awaits the Brazilian Government's and other competent bodies' commitments to implement repair and compensation actions in the impacted territory.

Inaugural class of the Yara Tupinambá Project in Parque da Cachoeira. Photo: Vale Archive.

Environmental reparation

Environmental reparation takes place on two major fronts: socioenvironmental and municipal compensation. The actions related to the socio-environmental reparation of the physical environment have unfolded in monitoring and studies of water quality, sediments, waste/tailings, as well as air quality, noise and vibration, among others, with a goal of interfacing closely with Vale's Engineering Department regarding emergency and containment works.

In this sense, one of Vale's priorities after the rupture of Dam I was the recovering the hydrographic basin of the Paraopeba River and its surroundings. This operation was divided into four fronts: preservation of local flora and fauna; removal of tailings on land and within the river, and thereafter assigning them to safe and controlled areas; containment of tailings, with the goal of preventing them from reaching the river in rainy periods; and monitoring and recovery of water and soil quality.

After almost a year of studies focusing on recovering the water quality of the Paraopeba River, more than 31,000 samples were collected at approximately 90 points along the Paraopeba and São Francisco Basin that resulted in more than four million analyses of water, soil, tailings and sediment, which meant to help monitor the conditions of the Paraopeba River. Such monitoring was carried out in consonance with the Instituto Mineiro de Gestão das Águas (IGAM in Portuguese) and showed that the sediment plume did not reach the São Francisco River, which makes it possible to concentrate environmental recovery efforts in the Paraopeba River Basin.

Studies were also carried out to evaluate the potential toxic effects of the tailings present in the water and sediments of the Paraopeba River, by means of analyses of labouratory organisms. Such analyses have not indicated toxic effects on the river water to date. The company also collected more than 100 tailings samples along the basin of the Ferro-Carvão stream (including within Dam I). The samples collected supported the characterization of the tailings to be "Non-Dangerous - Inert and Not Inert" waste according to ABNT Standard NBR10.004. The research and analysis work was performed by specialized labouratories and consultants, hired by Vale. The monitoring evaluated the effects of ongoing mitigation actions to act more effectively in reducing impacts.

All studies were reviewed and validated by the Coordination of Graduate Programs in Engineering at the Federal University of Rio de Janeiro (COPPE - UFRJ). Frequent Turbidity analyses were also carried out at 16 river points, using automatic probes. The turbidity plume is contained in the reservoir of the Retiro Baixo Plant, about 315 kilometres away from the rupture site.

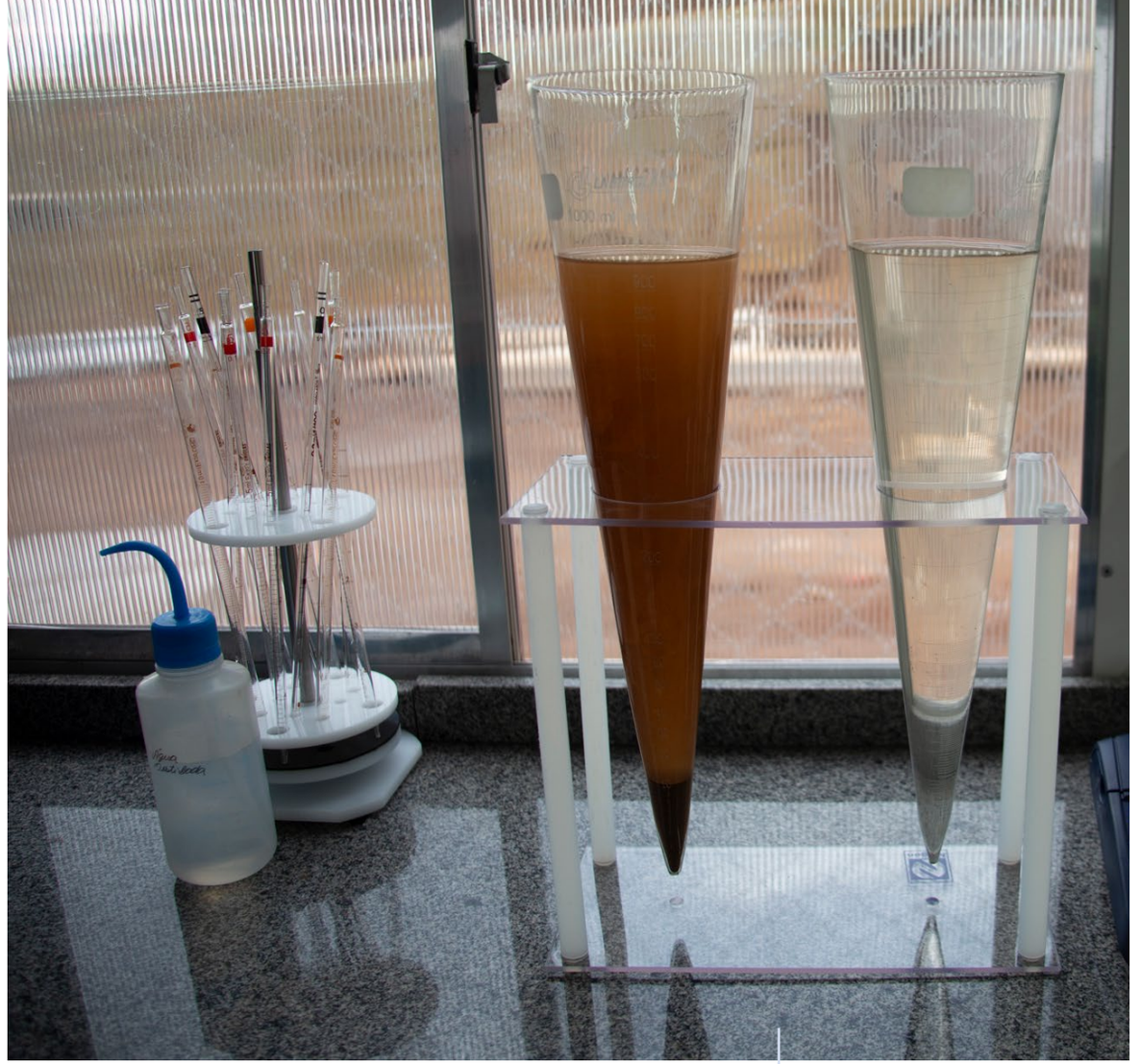
At the end of May 2019, Vale invested in the construction of the River Water Treatment Station (ETAF acronym in Portuguese), located in the Alberto Flores region. Three months later, ETAF had already managed to return more than 1 billion litres of clean water to the Paraopeba River. The water treated at the station arrived with values around 6,300 NTU (turbidity measurement unit) and was returned to Paraopeba with turbidity below 29 NTU, on average. The turbidity standard set by the National Environmental Council (Conama) for a class II river, such as Paraopeba, is up to 100 NTU.

To promote and strengthen the relationship with the community, in addition to presenting the work carried out in the treatment of water, ETAF opened the stations for residents, schools in Brumadinho, public agencies and other institutions. Through visits it is possible to learn about the operation of the station and how the water treatment contributes to the environmental recovery of the Paraopeba River. Still in 2019, Vale installed the second River Water Treatment Station in Brumadinho to work in integration with the dredging process of the Paraopeba River.

Dredging, an important stage in the environmental recovery of the Paraopeba River, the work is planned to continue in 2020, starting at the confluence of the Ferro-Carvão Stream with the Paraopeba River and continuing for about two km downstream from this point. In this stretch, it is estimated that between 300,000 m^3 and 350,000 m^3 of the material discharged by Dam I failure are deposited. Through dredging, the accumulated waste is removed in the silted region of the Paraopeba. The removed material is stored and dehydrated in large bags, and then transported to an appropriate area in the Córrego do Feijão Mine. The water drained from these bags is pumped to a treatment plant and returns cleanly to the Paraopeba River. By December 2019, approximately 5.8 billion liters of treated water had been returned clean to the Paraopeba River and Ferro-Carvão stream.

Vale signed a Term of Commitment (TC) with the Public Prosecutor's Office of the State of Minas Gerais (MPMG)[7] establishing the transfer of all water resources and sediment monitoring actions along the Paraopeba River Basin and on the São Francisco River to the Minas Gerais Water Management Institute (IGAM). Through this agreement, in addition to this transfer, the company hired an independent technical auditor, responsible for supervising the transfer process, which is expected to last 26 months. During this period, the audit has the task of supervising the monitoring carried out by the company. All other costs inherent to the TC are the responsibility of Vale. For ten years, the company will continue to pay for monitoring activities.

7 Judicial homologation by the Judge of the Second Circuit Court of Belo Horizonte - MG, where the Public Civil Lawsuit is being filed against Vale, after the rupture of the Córrego do Feijão Dam



Water before and after being treated at the River Water Treatment Station (ETAF), in Brumadinho (MG). Photo: Vale Archive.

In the areas of reparation intervention, throughout 2019 Vale also monitored air quality (six monitoring stations with operations started in June) and noise and vibrations (13 evaluation points, with operations started in October. At the end of 2019, automatic equipment was installed for data emission and noise and vibration alerts that operate 24 hours a day.

Treatment of the Paraopeba River

Clean and treated water at ETAF is returned to Ferro-Carvão stream.

Approximately 90 daily water quality monitoring points, between the Paraopeba River and the mouth of the São Francisco River.

- Monitoring points also installed along Ferro-Carvão Stream, Paraopeba and São Francisco Rivers to their mouths in the Atlantic Ocean, in the reservoirs of the Retiro Baixo and Três Marias Plants, in addition to the main streams of Paraopeba.
- In the period from January to June 2019, five membrane systems were installed in the Paraopeba River with the goal of containing ultrafine sediments and minimizing the advance of the turbidity plume.
- Containment and removal of tailings: implementation of structures along the Ferro-Carvão Stream to reduce the sediment transport to the Paraopeba River, in addition to contributing to the cleaning of the river and the Ferro-Carvão Stream, so that they return to normal conditions.

Implemented structures

Structures: BH0 Hydraulic Filter Barrier. Built with about 30,000 m^3 of rock and approximately 100 metres long.

Dike 2: built to retain the material deposited along the Ferro-Carvão Stream, thus reducing water turbidity.

BH1 Hydraulic Barrier: built with approximately 60,000 m^3 of rock and extending 280 metres to retain thick sediments.

Overview of bags used for storage and dehydration of tailings dredging. The water drained from these bags is pumped to ETAF and returns clean to the Paraopeba river. Photo: Vale Archive.

Sheet piles: installed in the Alberto Flores region, the curtain consists of 75 steel piles 12 metres long and 1.4 metres wide. Coupled to each other, they form a 105-metre linear barrier that helps to prevent carrying solids to the Paraopeba River. The tailings contained by sheet piles in the Alberto Flores region are collected using a pumping system and taken to the River Water Treatment Station. Excavators are also being used to remove sediments accumulated upstream and downstream from the piles.

River Water Treatment Station (ETAF): the mass of sediment and water pumped from the sheet pile bus is taken to the ETAF, where the water goes through filtering and sediment removal processes and is returned cleanly to the Paraopeba River. The treatment plant has the capacity to treat approximately two million litres of water per hour. The decanted solids in the sedimentation basin are directed to large pockets responsible for storing and dehydrating the tailings. The solids decanted in the sedimentation basin are directed to large pockets responsible for storing and dehydrating the tailings. The water drained from these bags also goes through the filtration process and returns clean to the Paraopeba River. The solids left in the bags are removed and transported to an appropriate area in the Córrego do Feijão Mine. The water drained from these bags goes to a treatment plant and returns clean to the Paraopeba River.

Sheet Pile- General View. Photo: Vale Archive.

The actions to contain the waste play an integrated role with the dredging and water treatment initiatives.

Together, they contribute to the environmental recovery of the Ferro-Carvão stream and the Paraopeba River. Despite the conclusion of the emergency containment works, the search work of the Fire Department, the removal and management of tailings and the environmental recovery of the impacted areas was kept in progress.

The Minas Gerais Fire Department momentarily stopped, for the first time, on March 21, 2020 - after 422 uninterrupted days with a staff of 3,618 military personnel - the search for the victims of the rupture of the Mina de Córrego do Feijão Dam in Brumadinho, as a measure of prevention, confrontation and contingency of the pandemic of the new coronavirus. The operation will return with the finding of no new cases of local or community contagion in the state.

River Water Treatment Station (ETAF), in Brumadinho (MG). Photo: Vale Archive.

Biome recovery

The actions aimed at the Biotic Environment were distributed in five major axes: Terrestrial Fauna, Aquatic Fauna, Biodiversity Monitoring, Suppression of Vegetation and Recovery of Degraded Areas. For Terrestrial Fauna, activities were performed aimed at emergency rescue of and prospecting for fauna, driving away and rescuing fauna as a result of emergency works, in addition to monitoring the impacted fauna. Vale had the support of consulting companies and partnerships with universities and institutions for animal care and environmental restoration, to try to recover the loss and fragmentation of natural habitats, as well as the alteration of aquatic and terrestrial environments, among other environmental issues.

One of the main actions to rescue and care for animals after the dam rupture involved a multifunctional team of veterinarians, biologists, zootechnicians, among other environmental experts. These professionals who worked to track, rescue, monitoring and care for the local fauna throughout the affected area, covering both domestic and wild species. The injured rescued animals were sent to the Campanha Veterinary Hospital, which was set up to deliver emergency care, and, later, to the Fauna Shelter Farm (FAF acronym in Portuguese), located near Brumadinho. Large and wild animals, on the other hand, were sent directly to the FAF - those that needed rehabilitation were sent to specialized institutions for their complete recovery and reintroduction.

By December 2019, over 900 animals had passed through the two structures of hospital, both domestic (890) and wild (39). At the farm, 912 animals (835 domestic and 77 wild) were treated. To support this work, Vale also implemented the Adoption and Post-Adoption Program, and held three adoption fairs held, which resulted in 115 animals being adopted, including cats and dogs, and another 67 being transferred to temporary homes. The initiative is part of an agreement signed with the Public Prosecutor's Office of Minas Gerais in the Preliminary Commitment Term (PCT). In addition to hosting the adoption fair, Vale took responsibility for monitoring the adopted animals for six months.

Vale also plans to replenish the local flora, through reforestation and environmental reintegration in the impacted area. In 2019, it was possible to revegetate approximately 12 hectares. Other actions will start as soon as the set of tailings removal and containment works are at a more advanced stage. By 2024, five million seedlings are expected to have been planted to restore native vegetation throughout the impacted area. Part of these seedlings are grown simultaneously in Reserva Vale, in Espírito Santo, and in partnership with regional nurseries in the Cerrado biome.

To rescue seedlings, seeds and epiphytes from the target areas of suppression, we developed the Flora Conservation Program. By December 2019, nearly 1,600 specimens, from around 160 different species, were rescued. Among these species, orchids, cacti and bromeliads stand out, in addition to threatened or protected species. In addition, actions to conserve DNA conservation from endangered species were part of our Recovery of Degraded Areas activities.

Ground Zero

The Ground Zero Project consists of reconstructing of the original conditions of the Ferro-Carvão Stream and the revegetation with native plants from the riparian forest region, in addition to recovering of the Paraopeba River. The area covered by the project starts at the curtain of metal piles, installed near the new bridge on Avenida Alberto Flores, continues for around 400 metres downstream along the Ferro-Carvão Stream and, after joining the Paraopeba River, goes for around another two kilometres along the river.

The program was in the pilot phase at the time this report was published. It will be evaluated, adjusted and, if its efficiency is proven, it can be replicated case by case in other impacted areas. So far, the program appears to have demonstrated efficiency in the face of rains registered in the region. The pilot project is expected to be completed by the end of May 2020.

The project's first challenge was to restore the stream's layout. For this, we removed 130,000 m^3 of tailings were removed from the stretch. With the use of Green Wall technology, the recovery of the watercourse appears to have been was carried out. After the reconstruction of the canal, the surrounding area was reorganized, recovering its original topography.

Reforestation

The revegetation process of the area comprised by Ground Zero will be executed in three phases. The first phase began after the reconstruction of the Ferro-Carvão Stream shore by applying fertile organic soil and the planting of herbaceous species by means of hydro-seeding (water-assisted seeding technique) on the banks of the channel. Next, bio blankets composed of coconut fiber were installed above the sown layer in order to protect the seeds, retain soil moisture and prevent the emergence of erosive processes, providing an ideal environment for plant germination and development.

In the second phase, medium-sized vegetation is expected to will be planted, which should provide favourable conditions to execute of the third and final phase, which will involve the planting of several native species in the region, attracting fauna and increasing biodiversity. The native species to be used come from seeds collected in the region of Brumadinho itself, thus ensuring a forest restoration compatible with the environmental quality of the region.

All actions are accompanied by the State Forestry Institute (IEF acronym in Portuguese) and an independent technical audit designated by the Public Prosecutor’s Office of Minas Gerais and systematically reported to the competent bodies.

Infrastructure recovery

Throughout 2019 Vale performed, in the infrastructure area, emergency works for environmental recovery on a number of different fronts to contain and remove tailings to fous of on minimizing the impacts caused and contributing to improving people's lives. The executional details of all the works have been defined with the regulatory bodies, and strives to respect legal guidelines and public policies.

To execute this set of works, approximately 45 companies, 584 pieces of equipment and 2,800 workers were mobilized. At least half of these workers are residents of Brumadinho and the surrounding region. Investments in 2019 totaled around BRL 651.9 million in reparation and compensation works (which include infrastructure and social welfare projects, such as day care centres, courts and road maintenance), of which BRL 524.9 million were spent to contain and remove of waste alone. These investments are expected to reach approximately BRL 1.8 billion by 2023.

Ground Zero - pilot project for environmental recovery of area impacted. Photo: Vale Archive.

Part of the compensation work includes a commitment term signed with the Brumadinho City Hall for the construction of public equipment and for improvements in urban infrastructure in the communities of Tejuco, Córrego do Feijão, Parque da Cachoeira, Pires, Cohab, Carmo and Palhano. Among the commitments made are the construction of daycare centres, a soccer field, a family health unit, paving, public lighting, sewage infrastructure and a drinking water supply.

Among the main reparation works carried out, with their respective investments, the following stand out:

Works	Investment (BRL million)
Tailings handling	227.34
Dredging of the Paraopeba River	79.7
Dike 2's construction	63.6
Hydraulic barrier implementation	57.3
Access restoration and Alberto Flores bridge	43.5
River Water Treatment Station (ETAF in Portuguese) at Ferro Carvão Stream	34.8
Ferro Carvão Stream Shore Coating	18.8
Recovery plan for degraded areas	6.2

Among the main initiatives, in addition to the full restoration of the Paraopeba River is the repair of Alberto Flores Bridge, which was concluded and become available for community use on April 10, 2019. Built on Alberto Flores Avenue, the bridge restablish safe two-way traffic between the central area of Brumadinho and communities such as Parque da Cachoeira, Córrego do Feijão, Aranha and Casa Branca. A pedestrian walkway was also installed, with lighting powered by a solar energy system.

Vale also made improvements to the Cantagalo community road and built a new section to re-establish complete access to the road. With about 3.5 km, the road connects the districts of Córrego do Feijão and Cantagalo to the Center of Brumadinho. In addition, Vale carried out maintenance and improvements on approximately 700 km of roadways in Brumadinho and other impacted cities, such as São Joaquim de Bicas and Mário Campos, in order to mitigate the impact of heavy vehicle traffic on local roads.

Strengthening agriculture

A partnership between Vale and the City Halls of Mario Campos and Brumadinho and the Associação Mineira de Supermercados (AMIS in Portuguese) enabled 13 local producers to participate in the Superminas Fair in Belo Horizonte. This was the first step in a project to strengthen small producers in the region. The experience resulted in the construction of a farmers' development plan, which bring up to 300 properties assistance with marketing, socio-productive organization, compliance with relevant legislation, product traceability and consequent valorization of the agricultural product from the Brumadinho region.

Main restoration works for environmental recovery of Paraopeba River:

Containment / Work	Situation
Rail Stabilization Barriers	Concluded ●●●●●
Hydraulic Filter Barrier BH0	Concluded ●●●●●
Dike 2	Concluded ●●●●●
Hydraulic Filter Barrier BH1	Concluded ●●●●●
Sheet Piling (Alberto Flores)	Concluded ●●●●●

Water Treatment / Work	Situation
Rainwater treatment Plant (Alberto Flores)	Concluded ●●●●●
Rainwater treatment Plant (Alberto Flores)	In Progress ●●●●●
Paraopeba river Dredging	In Progress ●●●●●
Water Treatment Plant (Lajinha)	Concluded ●●●●●

Dam safety recovery

After the Dam I rupture at the Córrego do Feijão Mine, Vale has accelerated its plan to de-characterize its upstream dams. The goal is to reintegrate these structures into the environment and, therefore, mitigate the risks they pose to people in surrounding communities. The plan considers all the upstream structures, including the drained piles, which were required to be decharacterized after a change in National Mining Agency (ANM in Portuguese) legislation. The project of de-characterizing of these structures has a foreseen investment of approximately USD 2.6 billion.

Vale's plan is for these structures to lose their dam characteristics, according to the technical project. In the last stage of the de-characterization, according to the plan, the site will be revegetated. The work has been underway since the beginning of 2019 - in December, work on the first of nine upstream dams announced in January (the 8B dam, located at the Águas Claras Mine in Nova Lima) was completed - and will continue in the coming years. Read more about dam de-characterization on page 91.

Work on the first of nine upstream dams was completed.

Dam 8B, located at the Águas Claras Mine in Nova Lima, before and after being de-characterized. Photo: Vale Archive.

Territories evacuated by dam security measures

One of Vale's priorities in 2019 was to invest in actions to ensure community safety and minimization of impacts. To this end, it launched a set of integrated actions for the communities of Macacos (Nova Lima), Barão de Cocais and Itabirito, which are part of the Impacted Territories Development Plan. Prepared according to the economic and social profile of each of these locations, the plan aims to develop the regions' economic vocations of the regions, in addition to promoting social well-being after changes in the emergency levels of the B3/B4 Dams, Sul Superior and Forquilhas.

With an investment of around BRL 190 million, the company aims to promote tourism, infrastructure, education, health, environment and professional training initiatives. The planning was built based on the demands and needs of the impacted territories, ongoing dialogue with the communities involved and municipal public authorities.

As a way to compensate the communities evacuated in Barão de Cocais, Macacos and Itabirito, Vale undertook a series of actions and programs, always focusing on caring for families and seeking to improve the living conditions of the affected populations. In these communities, the company aims to provide vital assistance to families. In total, 334 families (196 in Barão de Cocais, 125 in Macacos and 13 in Itabirito) are residing in houses rented by the company, hotels, regional inns, or in houses of friends and relatives, according to choices of those affected.

In addition, the company has placed multidisciplinary teams of psychologists, social workers and doctors at the disposal of these communities. This assistance aims to provide, for example, access to medicines and special food for those in need. Vale commitment is to continue supporting the hosted population until the situation is normalized.

Macacos

In Macacos, our the actions aim to encourage local tourism - one of the local vocations most impacted by the evacuation of the region due to the increased risk of the Macacos B3/B4 Dams. As well, these actions will reduce impacts to the residents' routine. In 2020, Vale will hopes to implement a comprehensive Urbanization Plan for the central area, which would add more value to the tourist infrastructure. Investments in public goods are also planned, such as the restoration of the Church of São Sebastião das Águas Claras (built in 1718), the installation of public parking and road recovery.

Another area of activity is economic diversification, with an estimated contribution of around BRL 1.5 million to the Municipal Tourism Fund (FUMTUR acronym in Portuguese). The goal is to enable workforce training programs, which, in turn, can enable productivity gains and service development.

Although the tourist attractions were not directly affected, people stopped visiting Macacos, due to the fears of the risk of a new dam breaking. Local businessmen and employees who worked on the developments were had their businesses completely affected. Increasing communication is being established with the community, through which we advise on measures taken to reduce risks and holding consultations for local investment works. One of these works is the Macacos Requalification Plan, which covers the complete architectural revitalization plan for the tourist village of Macacos and includes public squares for events and shows. The objective is to make the local community even better positioned to receive tourists than it was before.

Barão de Cocais

The plan in Barão de Cocais includes actions such as cleaning and desanding of water courses, constructing containments for unstable areas on the banks of these water courses located inside the city headquarters to minimize the risk of flooding in the city, and improvements in urban infrastructure - such as revitalizing public squares, and construction day care centres, developing professional training programs and strengthening of the Municipal Primary Care Program for the Family. We have also made investments in sports projects and teacher training have also been made. In the health area, we have made financial contributions were made to the Municipal Hospital to help them hire temporary hiring of professionals, support in the opening of an Emergency Assistance Unit (UPA in Portuguese), in addition to support for the implementation of the municipal emergency rescue system (SAMUB acronym in Portuguese) and the donation of an ambulance to complement the SAMUB fleet[8].

A new school was delivered to the Macacos community. Photo: Vale Archive

8 This work was made possible by the signing of a term of agreement with the City Hall, duly homologated by the Judge of the Civil Court of Barão de Cocais, where the Public Civil Action, filed against Vale, is being processed, after the raising of the alert level of the Sul Superior Dam.

The objective, built in common agreement with the impacted communities and the public authorities, is to improve the urban infrastructure of Barão de Cocais and maximize the regions' tourist potential by promoting events and attractions, such as local and religious festivals, local cultural events and local natural highlights. It is noteworthy that the city is part of the Caminho dos Diamantes, one of the routes of the Estrada Real, which goes from Ouro Preto to Diamantina, and the Circuito Entre Serras, a cycling tour in the central region of the State.

We continue to build the compensation plan with the participation of the community. The proposal foresees meetings that will include community representatives, trade associations, municipal councils, City Hall and City Council, so we can listen directly to those involved as they respond to action proposalss that we feel will make sense to the population.

In 2019, Vale signed an agreement[9] to pay of emergency compensation to Self-Rescue Zone (ZAS in Portuguese) residents, evacuees, as well as to Secondary Safe Zone (ZSS) residents who requested temporary housing.

Itabirito

In Itabirito, the projects will be defined together with the community and the newly elected municipal administration, as a result of a decision by the Regional Electoral Court. Among the planned actions already identified are reforms of public goods and equipment, such as the Center for Specialties in Rehabilitation, the municipal school Marzagão, and the Association of Parents and Friends of the Exceptional (APAE in Portuguese); the construction of basic health units (BHUs) and covered courts in São Gonçalo do Bação, Engenheiro Correia and three more at the headquarters of the Municipality of Itabirito; improvements in tourist itineraries; construction of an open-air gym; and projects to train professionals in the local workforce, encourage local businesses and generate income through such events as the Economic Development Week, night race, Illuminated Christmas, and Carnival. We also donated a wagon for the Carnaval's Pastel de Angú project. The Carnaval, established by Vale, receives security, support, checkpoints, ambulances, camera monitoring and Municipal Civil Defense equipment from the company. In addition, we also carried out works to desand the Itabirito River, which minimized the issue of local annual floods

Relocations

- Brumadinho: Approximately 360 people have been allocated in temporary housing, hotels, inns, or the homes of friends and relatives;
- Barão de Cocais (Sul Superior dam of the Gongo Soco Mine): Around 570 people have been placed in temporary housing, hotels, inns, or in the homes of friends and relatives;
- Macacos, Nova Lima (Dam B3/B4 of the Mar Azul Mine): Approximatly 320 people have been placed in temporary housing, hotels, inns, or in the homes of friends and relatives;
- Nova Lima headquarters (Vargem Grande Dam of the Vargem Grande mine): Approximately 30 people have been allocated in temporary housing, their own home or their family's home;
- Ouro Preto (Forquilhas I, II and III dams and Group dam of Fábrica Mine): Approximately 40 people have been allocated to temporary housing and relatives' homes.

9 Agreement homologated in court, by the Civil Court Judge of Barão de Cocais, where the Public Civil Action was filed against Vale, after the raising of the alert level of the South-Superior Dam was raised. The agreement had the participation of the Federal and State Public Prosecutors' Office, the State Public Defender's Office and followed the rationale of Brumadinho's emergency indemnity agreement.

Legal sanctions

There are five criminal investigations related to Dam I. Four of them are still active and intend to assess the probable cause of the dam failure, as well as the responsibilities of those involved. Two of them are being conducted at the State level by the Public Prosecution Service of Minas Gerais. Another other two are being conducted by the Federal level, by the Federal Public Prosecution Service. The fifth investigation has already been concluded by the Federal Police and was aimed to issue the Declaration of the Condition of Stability (DCE) of Dam I and the risk analysis work carried out by the consultancy TuvSud.

Federal investigations:

Criminal Investigation Process (CIP) Nº. 1.22.000.000762.2019-10, led by the Federal Public Prosecutor's Office.

Police Inquiry Nº. 1494/19, led by the Federal Police (investigation of causes of dam rupture).

Police Inquiry Nº. 62/19, conducted by the Federal Police (completed investigation related to the DCE of Dam I and risk analysis carried out by TuvSud).

State investigations:

Criminal Investigation Process (CIP) No. 0090.19.000013-4, conducted by the State Prosecutor's Office;

Police Inquiry Nº. 2019-090-090-002771-001-007977976-69, conducted by the Civil Police.

The Public Prosecutor's Office of Minas Gerais (MPMG in Portuguese) presented to the Justice (Second Criminal Court of Brumadinho), on January 21th 2020, a complaint in which it accused 16 people of double-qualified homicides and environmental crimes resulting from the rupture of Dam I. Vale trusts in the complete clarification of the causes of the rupture and reaffirms its commitment to continue contributing to the authorities.

Regulatory changes

Since the rupture of the Córrego do Feijão Mine Dam I, several regulatory and compliance developments, including the environmental area, have been carried out, both in the mining segment and in the general scenario of Brazilian legislation. There were seven resolutions, 17 decrees and three amendments to laws, which included the implementation of Municipal Law Nº. 2,476 declaring January 25 as a public holiday within the municipality of Brumadinho. In addition, three normative resolutions and six ordinances were published.

Renan Nascimento Ambrósio (intern) and Kassiano de Matos Fernandes Rocha (equipment and facilities operator) at the coal pier at Praia Mole terminal, in Tubarão Port. Photo: Vitor Nogueira.

New pact with society: proximity and transparency

Vale is writing a new chapter in its history focused on transforming its future, promoting especially the socioeconomic development of the regions where it operates. The company is committed to facilitating this process, with the goal of generating of a positive and lasting legacy. Aligned with strategic pillars to transform and evolve the company, Vale aims to ensure the effective management of social and environmental risks and impacts, collabourating on the improvement of safety and industry management standards, essential factors in this trajectory.

The Dam I rupture changed the company's management - not only in terms of reviewing its governance, standards of operational excellence and safety, but also in its engagement with its stakeholders and commitments to local communities and society as a whole.

Vale is focused on regaining the trust of communities and stakeholders in general.

This means that, in the social sphere, respect for human rights is a priority, Vale strives to respect. Vale also aims to prevent and remediate any impact caused by our projects and operations; to support the health and safety of communities; to engage with communities in general and indigenous peoples and traditional communities in particular; and to review and continuous improve grievance mechanisms and investment plans in the communities.

To support the proper and unrelated management of the operational areas, Vale created the Executive Office for Safety and Operational Excellence, which has been transforming the way the company operates in relation to three interconnected themes: safety and risk management, asset management and organization, and process and culture. The Executive Office reports to Vale's CEO and aims to act to manage risks and assets in the operational areas, define and standardize parametres and procedures, and also develop specific assessment processes.

Vale is focused on regaining the trust of communities and stakeholders in general. For this reason, since the Dam I rupture, the company has been aiming to improve the community's ability to listen to and become involved in its participatory and decision-making processes. This will help the company to incorporate different views and finding more convergent paths, which generate value not only for shareholders, but for all the parties involved. The company also strives to implement actions to prevent events such as the rupture of Dam I from happening again. Vale's objective is to increasingly share its commitments and performance on all fronts of the company's operations and on all matters relevant to society.

The company has also assumed a commitment to implement actions to guarantee the non-repetition of events such as Brumadinho.

Renova

The Renova Foundation is responsible for carrying out programs to repair the social and environmental impacts caused by the rupture of the Fundão Dam, in Mariana (MG). Vale participates in the Governance of the Renova Foundation through the Board of Trustees, to which it has the right to appoint three full members and three alternate members.

Approximately BRL 7.8 billion have been invested in the 42 programs agreed in the Term of Transaction and Adjustment of Conduct (TTAC), of which BRL 7.3 billion have been invested in remedial actions and BRL 0.5 billion in compensatory actions. Only in 2019, BRL 2.6 billion were invested, which represents an increase of around 24% compared to 2018. Within the scope of reparatory actions, since 2015, approximately BRL 2.1 billion in indemnities and financial assistance have already been paid, which represents approximately 320,000 people attended. In 2019 alone, the amount paid was approximately BRL 858 million, an increase of about 16% compared to 2018. For 2020, the first review of Renova's programs is scheduled, and reparation actions are expected to reach BRL 12 billion by the end of 2020.

Over four years, the set of actions carried out shows progress, revisions of structures and adjustments to programs in a wide range of activities undertaken. There is still a long way to go. However, the results achieved in 2019 indicate greater technical efficiency and broad stakeholder participation in definiting and implementing ongoing solutions.

The results achieved in 2019 indicate greater technical efficiency and broad stakeholder participation.

One of the achievements of 2019 is the start of construction on the houses of Novo Bento, a new location planned to shelter the residents of Bento Rodrigues. The site was chosen and designed with the broad participation of its new residents, following the best worldwide references for resettlement, such as the International Financial Corporation (IFC) Performance Standard 5 for Land Acquisition and Involuntary Resettlement. Also in 2019, construction also began on the new site that will house the residents of Paracatu de Baixo, which is also being planned under the same standards.

Environmental indicators continue to show the restoration of water quality in the Doce River to conditions prior to the Fundão rupture. After treatment, this water is now safe to consume.

To report the main relevant facts related to biodiversity in 2019, Renova issued the annual report on aquatic biodiversity monitoring in the Espírito Santo portion of the Doce River and the adjacent coastal and marine portion.

Regarding sustainable land use, about 230 rural properties located upstream of Hydroelectric Power Plant Risoleta Neves now receive actions to promote the resumption of their agricultural activities and environmental recovery, aligning projects to restore, conserve and produce, with no known planting restrictions in recovered rural properties.

We continue to provide training and technical support to municipalities to help them prepare and get approval of basic sanitation projects and plans, allocating more than BRL500 million in compensatory resources.

In the health area, Renova has been working with governments in the states of Minas Gerais and Espírito Santo to develop a specific methodology for Integrated Environmental Management for Health and the Environment, with a focus on mapping and managing possible risks to human health associated with the disruption at Fundão, as well as necessary actions for its management.

In relation to management transparency, Renova Foundation has a Whistleblower program and its own channel, which confidentially receives complaints regarding internal and external actions through the Whistleblower Denunciation Channel. As provided for in Governance TAC, the selection process for the Whistleblower program aims to be is open, collabourative, transparent and structured. It is managed by people who are qualified to adequately and efficiently exercise the function, have an unblemished reputation and have no professional or personal relationship with the managers.

See more at www.fundacaorenova.org

Chapter 2

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Vale

Profile

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With operations i 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, ferro-alloys, copper, metals of the platinum group metals (MGPs in Portuguese), 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.

To ensure support for the transportation of the produced ores, from their extraction in the mines to their delivery to customers, there are distribution centres (DCs) and maritime chartering activities. Through our affiliates, joint ventures or direct participation, we have relevant assets in the energy, steel and bauxite segments. Our raw materials supply various industries worldwide, such as the steel and automobile industries.

Vale is a publicly traded private organization with corporate headquarters in the city of Rio de Janeiro, Brazil. Our shares are traded on the Novo Mercado of the São Paulo Stock Exchange (B3). Vale is also present in the financial markets of New York (NYSE) and Madrid (Madrid Stock Exchange - Latibex).

In 2019, the company ended the year with 149,300 employees (71,100 own and 78,200 third parties), 75.6% of which were allocated in Brazil.

Mission

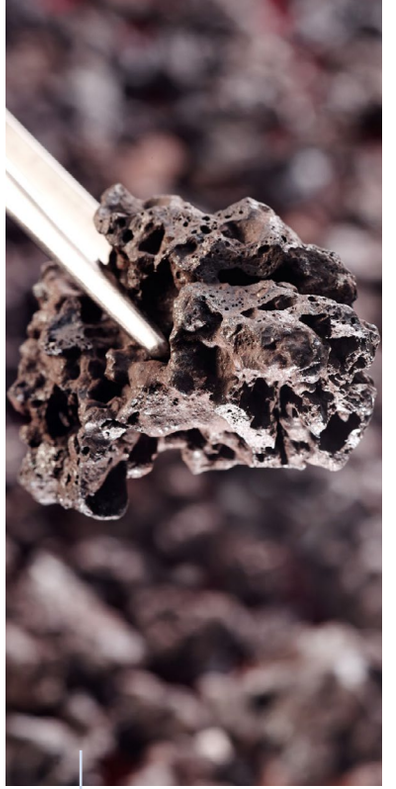
To transform natural resources into prosperity and sustainable development.

Vision

To be the number one global natural resource company in creating long term value, with excellence, passion for people and the planet.

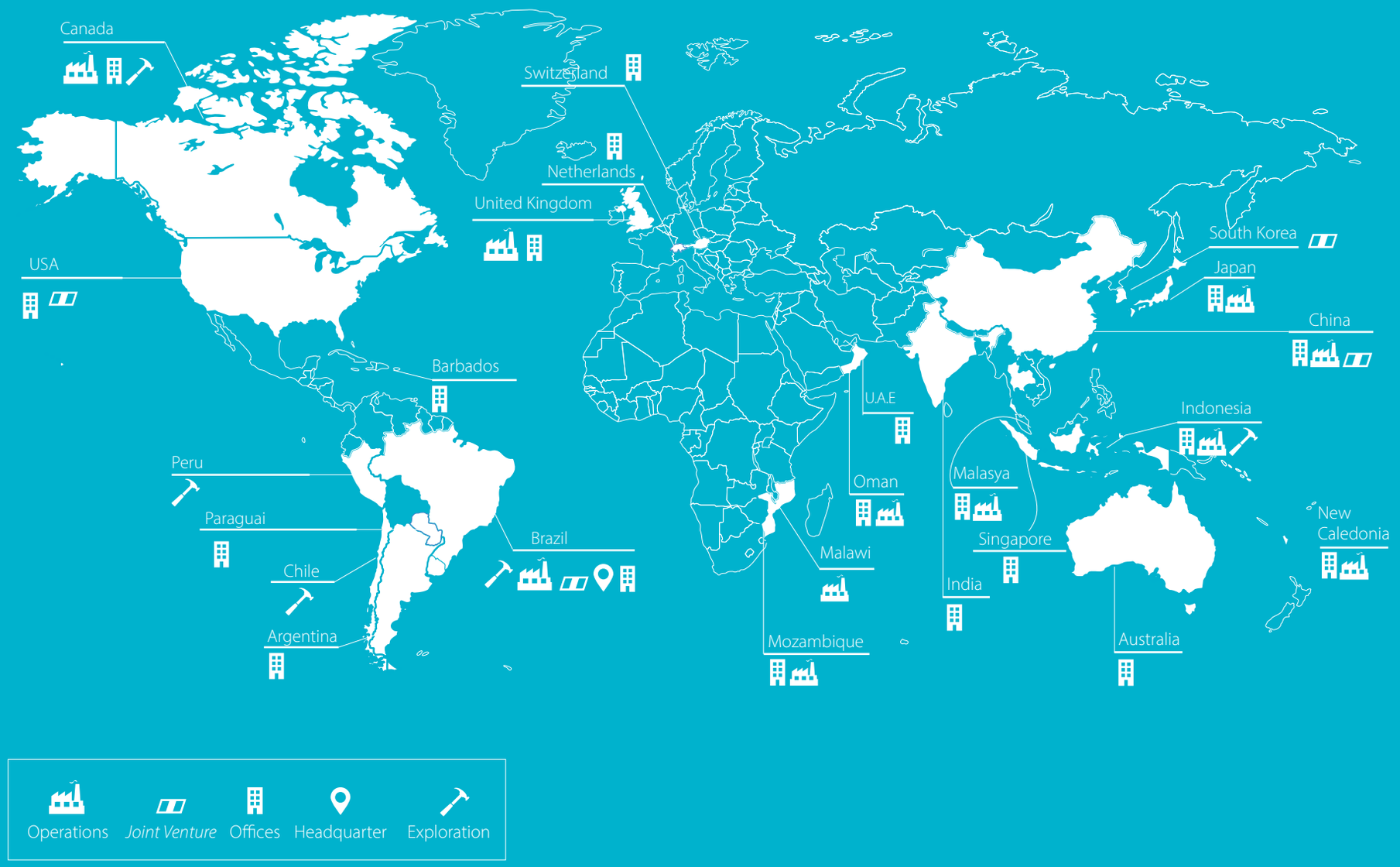
Values

- Life matters most.
- Value our people.
- Prize our planet.
- Do what is right.
- Improve together.
- Make it happen.

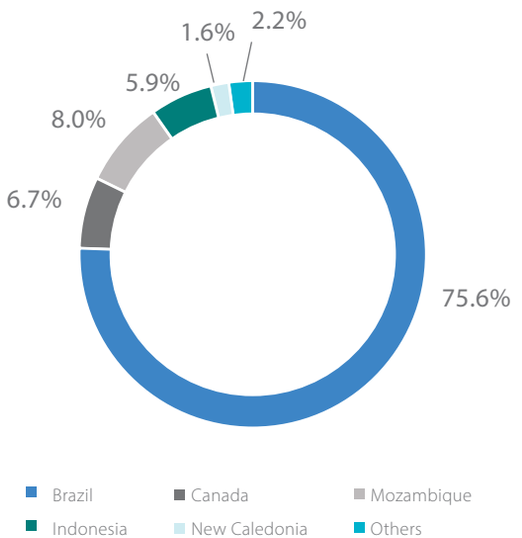


Vale is one of the leaders in global ore market of iron. Photo: Vale Archive.

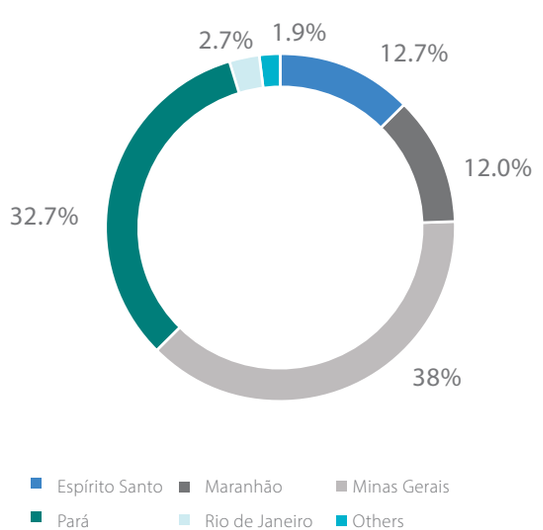
Global operations



Distribution of own and third party employees by region (2019)



Distribution of own and third party employees by Brazilian state (2019)



Strategic pillars

Safety and operational excellence

To transform the way we operate in relation to three interconnected themes: (i) security and risk management, (ii) asset management and (iii) organization, processes and culture – through the Vale Production System (VPS).

New pact with society

To positively impact society, going beyond taxes, social projects and the reparation of Brumadinho, becoming a sustainable development enabler in the areas where we operate and fostering a safer and more sustainable mining industry.

Base Metals transformation

To keep on track with the transformation of the Base Metals business unit, applying best practices throughout all its operations.

Discipline in capital allocation

To keep focus on value creation and safety of assets, investing in the sustainability of production and in protecting and increasing margins.

Maximize flight to quality in Iron Ore

To leverage our strengths in Vale's world-class reserves, assets and logistics, to maximize the value of our premium portfolio of products.

Governance

GRI 102-18

Vale's governance model was developed with the objective of achieving the principles of role clarity, transparency and stability in guiding the company's actions. The policies of Sustainability, Anti-Corruption, Human Rights, Mitigation and Adaptation to Climate Change policies and the Code of Conduct, among others, are instruments that align us with market practices and regulations and legislation in the public and private sectors. All of these documents are on our official website at www.vale.com.

The Board of Directors, a link between shareholders and leadership, is the body responsible for guiding and directing the management of the organization and has a duty to ensure its longevity. For this reason, its attributions refer to strategic and monitoring matters.

Our Board of Directors is responsible for defining Vale's general policies and guidelines, evaluating plans and projects proposed by the Executive Board and assessing the results achieved.

Notes to the flowchart

I. Eduardo Bartolomeo temporarily assumed the position of CEO of Vale, on March 1, 2019. Until that date, the position was held by Fabio Schvartsman. On April 29, 2019, Eduardo Bartolomeo was definitively confirmed in the position.

II. Marcello Spinelli, who had been acting as CEO of VLI Logística since 2010, took over the executive board of Ferrous on May 27, 2019, which had been occupied by Cláudio Alves and, previously, by Gerd Peter Poppinga, since March 1, 2019.I

III. Mark Travers, former Legal Officer of Institutional Relations and Sustainability of Base Metals, temporarily took over as Chief Executive Officer of Base Metals on March 1, 2019.

IV. Carlos Medeiros was appointed executive officer of the new Executive Board of Safety and Operational Excellence on June 5, 2019.

Board of Directors

GRI 102-19 | 102-20 | 102-22 | 102-23 | 102-24 | 102-26 | 102-27 | 102-28 | 102-29 | 102-31

Vale's Board of Directors acts as guardian of the company's corporate governance model and practices. At monthly meetings, the Board of Directors, among other duties, deliberates on the strategic guidelines and the strategic plan proposed by the Executive Board. It also evaluates the economic and financial performance and the corporate and financial risk policies, elects the executive officers and establishes their duties, remuneration and goals.

Since the Annual General Meeting held on April 30, 2019, the Board of Directors has 13 members, three of whom are women, three are independent and another represents Vale's employees. In 2019, 46 meetings were held. For more information, see the Governance section, at the Vale ESG portal.

The company does not currently have a formal appointment policy approved by its Board of Directors, but it clarifies that the appointment of Board members follows qualification criteria and technical experience, as well as legal and reputational aspects in light of corporate governance best practices, to allow the company to benefit from the plurality of arguments and a decision-making process with regard to quality and safety. The Personnel and Governance Committee reinforced its role as Nomination Committee until 2021, when a specific committee will be set up for this purpose. Read more on the Vale ESG website at http://www.vale.com/esg/.

The Board's bylaws provide for the Board's annual performance evaluation, with the support of the People and Governance Committee, as well as its advisory committees and the governance secretariat. The process is structured based on the diagnosis of each body's operation of each body, and the result is used as a benchmark for the comparative analysis of the composition and operation of the Board in comparison with other organizations with a high level of corporate governance, in Brazil and abroad (peer group).

In 2019, with the support of the Personnel and Governance Committee, the company hired a specialized external consultant experienced in the subject to develop the evaluation process of the Board of Directors and Board Committees (excluding Independent Consulting Committees), as collegiate bodies and individually on the performance of each member.

Vale continues to evolve its governance model, to adapt it to the new requirements of the Novo Mercado regulation, heightened investor demands and to prepare Vale to become a corporation, considering the fact that the shareholder agreement will expire in November 2020, with no provision for renewal. The Board has led changes in cultural aspects and has taken several steps to strengthen Vale's governance further to ensure a proper transition.

In March 2020, Vale published in a new format with greater disclosure, the manual for the Annual and Extraordinary Meetings of Shareholders, to be held on April 30, 2020. In addition to approve the Financial Statements for 2019, items of business include to elect the Board of Directors, to elect the Fiscal Council, to set compensation for 2020, to approve the amendments of Vale's bylaws and the incorporation of wholly owned companies. Access here.

Significant improvements in Vale's governance, processes and team were implemented, aiming to make it one of the safest mining companies in the world. Vale's Board of Directors approved the new Risk Management Policy, establishing, among other measures, four Executive Risk Committees to deal with operational risks, strategic, financial and cyber risks, compliance risks and geotechnical risks, helping a wider flow of information to circulate freely and widely throughout all levels of the company.

Going further, the new Executive Board of Security and Operational Excellence, which reports directly to the Chief Executive Officer and has the authority to interrupt operations based on security reasons, has outlined its work plan for the next two years. Actions covering the four areas around which it is organized: (a) Dam Management, working towards increased safety of Vale dams and alignment with international standards; (b) Asset Integrity, aiming to ensure the maintenance of assets and the safety of operations; (c) Operational Excellence, implementing the Vale Production System (VPS) throughout Vale, ensuring the continuity of the improvements that are being implemented; (d) Health and Safety and Operational Risk, improving the safety culture and mapping risks in a comprehensive manner. One of the main milestones in reducing the company's level of risk is the de-characterization of dams with upstream structures, a process that will continue for years to come.

Overseeing the 3rd Line of Defense, Vale is proposing to its shareholders the creation of the Compliance Officer, who will be responsible for the compliance office, including the integrity department, for the internal audit function and for the Ethics and Conduct Channel, which are directly subordinated to the Board of Directors. The updated governance and lines of defense increase the flow of information within the company, enabling risk-related information to reach upper management.

Fiscal Council

The Fiscal Council is a permanent and independent inspection body that permanently operates apart from the Executive Board and the Board of Directors. It seeks, through the principles of transparency, equity and accountability, to contribute to the better performance of the organization.

The Fiscal Council is responsible for supervising the compliance acts and the fulfillment of its statutory and legal duties; giving an opinion on the Management Report; giving an opinion on the proposals of the management bodies applicable to the alteration of the capital stock, issuance of debentures or subscription bonuses, investment plans or budgets.

Ore extraction and transportation iron in the Santa Cruz mine, in Corumbá (MS). Photo: Ricardo Teles.

Board Committees

The Board Committees advise the Board of Directors, including proposing improvements related to their areas of operation. In order to give greater efficiency and quality to the decisions, the Board ensures the Company's activities are conducted in accordance with laws, ethics and internal controls.

The Board of Directors had in 2019, on a permanent basis, four advisory committees, as follows: People and Governance Committee, Compliance and Risk Committee, Financial Committee and Sustainability Committee. Among this committee's atributions is the validation of strategic climate change guidelines, for example.

Board oversight

The Board deliberates on strategic guidelines and plans, monitors and evaluates Vale's economic and financial performance, analyses its corporate and financial risk policies, elects and evaluates the Executive Officers.

Committee

Audit ***(established in 2020)***
Oversees the quality os financial statements, internal controls, compliance, integrity and risk management.

Personnel and Governance
Evaluates and recommends corporate governance practices, compensation metrics, and borad nomination.

Complince and Rick
Monitors internal controls systems and practices, ensures compliance with all requirements.

Finance
Oversees the capital structure, annual budget and funding, mergers ans acquisitions, capital porjects and shareholders remuneration.

Sustainability
Evaluates the sustainabilty strategy ensuring that it it beign implemented into the overall strategy.

Management

The executive officers are responsable for day-to-day operations and implemetations of policies and guidelines set by Board of Directors.

With the rupture of the Córrego do Feijão Mine Dam I in Brumadinho, MG, Vale's Board of Directors created three Independent Extraordinary Consulting Committees: the Independent Committee for Extraordinary Advisory on Determining of Causes and Responsibilities for the Rupture of Dam 1 (CIAEA in Portuguese), the Independent Committee for Extraordinary Support and Reparation Advisory (CIAEAR) and the Extraordinary Independent Committee on Dam Safety (CIAESB).

This allowed for agility in addressing concerns or critical demands to the highest governance bodies. The Independent Committees aim to anticipate and prevent risk situations and act to determine impacts and reparation actions.

- Extraordinary Independent Consulting Committee for Investigation (CIAEA in Portuguese): responsible for assisting in matters related to the investigation of the causes and responsibilities of the rupture of Dam I. The result of the work was made available in a report to the Board of Directors and its summary was disclosed to the market to ensure accountability to the company. This report contains technical and governance recommendations. The executive summary of the report is available here. In March 2020, Vale defined the deadlines for actions to comply with the recommendations in this final report. The implementation schedule shows that 21 of the 25 recommendations were already being addressed by Vale through actions to improve internal controls. The timeline also foresees that 95% of the actions will be completed by the end of 2020, and that all actions will be finalized by December 2022. The detailed timeline, shared with the competent authorities, is available on Vale's ESG portal.

- Extraordinary Independent Consulting Committee for Support and Reparation (CIAEAR in Portuguese): dedicated to monitoring measures to assist affected people and recover areas affected by the rupture of Dam I. With the conclusion of its work, the Independent Advisory Committee on Extraordinary Support and Reparation (CIAEAR) presented a final report, including analyses of the commitments and actions taken by Vale in response to its recommendations, as well as points for Vale to continue the process of reparation, which Vale has complied with and undertaken to implement. Access the CIAEAR report here.

- Extraordinary Independent Consulting Committee for Investigation for Dam Safety (CIAESB in Portuguese): This Committee aims to advise the Board of Directors on issues related to the diagnosis of the safety conditions of dams and dykes used by the Company in its activities in Brazil, with priority given to structures elevated by the upstream method and those located in areas of special attention, recommending measures to the Board of Directors to reinforce the safety conditions of dams.

Unlike the other two Independent Consulting Committees, the Dam Safety committee will continue beyond 2020, as the discussions around the dam safety standards are still ongoing in the mining industry.

Expert Panel on the Technical Causes of Rupture

To perform a detailed investigation into the technical causes of the rupture of Dam I, Vale hired, through the U.S. law firm Skadden, Arps, Slate, Meagher & Flom LLP, four leading experts in tailings dams (collectively called the "Expert Panel"): Dr Peter K. Robertson, Chairman of the Expert Panel; Dr. Lucas de Melo; Dr. David J. Williams; and Dr. G. Ward Wilson. The Expert Panel was instructed to use its professional expertise and judgment to provide an assessment and report on the technical causes for the rupture of the dam.

On December 12, 2019, the Expert Panel released the result of the investigation in the "Report of the Expert Panel on the Technical Causes of the Failure of Feijão Dam I". The publication, together with ten annexes and an explanatory video, is available here.

Executive Officers

It is responsible for carrying out the business strategy defined by the Board of Directors, for drafting plans and projects, and for Vale's operational and financial performance. The CEO acts as interface between the Executive Office and the Board of Directors.

The current composition is made up of a chief executive officer (CEO) and six executive officers: Finance and Investor Relations, Ferrous, Sustainability and Institutional Relations, Base Metals, Business Support and Safety and Operational Excellence. There are also four non-statutory officers who report directly to the President: the Director of People, Officer of Coal, Strategy and Mineral Exploration, Special Officer of Repair and Development and the General Counsel.

Temporary dismissal of executives

Following the rupture of Dam I of the Córrego do Feijão Mine, in Brumadinho (MG), the Board of Directors received from the Federal Public Prosecutor's Office, the Public Prosecutor's Office of the State of Minas Gerais, the Federal Police and the Civil Police of the State of Minas Gerais the recommendation to remove of executives and employees at the various organizational levels of Vale.

The same Board received requests for temporary removal from their duties of four executives, namely Fábio Schvartsman (CEO), Gerd Peter Poppinga (Executive Officer of Ferrous and Coal), Lucio Flávio Gallon Cavalli (Officer of Ferrous and Coal Planning and Development) and Silmar Magalhães Silva (Officer of Operations for the Southeast Corridor). These requests were readily accepted.

This triggered the previously discussed interim plan, which appointed Eduardo de Salles Bartolomeo (then executive officer of Base Metals) as Vale's interim CEO, from March 1 to

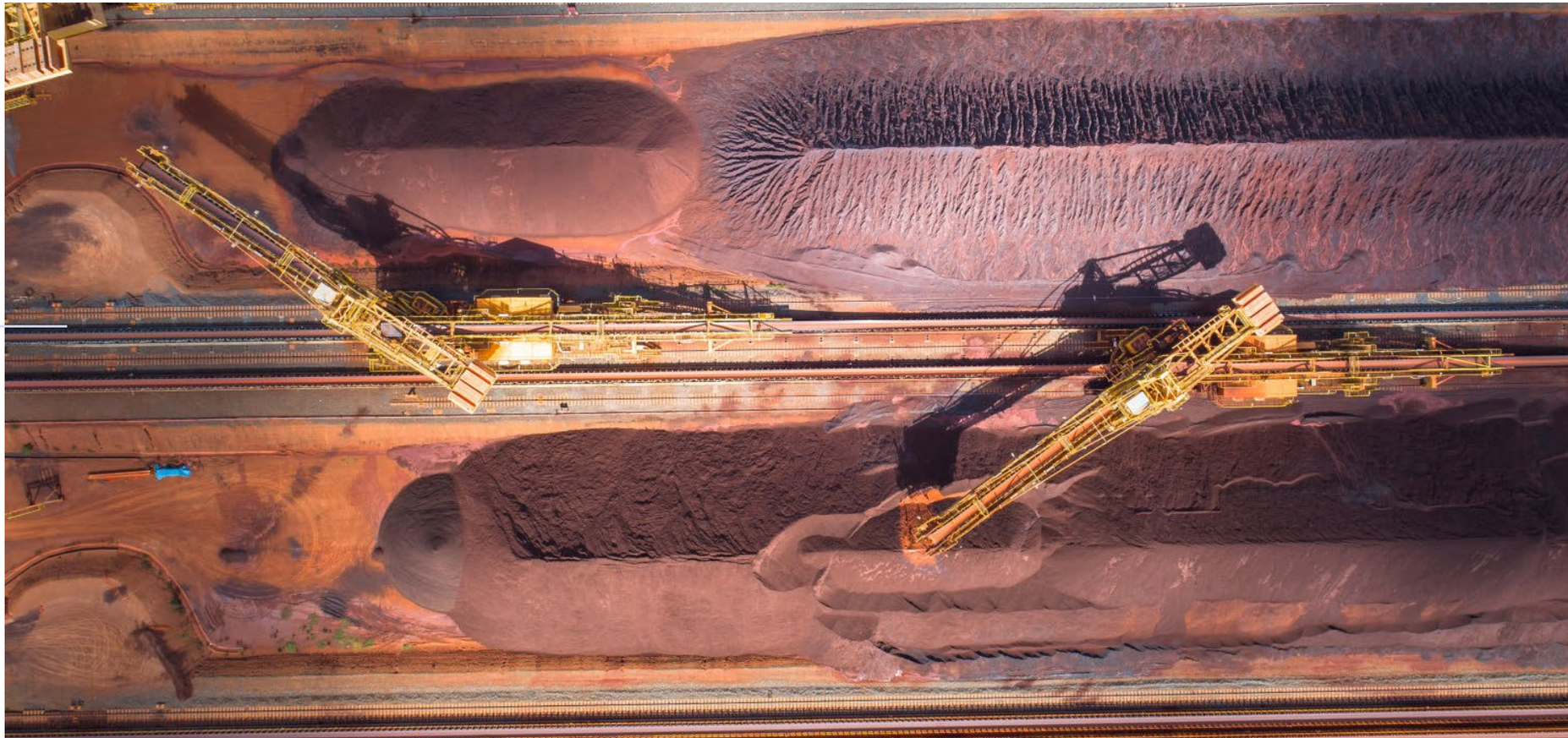
Know that we will only be able to generate greater value for the world through a journey of evolution of our organizational culture.

April 29, 2019. On the same date, Mark Travers (then Legal, Institutional Relations and Base Metals Sustainability Officer) was confirmed, on an interim basis, as Base Metals executive officer. In turn, Claudio de Oliveira Alves (then Officer of Pelletizing and Manganese) temporarily assumed the role of executive officer of Ferrous and Coal, until May 27, 2019, when Marcello Spinelli took over the role.

Cultural transformation

Building a positive social, economic and environmental legacy where we operate, transforming Vale into one of the safest and most reliable mining companies in the world and fully repairing Brumadinho are our commitments to society. In line with these commitments, we know that we will only be able to generate greater value for the world through a journey of evolution of our organizational culture.

In 2019 we dedicate time to building understanding about what we need to change. We have redefined our aspirations, strategic imperatives and key behaviors. We know that such a movement can only happen if it is driven by leadership, which needs to be networked and act as a model for the



Aerial view of storage yard of the S11D Eliezer Batista Complex, Canaã dos Carajás (Pará State). Photo: Ricardo Teles.

entire organization. Therefore, we have invested heavily in developing our leadership through culture-focused workshops, 360º evaluations that measured adherence to behavior, and in building a unique cultural narrative.

Setting standards and ensuring understanding of what behaviors need to be experienced in practice was one of the main objectives of the year.

We also began to rethink and redesign some of our systems that act as important levers of change. We evaluated relevant organizational systems such as our management model, safety and risk, innovation, talent management, work environment, among others, and discussed how they need to support the strategy and can drive the cultural evolution we want.

The creation and dissemination of a Diversity and Inclusion strategy is an example of this movement. There is no way to have a company with open dialogue if there is no diversity of ideas and styles. Diversity can be seen as an insurance policy for any organization as people with diverse perspectives can see risks much more broadly.

We have also made significant progress in creating new symbols to indicate that cultural change is happening. The formation of networks (women, LGBT), changes that reflected the breakdown of silos and greater flexibility in the work environment, new decisions and actions in the face of work accidents are some examples that have generated impact at all levels of the organization.

Some figures from the actions carried out in 2019:

- Five Culture Workshops with the Executive Board focused on cultural evolution + workshop with the leadership teams of Ferrous Minerals and Global Business Support;
- Six meetings with the leaders of leverage (systems), with the objective of mapping the functional initiatives from a cultural perspective;
- Two cultural diagnoses implemented, with quantitative and qualitative mapping of the organizational culture and participation of over 500 employees at all levels;
- Three workshops with the Board and interviews with all Board members;
- Four workshops for training approximately 60 executives with a focus on culture;
- Global launch of the Impact program for the management public, focusing on key behaviors. By the end of 2020, approximately 1200 leaders will have participated in this development journey;
- Engagement of 200 executives focusing on cultural evolution through the Leaders Forum;
- 360º evaluations with focus on the experience of behaviors, performed with approximately 60 executives.

In 2020, we need to strengthen the connection between the levers of change and strategic imperatives and measure added value. These metrics need to be continuous and are essential to advance on this journey of evolution. We need to ensure the scalability of this transformation and activate new networks for change. And to maintain the momentum of this change, we are coordinating culture actions in a timely and consistent manner, and new channels of impact communication will need to be developed to increase employee engagement.

We know that culture is an evolutionary work and that these advances happen according to the rhythm of each organization, in an integrated way with the company's strategy. But there is no doubt that only through this evolution can Vale reach a new level of performance and fulfill its mission to transform natural resources into prosperity and sustainable development.

Vale's locomotive.
Vitória (ES), Brazil.

Sustainability Governance

102-25

Vale's mission to transform natural resources into prosperity and sustainable development 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 Executive Office for Sustainability and Institutional Relations 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.

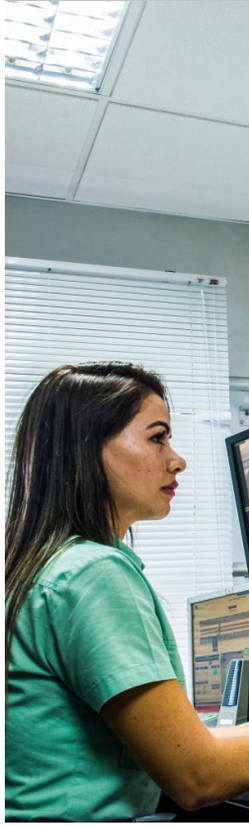
Policies and procedures

The main reference for managing sustainable development at Vale is its Sustainability Policy, which is currently under review and will go for public consultation in 2020. Our Code of Conduct and the Human Rights, Mitigation and Adaptation to Climate Change, Anti-Corruption and Socio-Environmental Investment policies are other important references in the company's strategy and sustainable performance, as well as our Social Relationship and Investment Plan with the Community, the Social Action Guide, among others. In 2019, the Anti-Corruption Policy, the Risk Management Policy and the Human Rights Policy were updated. In addition, the publication of a new Water Resources Management Policy is being evaluated for 2020. These documents can be found here.

Global Sustainability Goals

In 2018 and 2019, Vale updated its sustainability goals for the coming years, in line with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030. By the end of 2019, Vale had met its annual targets for four of these goals aspects (water, energy, forest and socioeconomic). Only the climate change target (greenhouse gas emissions) was not achieved. It currently has six goals for 2030 that cover the main aspects of the company's socio-environmental and governance impact:

Vale's Social and Environmental Goals – 2030 Agenda
Goal: Energy **Previous target:** 100% self-production of clean energy in Brazil **New target:** 100% clean energy self-production globally
Goal: Forest **Previous target:** Recover 100,000 hectares of degraded areas, beyond our borders **New target:** Recover and protect 500,000 hectares of degraded areas, beyond our borders
Goal: Water **Previous target:** Reduce the specific use of new water[10] by 10% by 2030 considering the year 2017 as baseline **New target:** Reduce the specific use of new water by 10% by 2030 considering the year 2017 as baseline.
Goal: Climate Change **Previous target:** Reduce greenhouse gas emissions intensity by 16% **New target:** Reduce absolute greenhouse gas emissions by 33%[11], in line with the Paris Agreement, and become carbon neutral by 2050;
Goal: Socioeconomic Contributions **Previous target:** Health, education and income generation **New target:** Health, education and income generation
New Goal: ESG - Environmental, Social and Governance Gaps **Objectives:** Eliminate key ESG gaps in relation to best practices. We have analyzed the methodology behind our leading ESG providers (ISS, Glass Lewis, MSCI, Sustainalytics, Responsible Mining Index, Dow Jones Sustainability Index). A gap analysis identified approximately 50 gaps concerning best practices, and we have mapped an action plan to close these gaps



10 The specific use relates the removal of fresh water from the environment for use in the processes and activities of Vale's operating units to its production.

11 Aligned with the Science Based Target Initiative (SBTI) methodology. Preliminary evaluation, together with SBTI, indicates that the absolute emission reduction target should be 33% by 2030, with base year 2017. Small adjustments in this percentage may occur during the process of submission and validation of the target in progress.

Indira Almeida Guerra, at the forklift control center at the port of Tubarão. Photo: Vitor Nogueira.

This last goal comprises other specific objectives, among which it is possible to highlight:

- Boost gender diversity: double the female workforce by 2030 from 13% to 26% and increase female leadership from 12% to 20%;
- Obtain ISO 14001 certification for all operations by 2022;
- Establish audit committee in 2020;
- Conduct a Human Rights Policy Review: public consultation with key stakeholders (Concluded. New version of the Human Rights policy published in 2019);
- Link long-term compensation to ESG: from 100% based on Total Shareholder Return to 80% on TSR and 20% on ESG metrics.

Vale launched an ESG Portal to address the need for greater transparency about non-financial information. The portal meets the growing demand for a structured source os information on Vale, dealing with topics of interestet to Investors, risk agencies and shareholders who take into account in their investments companies with corporate transparency. Please find more about our ESG Portal: vale.com/esg.

Vale and sustainability

103-2 | 203-1

Throughout 2019, Vale worked toward its goals in the Sustainability area, through initiatives to mitigate and offset the impacts of its activities, in addition to developing environmental actions and creating value for communities.

In the environmental context, Vale pursued initiatives with the objective of reducing atmospheric emissions, improving the destination of its residues, improving the management of water resources and environmental conservation stand out. On the social side, it is worth highlighting investments in Indigenous communities and traditional peoples, in addition to initiatives related to culture, work and income generation, health and education.

In 2019, Vale contributed USD 738.7 million in social and environmental expenditures, including the values spent with the reparation after the rupture of Dam I in Brumadinho. Of this total, 61% was spent on mandatory actions and 39% on voluntary actions. In the social sphere, the largest investments were aimed at indigenous peoples and traditional communities, in addition to initiatives related to culture, community support and work and income generation, for a total of USD 190.2 million. In the environmental field, the amount spent was USD 548.5 million, mainly related on waste management, atmospheric emissions and water resources. Read more at: http://www.vale.com/esg/.

Sustainability KPIs

The Sustainability KPI goals program 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.

All of these goals, once defined, are registered and monitored in the Career, Succession and Performance (CSP) system. The Sustainability KPIs integrates the variable remuneration of all Vale employees and impacts all hierarchical levels, up to the CEO.

In 2019, the program continued to correspond to 10% of employees' variable remuneration.

Business area	Indicators	Size	Evaluation Metrics	2019 Results
Iron Ore, Pellets and Manganese	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned	●
	Water Resources	Environment	Volume/Production	●
	Hazardous Waste Generation	Environment	Mass/Production	●
	Atmospheric Emissions	Environment	Mass/Time; No. of Overruns of Established Standards	●
	Significant Social Initiatives	Social	Completed Actions	●
	GHG Emissions	Environment	Mass/Production	●
Base Metals	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned	●
	Waste Management	Environment	Mass	●
	Water Resources	Environment	Volume/Production	●
	Significant Social Initiatives	Social	Completed Actions	●
	GHG Emissions	Environment	Mass/Production	●
Coal	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned	●
	GHG Emissions	Environment	Mass/Production	●
	Atmospheric Emissions	Environment	Mass/Production; Overruns of Established Standards	●
	Water Resources	Environment	Volume/Production	●
	Significant Social Initiatives	Social	Completed Actions	●
Supplies	Waste Disposal	Environment	%; Mass;	●
Mineral Survey	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned	●
	Significant Social Initiatives	Social	Completed Actions	●
Energy	Ensure future additional volume of self-production	Energy	Average MW	●
Social Investment	Variation of entrepreneurs' income	Social Investment	Number of beneficiaries	●
	Support for new entrepreneurs	Social Investment	Number of beneficiaries	●
	Families served with dry toilet and/ or cistern	Social Investment	Number of beneficiaries	●
	Basic Health Units that have had expanded services	Social Investment	Number of units	●
	Training of education profes-sionals	Social Investment	Number of beneficiaries	●

Legend:

● *Goals met or exceeded* ● *Goals not met*

Dialogue with stakeholders

GRI 102-21 |102-40 | 102-42 | 102-43 | 102-44 | 103-2 | 103-3

The consequences of the Dam I rupture at the Córrego do Feijão Mine reinforced the need to develop and expand Vale's dialogue with its stakeholders, in a clear, honest and balanced way, in search of building joint solutions to the challenges of the territories in which the company operates.

This context resulted in the ongoing review of channels and mechanisms for listening and communicating with stakeholders to enhance dialogue with stakeholders directly affected by its operations and projects, as well as with society at all. Teams dedicated to institutional and community relations work directly in the territories to strengthen dialogue.

We are fostering the engagement of employees, suppliers, communities, investors, governments, academia, civil society organizations, national and international organizations and companies, among other audiences, through a variety of resources and means, ranging from face-to-face meetings to wide-reaching digital communication vehicles, such as websites and social networks.

The expectation is that, through this review and repositioning, the company can assume a new, more cooperative and empathetic posture, seeking to understand stakeholders's views, in line with the new strategic pillar of the New Pact with the Society.

In December 2019, Vale launched an internet portal to increase the transparency of its actions in the areas of Environment, Social and Governance (ESG) areas. Through the new channel, the company presents its advances and points of improvement in ESG practices in a direct and easily accessible manner. The portal meets the growing demand for a structured source of information about Vale, addressing various topics of interest to investors, risk agencies and shareholders that link their investments to corporate transparency.

In 2019, Vale also implemented the Sounding Panel, made up of five independent members with outstanding knowledge and experience in sustainability, with the aim of promoting "active listening" of Vale's top leadership and capturing the main sustainability messages that the members consider relevant to the mining industry. Three annual meetings are planned with the entire Executive Board present.

Grievance Mechanisms

GRI 102-17 | 102-34 | 103-2

Vale has structured channels with the aim of strengthening the relationship between the company and its stakeholders. These channels, which make up the formal grievance mechanism, can be used by individuals, employees, communities and civil society organizations that may be affected by a certain activity or operation of the company. Vale's grievance mechanisms are composed of the following channels:

- Whistleblower Channel: free contact via telephone, e-mail, electronic form, letter or in person
- Talk to Us: on-line form available on the Vale website
- Hello Railroad: free phone contact (0800-285-7000)
- Digital media: instant messaging over social networks
- Community Relationship Professionals (RCs acronym in Portuguese), who interface personally with stakeholders
- Reparation Service Center: free phone contact (0800 031 0831)
- Indemnification Center: free phone contact (0800 888 1182)

Through these channels, Vale strengthens dialogue and improves relationship management processes, anticipating

and treating risks, impacts and possible conflicts and rights violations.

Demonstrations received by these channels are recorded, handled and responded to. However, at Vale, the channels are at different levels of maturity for the management of the manifestations. In this sense, a work of standardization and integration of information for Brazil has been underway since 2018, and it will later be implemented for the other countries where the company operates.

The community's manifestations are captured, as a priority, by the relationship teams and registered in the Stakeholders, Demands and Issues System (SDI) - where manifestations from other listening channels, such as 0800 and Hello Railroad, are also inserted. It allows the preparation and monitoring of action plans for treatment, as well as the management of response deadlines, generating corporate memory and organizational learning for the relationship.

As part of the relationship management processes, the company monitors a range of indicators such as: number of manifestations met, the generating event, the estimated time for response and completion of the service. In 2019, 12,362 community manifestations (compliments, information, requests, suggestions, complaints and denunciations) were registered globally, of which 65.2% were met within the deadline and 70.8% of these were treated. The main facts that generate manifestations in the period were applications for job openings and payment (which include issues surrounding resettlement process indemnifications[12], fees, taxes, among other types of disbursement), which represent around 25% of the total number of manifestations. The average response time to the protesters is 30 days and the average time for treatment and completion of the manifestation is close to 90 days.

The manifestations regarding Brumadinho were recorded in an exclusive tool. In 2019, more than 69,000 statements were recorded, with 100% of responses made on time and 98% answered.

Channels		Numbers of Registration (2018)	Numbers of Registration (2019)
Hello Railraod	Brazil	261,610	159,472
Reparation Channels*	Brazil - Minas Gerais		>69,000
Community relations professionals	Brazil, Malawi, Mozambique, Oman, Peru	8,483	12,362
Contact Us	Global	16,200	12,329
Social medias	Brazil	10,169	193,817
Ethics and Conduct Channel	Global	2,888	3,507
Global Headquarters Phone	Global	27,600	43,031

*The manifestations regarding Brumadinho and Reparation were captured in the different channels available by Reparation area (0800, PAs, RCs, among others). Such manifestations can also be captured on other channels and directed to the Special Office for Reparation and Development.

12 Data on resettlements that occurred in Mozambique in 2019.

Records of community manifestations in 2019

(registered in SDI - Stakeholders, Demands and Issues tool) *

Country	Total manifestations	Main fact generating manifestation	% response on time**	% attendance***
Global	**12,362**	**Job openings**	**65.2**	**70.8**
Brazil	5,177	Access (mobility)	80.9	92
Mozambique	7,112	Job openings	70.6	78.6
Malawi	17	Job openings	53.6	55.5
Peru	45	Support for work and income generation projects	30	100
Oman	11	Support for social projects	93.2	82.9

*This table does not include the manifestations related to Brumadinho.

**Answers on time are the manifestations in which Vale provided information or made a decision on the outcome of the claim within the time period established with the stakeholder.

***Attendances are the manifestations in which Vale's commitment to action took place within the deadline established with the stakeholder.

Distribution of agricultural inputs to beneficiaries of the Agricultural Livelihood Restoration Program in Nampula, Mozambique. Photo: Alcino Mucama.

Risk management

GRI 102-25 | 102-30

In its operations and project feasibility analyses, Vale seeks to identify and assess risks associated with the multiple dimensions of the business: environmental, social, reputational, financial, human rights and health and safety, climate among others. The objective is to map out the causes and establish preventive and mitigatory actions necessary to keep risks within acceptable levels.

Striving to better manage its risks, the company adopted an integrated flow of Risk Management Governance, based on the concept of three lines of defense, compatible with its approach and governance of the company and seeking to more effectively in determine and mitigate risks inherent to its processes.

Shortly after the rupture of the Brumadinho dam, the Board of Directors and the Executive Board adopted several measures to understand the event and further strengthen risk-related governance. These measures included:

- The hiring, by the Company's management, of a panel of experts, composed of world-class geotechnical and engineering experts, to investigate and report on the technical causes of the rupture of Dam I. Read more at page 48.
- Creation of Independent Extraordinary Advisory Committees, composed of independent and experienced members, with an unblemished reputation, to collaborate in identifying the causes of the incident and in planning actions to support the reparation efforts and prevent recurrence. Read more at page 48.
- Launch of the Geotechnical Monitoring Center.
- New Risk Management Policy defined and approved by the Board of Directors.
- Creation of 4 Executive Risk Committees, reporting to the Executive Board, with different scopes of activity, allowing greater focus on:
  - Operational Risks
  - Geotechnical Risks
  - Strategic, Financial and Cyber Risks
  - Compliance Risks
- Internal lines of defense were reinforced, while external sentries, such as public authorities, increased scrutiny of the Company's practices in the geotechnical field.
- In June 2019, the 2nd Line of Defense was strengthened, with the new Executive Officers for Safety and Operational Excellence created with the objective of making CVRD one of the best in the world in terms of operational standards. The new Executive Board acts independently of operations and has the authority to close any unit whenever necessary. It has been conducting a global risk assessment, a complete analysis of the Waste Management System, the relaunch and analysis of the Vale Production System (VPS) and the strengthening of our global maintenance structure.
- To oversee the 3rd Line of Defense, a Compliance Officer is being created, who will be responsible for the integrity department, the internal audit department and the Reporting Channel, and will report directly to the Board of Directors. This matter is subject to the approval of changes to the Bylaws. Updated governance and lines of defense increase the flow of information within the company, allowing information related to risks to reach senior management.

The Safety and Operational Excellence Executive Office, acting as the 2nd Line of Defense , adopted new measures in 2019 to improve the management of operational risks, of which the conduction of a new, comprehensive and structured process of hazard identification and risk assessment - Hazard Identification and Risk Analysis (HIRA), whose main results include: an updated list of the main operational hazards, regardless of their probability of occurrence; a complete risk analysis for each main hazard; a revised list of critical assets and critical controls associated with the main hazards; a list of actions to be implemented to further reduce operational risks. This process will assess all Vale's operational units by the end of 2020. By March 2020, 30 sites with around 1,200 major hazards have been assessed. These risk assessments have mobilized 4,000 employees by the closing date of this report. This structured process will be repeated in a cycle of 3 to 5 years. From this risk sweep, it is possible to rectify or ratify the controls and critical assets by assessing and reviewing, when necessary, their performance requirements. This structured methodology has the benefit of improving risk KPIs (the KRIs) and better managing safety critical controls and assets.

Risk management at Vale supports the strategic planning, budgeting and sustainability of its businesses, strengthens our capital structure and asset management, and inserts risk-based management concepts and criteria to our operation and maintenance of assets and logistics modes. See more information at http://www.vale.com/esg/pt/Paginas/GestaoRiscos.aspx

Dam Management

Vale significantly increased its expenditures with the improvement of the Waste Management System. We also invested in preventive measures and safeguards to ensure that accidents with catastrophic consequences never occur again.

Vale is committed to continuously increase the reliability of its operational processes, besides keeping its Tailings Management System in permanent alignment with the most stringent international practices whose standards exceed the local legal requirements. There are two Geotechnical Monitoring Centers (CMG in Portuguese), one located in Nova Lima and the other in Itabira, both in the state of Minas Gerais. These monitoring centers operate 24 hours a day, 7 days a week and monitor approximately 100 geotechnical structures. CMGs provide accurate information to support fast and reliable decision making. Read more at page 91.

Internal layer of defense

Business Unit				
Geotechnical operations team	Geotechnical support team	Saftey & Operational Excellence Office	Independent Board Committee for Dam Safety	Compliance Office (Internal and Wistleblower Channel)

External sentinels

Engineer of Record	External audit	Public Prosecutors
Constant assessment	Semiannual assessment	Independent Auditors for about 100 structures
Issue of Declarations of Sensibility Conditions		

Ethics and Compliance

GRI 205-1 | 205-2 | 205-3 | 307- 1 | 419 -1

The principles of ethics and integrity are directly linked to one of Vale's values: "Do what is right". The company has zero tolerance for bribery and, therefore, prohibits all forms (direct or indirect).

These guidelines must be followed by everyone who acts on behalf of the company, internally and externally. In this sense, Vale has a Code of Conduct[13], which, together with the Global Anti-Corruption Policy and the Global Anti-Corruption Manual, comprise the Global Anti-Corruption Program, which is under the responsibility of Corporate Integrity. The program is aimed at all employees, administrators, service providers, suppliers, distributors, consultants, representatives, agents, brokers or any other professionals contracted to represent, act on behalf of, for the benefit of, or in the interest of the company.

An employee who fails to comply with those standards may also be exposed to disciplinary actions and to personal legal risk.

Managing ethics and integrity is a joint responsibility of the areas of Corporate Integrity, the Ethics and Conduct Office, Procurement, Corporate Security, Auditing, Sustainability, Human Resources, Communications and Internal Controls. Each of these areas has an important role to promote ethics and integrity in our company. The Communication and Human Resources areas support the Global Anti-Corruption Program in carrying out communication and training activities, which strengthen the culture of compliance and anti-corruption at Vale. Various actions are carried out, such as on-line and on-site training, mass communications, updates on the intranet and the Vale website, as well as campaigns and other initiatives.

13 In 2019 the Code of Conduct was updated. The new version reinforces the whistleblower protection, granting that under no circumstances, there will be any breach of confidentiality, intimidation or retaliation of any whistleblower.

Employees trained in anti-corruption policies and procedures

GRI 205-2

Country	Number of employees trained
Brazil	3,248
Canada	368
China	42
India	2
Indonesia	326
Japan	71
Malasya	143
Mozambique	207
New Caledonia	7
Oman	22
Paraguay	1
Singapore	35
Switzerland	10
United Arab Emirates	4
United Kingdom	5
Total	**4491**

One of the company's main actions to promote reflection on ethics and integrity is the "Action for Integrity", held annually since 2015. Through this event, we reinforce the attitudes expected of anyone who witnesses violations of Vale's Code of Conduct are reinforced. In 2019, the sixth edition had 53,112 participants, among employees and third parties, and its theme was "A winning team will not be silenced".

Every year, on the Fighting Against Corruption International Day, an email is sent to all employees, in which the CEO reinforces Vale's values and zero tolerance of any form of corruption.

The Sustainability area works collabouratively with the Global Anti-Corruption Program. This area is responsible for planning social and environmental investments, which are an important way for Vale to contribute to the development of the regions where it operates to improve public well-being and community relations.

All social and environmental investments made by Vale for the benefit of society are subject to a strict diligence conducted by Corporate Integrity, to ensure the integrity of operations. This process is described both in the Social and Environmental Investment Policy, as well as a dedicated chapter in Vale's Global Anti-Corruption Manual and should be carried out only through: Donations (including technical and/or financial cooperation agreements); Sponsorships, Contributions (referring to associations with similar or equivalent entities that require institutional representation) and Services.

In order to properly manage its value chain, Corporate Integrity relies on the support of Corporate Security, which performs due diligences on third parties that interact with Vale, whether they are suppliers, subcontractors, or recipients of donations or sponsorship payments. In 2019, 20,553 due diligences were carried out on Vale's third parties.

In addition, suppliers that bring greater exposure to the risk of corruption to Vale, a risk defined according to the service to be provided, receive the Anti-Corruption Policy and must apply these rules when providing services.

Vale has a supplier registration and certification system, managed by the Procurement area, which ensures that due diligence is performed on suppliers. In addition, the area plays an essential role in making these suppliers aware of the importance of combating corruption, together with the Corporate Integrity team.

In the period, no allegations of corruption in relation to public officials were substantiated. Three cases of private corruption involving suppliers were confirmed. Each of the three cases was analyzed by the company, and resulted in the termination of the supplier's contract, the supplier being blocked from future work with the company and three company employees were dismissed.

The Global Anti-Corruption Program also brings together rules related to gifts and hospitality, requiring approvals above de minimus amounts, and providing specific guidelines for gifts and hospitality involving government officials. The Program prohibits facilitation payments unless if made because an individual's safety or liberty, or someone else's safety or liberty would be at risk if the payment is not made (and after all other reasonable options to avoid such risk have been tried). However, such payments and the circumstances surrounding them should be reported as quickly as reasonably possible to the Corporate Integrity department. These payments must be recorded accurately in the company's books and records as extortion/facilitation payments made to preserve personal safety.

The Internal Controls and Audit areas provide support in the continuous reporting and execution of controls. In addition, the Corporate Integrity area has its own tools and controls for information analysis, and company representatives also work to ensure that Vale group companies establish and maintain internal control systems similar to those required by the Program.

Finally, it is prohibited for Vale and its subsidiaries in Brazil or abroad from making, directly or indirectly political donations and contributions (including donations or contributions to political parties and their respective representatives or candidates, or to election campaigns).

Channel available for all employees and to the external public.

Ethics and Conduct Office

GRI 406-1

Vale provides to all employees and the external public an exclusive channel for reporting violations of the company's Code of Conduct, Vale's values or for the second instance of problems that have not been solved by traditional service channels of the company. Access to the channel is through an electronic form, available on-line at Vale's website, by e-mail ouvidoria@vale.com, by phone, letter or face-to-face visit previously scheduled. The walkthrough can be found on the page: http://www.vale.com/ethics.

The Ethics and Conduct Channel is available in all countries where Vale operates, always operating in accordance with local laws, providing for procedures that guarantee the whistleblower's secrecy and protection, transparency throughout the process and the independence and autonomy of the structures/people who will participate in the complaint investigation mechanisms.

All allegations submitted to the Channel are dealt with by Vale's Ethics and Conduct Office, an independent department that reports directly to the Board of Directors and is responsible for handling complaints and for disclosing Vale's Code of Conduct. The Ethics and Conduct Office can also call upon specialized Vale areas to investigate complaints, such as Internal Audit, Corporate Security and Corporate Integrity.

All confirmed violations trigger correction plans, which are presented by the company's managers and approved by the Ethics and Conduct Office. As a general rule, these plans contain measures to promote improvements, training initiatives and employee feedback. Depending on the severity of the allegations, the employees involved may be subject to administrative measures, such as warnings, suspensions or terminations.

In 2019, the channel received 3,507 allegations and closed 3,382, of which 87% were investigated and the investigations, in turn, confirmed the violations in 38% of those complaints. Of the total confirmed cases, 40% refer to People Management which may include cases of disagreement between colleagues, inadequate manager posture, or less frequently, cases of bullying, sexual harassment or discrimination. Fraud cases, such as contract management and false schooling documents, and Relations with Third Parties, such as complaints from suppliers and the community, represented 14% and 20% of confirmed cases, respectively.

The investigations resulted in 1,833 corrective actions, including the dismissal of 227 employees, 42 of whom held leadership positions. In addition, 2 cases of discrimination by Vale employees were confirmed. All of them were analyzed by the company, which proceeded with the dismissal of those involved. Read more at Ethics and Conduct Office Report.

Chapter 3

Commitment to people and Human Rights

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Commitment to people and Human Rights

Valorization and respect for people are among Vale's main commitments, and this relationship is expressed in the company's regulations, as well as its vision and values. This way of thinking should be reflected both in the relationship with its own employees and third parties, as well as in the dialogue with communities, civil society organizations and other external actors, and is embodied in themes such as people management, health and safety, environment, human rights, territorial development, among others.

However, the rupture of Córrego do Feijão Dam I in Brumadinho, caused the company to review the governance and processes of operational risk assessment, human rights and remediation, among others, seeking to make the necessary adjustments in its performance with the goals of ensuring respect for people and regaining the trust of society.

Human Rights

GRI 412-2

Vale's Human Rights Policy has existed since 2009 and was updated in 2014 to ensure alignment with the UN Guiding Principles for Business and Human Rights. In 2019, the Policy was updated again and, in addition to the internal participatory process, a public consultation was held with 382 contributions from a diverse public.

To bring the policies closer to our employees' day-to-day reality, the third edition of the Human Rights Guide was produced in its Brazilian version, in addition to specific documents to deepen relevant topics on the subject in the extractive sector. The content of the Policy and Guide are made available to all employees in processes of dissemination and on-line and face-to-face training. International versions will be developed throughout 2020.

Since 2016, 12% of employees, about 27,000 professionals, have been trained in human rights policies and procedures; 3.34% of them in 2019, considering 5,363 hours of training. In the training programs, 305 third-party professionals participated, 178 of whom were dedicated in the area of business security. A total of 1,128 hours of training took place.

Among the critical human rights themes that demanded specific actions throughout 2019, we highlight the work done together with the Special Office for Reparation and Development, which involved technical support and the training of all professionals of this new structure; the formalization of the partnership with Childhood Brasil that will enable the implementation of new actions to combat child sexual exploitation, including the mobilization of business partners; the establishment of a partnership with InPACTO, the Pact for the Eradication of Forced Labour; and, the training of the company's leaders on Human Rights in the Supply Chain.

In 2019, Vale maintained its commitment to respond to 100% of the allegations and controversies received from the Business and Human Rights Resource Centre (BHRRC), an international organization whose website provides on its website a space for transparency on human rights management.

Vale works to improve the complaint listening mechanism and is performing work to integrate all its channels. This new model creates conditions to consolidate complaints processing, which makes it possible to respond, with more agility, to the problems identified by the community and avoid conflicts, such as operations bans.

Bepkangoo Xikrin, indigenous to Xikrin ethnicity, from TI Xikrin of Cateté. Photo: Rafael Scherer.

Human rights risk assessment

GRI 412-1 | 412-3

Risk and impact management considers all human rights issues in the company's activities by identifying, developing and implementing detection, preventive and mitigating controls. We also perform self-assessments and external due diligence.

The methodology for self-assessments adopted by the company considered 91 risks situations related to human rights. The evaluations were carried out with the participation of multidisciplinary groups of professionals from various areas of the company that identify and analyze each risk situation in an integrated manner and from different points of view. The current controls, the probability and severity of the occurrence of each risk and the degree of the risk were considered to propose action plans when necessary.

In 2019, aligned with the company's strategic pillars, Vale defined indicators related to human rights with a focus on risk self-assessment as a goal of the Sustainability KPIs for performance and variable remuneration purposes. A total of 55 projects, including mineral operations and exploration projects, carried out their self-assessments and developed action plans aimed to mitigate the main identified risks: 32 in operations in Brazil and 19 in other countries, which 15 are operations and four exploration sites. Only paralyzed operations did not participate in this cycle.

We consider the integrated results of these evaluations to manage the company in a permanent process of continuous improvement. As well, we monitor controls to analyze their effectiveness both in Vale's activities and in its relationships with suppliers and business partners.

Supplier contracts contain a clause stating that they are obliged to commit to respect human rights, respect Vale's Human Rights Policy and follow the Supplier's Code of Ethics and Conduct. The registration process for new suppliers vets them for inappropriate conduct related to human rights. If a human rights impact or violation is identified, the company will endeavor to take appropriate measures to address the specific situation.

The company's risk management process underwent changes in 2019, including revision to the Risk Management Policy and the governance involved, and the adoption of an expanded human rights lens, which formally became a 2nd Line of Defense. This means that, in addition to defining guidelines to empower and guide human rights risks management, we also conduct verification processes. For 2020, we foresee details of the operationalization of risk management in human rights being shared.

Socio-economic compliance

GRI 419-1

With the implementation of the new Social and Environmental Investment Policy, launched in 2018, Vale now has greater control over the approval of socio-environmental investments - expenditures (costing, investment, research & development) intended for third parties with social, environmental, institutional or cultural purposes, through evaluation and approval mechanisms. The objective is to better direct resources according to the company's socio-environmental strategy. Every investment request is registered, and Sustainability Department issues an opinion on its merits of the request according to the governance process approved by the Board of Directors. All investments include analysis of corruption risk under the Global Anti-Corruption Program, an initiative of the Corporate Integrity area in partnership with Corporate Security, which performs the *due diligence* of third parties involved in the process.

Child or forced labour

GRI 408-1 | 409-1

Vale requires, through contractual clauses, that its suppliers prohibit child labour and any types of employment practice that may be interpreted as equivalent to forced or slave-like labour.

The company promotes human rights awareness actions, paying special attention to eradicating child labour and promoting the rights of children and adolescents, with specific efforts to combat sexual exploitation in the vicinity of its operations at all stages of its life cycle.

At the end of 2019, Vale partnered with two institutions that work to defend children's and adolescents' rights and fight against child and forced labour: the Instituto Pacto Nacional pela Erradicação do Trabalho Escravo (InPACTO in Portuguese) and Childhood Brasil, an organization that is part of the World Childhood Foundation that works to protect children and adolescents from sexual violence.

The company maintains its policy of not hiring minors under 18 years of age, except in the Young Apprentice Program as allowed by Brazilian legislation only for non-operational, administrative functions.

In 2019, there was no record related to, or complaint against the company involving child labour, young people being exposed to dangerous work, nor forced or compulsory labour in any operation.

Vale expects its customers and partners to respect the human rights of its own employees, third parties and community members. Non-compliance with these contractual clauses, that expressly prohibit the use of child labour, forced labour or labour analogous to slave labour, implies breach of contract.

The management of this risk is done at various levels, both in the due diligence processes that are initiated in the contractual phases, with careful analysis of the company's documentation, as well as throughout the provision of services, with periodic evaluations and even auditing in some cases. In Brazil, a Black List registering individuals and legal entities of companies that have been reported for labour violations is used to verify suppliers. We adopt the same procedures in different countries and regions where there is higher risk of child labour.

Security practices

GRI 410-1

In situations involving interdictions and social conflicts, Vale seeks preventive action, by following its relationship guidelines, managing the impacts of its operations, managing the associated risks and establishing relationships of trust and cooperation between itself and communities.

Vale is a signatory and applies the Voluntary Principles on Security and Human Rights (VPSHR) and, in case of conflicts, seeks peaceful solutions aiming to ensure the physical integrity of individuals, paying special attention to those from vulnerable groups such as women, children, Indigenous peoples and traditional communities. Vale's security procedures call for the progressive and proportional use of force, as well as human rights training for professionals working in the area. During 2019, of the 4,329 employees of the Corporate Security teams, 47.4% received specific training on Human Rights policies and procedures related to Security, 93.8% of these were third parties.

Health and Safety

Life matters most is one of our values. We believe that life is more important than results and material goods, and we incorporate this vision in business decisions.

The rupture of Dam I at Córrego do Feijão Mine, in Brumadinho, like every catastrophic event of this magnitude, produced a revision of the risk management model practiced by Vale so far, leading it to reformulate the safety management model of production processes, while maintaining advances achieved in occupational safety field in recent years.

Health and safety strategies

Vale's health and safety strategy is based on three pillars:

- Prevention of injuries and chronic diseases;
- Prevention of fatalities;
- Prevention of catastrophic accidents.

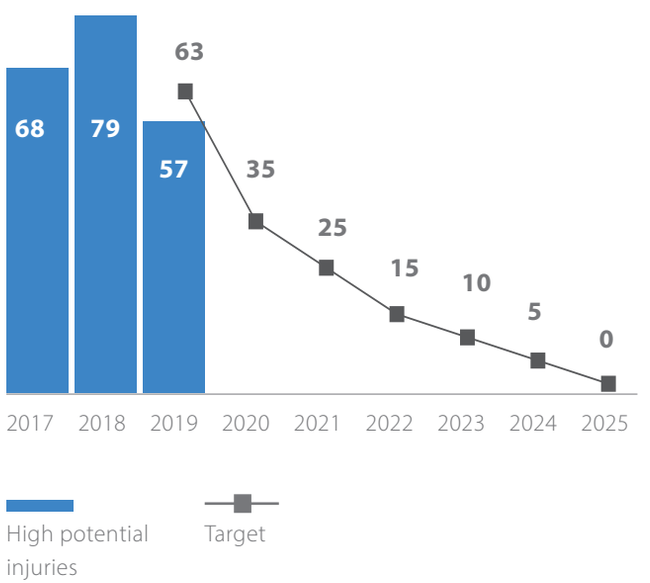
In order to support its new strategy, company's governance was revised with the implementation of the Safety and Operational Excellence Executive Board, which acts as a second independent line of defense in the management of operational and geotechnical risks. This executive board is composed of four distinct and interdependent areas: Health, Safety and Operational Risks Board; Geotechnics Board, Critical Assets Board and Operational Excellence Board.

Among the various duties of this new executive board is to establish policies and technical guidelines for the management of security and risk. It is also important to highlight the role of providing training for operations professionals, as well as carrying out specific inspections to assess the conformity of security processes. This new area reports directly to Vale's CEO.

In occupational safety, Vale remains focused on events based on its potential and not only on its consequence. The injury reduction strategy, specifically injuries with the potential for fatalities, started in 2018, continues to evolve. A 30% reduction was achieved in 2019 compared to the previous year for this injury category. In order to make it possible to significantly reduce the risk of fatalities in the coming years, 5 of the main life-critical patterns have been revisited to make them clearer and more restrictive. These new standards will be implemented throughout 2020.

Another important pillar of the occupational safety significant improvement strategy is the enhancement of work permit process. This revised process makes safe work permits as an integral and inseparable part of maintenance and project activities. The new process brings more quality and involvement of the parties in the task risk analysis and demands a discussion about the general and specific risks of each task and in each different situation. In addition, the process further clarifies the roles and responsibilities required for planning and performing safe work.

Below are Vale's goals for reducing, in the coming years, high-potential injuries, causes of which are considered to be fatal factors. These targets can be adjusted according to the progress of the security strategy implementation.



We deeply regret the 270 lives lost due to the rupture of Dam I of the Córrego do Feijão Mine in 2019. Among them, we recorded a total of 240 confirmed fatalities among company employees, with 123 employees, 117 contractors from outsourced companies, in addition to 11 people not yet located. In addition to these fatalities, Vale also recorded a fatality with a third party in Tubarão (Espírito Santo State) and a fatality with its own employee in São Luís (Maranhão State).

The table below shows the number of fatalities of Vale's own and third-party employees:

Fatalites

Year	Third part	Employee
2017	4	1
2018	1	1
2019	118	124

Governance for the company's health and safety management is based on two pillars: the first is the corporate structure acting as a 2nd Line of Defense , defining standards and technical criteria, in addition to providing training and conducting inspections to assess compliance; the other, operational and "owner" of the risk, in the 1st Line of Defense , with the task of implementing corporate guidelines and ensuring that risks are at levels defined by the organization.

Vale's health and safety management processes are part of the Vale Production System (VPS), which establishes policies, principles, criteria and procedures for the management of hazards and risks, as well as for environmental aspects and impacts arising from activities, products and services.

VPS is fully aligned with ISO standards for operational health and safety (OH&S) and environmental management and

contains technical, management and leadership requirements according to the PDCA model, based on steps of Plan / Do / Check / Act.

Corporate audits of the management system are conducted annually in order to assess VPS compliance in its dimension of Health, Safety and Environment (HSE), using specific protocols and duly trained professionals. Operations are selected by a specific risk criterion, in such a way that all of them are audited within a maximum period of five years.

Vale also has a Whistleblower mechanism to address any complaints about Health & Safety and Operational Risks (S&SOR), in order to provide due treatment and with assessments made by auditors independently.

Vale's health and safety goals for 2025 are to zero the number of fatalities and changed lives, in a sustainable manner, as well as to reduce by half the number of employees exposed to significant risk agents in the workplace, in addition to preventing process accidents with catastrophic potential.

Health and safety goals for 2025

1. To reduce to zero the number of recordable lesions of high potential for fatality or changed life;
2. To reduce by 50% the total number of employees exposed to the ten significant risk agents in the workplace;

Disseminating a culture of health and safety and facing the challenge of achieving zero fatalities are two of the topics that concern trade unions and collective agreements.

Vale takes into account the concerns and views of employee representatives in defining mechanisms to prevent incidents and occupational diseases in defining its health and safety management practices and programs whenever they are not already addressed by legal requirements. In addition, the company monitors the health and safety risks of its employees in all countries where it operates.

Other relevant actions to health and safety

One important initiative to build health and safety into our organizational culture is the Day of Reflection, created in 2010. On this day each year, all people at Vale stop and reflects on the theme health and safety, discussing the fatalities that have occurred and the lessons learned. In 2019, almost 90,000 people were reached by the campaign "The power of the word: the importance of good communication in incident prevention."

In the health area, the chronic disease prevention program ensures that all employees exposed to risk agents in the workplace are guaranteed to encounter concentrations below the exposure limits imposed by Vale or by the applicable legislation (whichever is more restrictive) by means of its own engineering devices.

The program aims to halve by 2025 the population of employees exposed to the ten main risk agents, including noise and dust.

To help achieve the goal to reduce the epidemic of SIDA, malaria and tropical diseases neglected in Brazil, Vale fully assumes the costs of the AIDS virus detection tests, if requested by the employee to the labour physician. The company also carries out HIV and AIDS awareness campaigns.

In Mozambique, we created an HIV policy was created to establish rules, commitments and principles to promote behaviour changes, access to methods of prevention and combating stigma and discrimination among Vale workers.

To reduce mortality and disability from non-transmissible diseases, the company develops integrated actions at the levels of primary, secondary and tertiary prevention levels.

Specific procedures were also established to mitigate the risks of working under the effect of psychoactive substances that interfere with the safety of activities. Workers are subjected to toxicological testing by random sampling, which excludes the possibility of discrimination. The sole objective is to stop people from working under the effect of psychoactive substances that may result in work incidents that could harm them and others. The program also includes educational initiatives and information on substance abuse.

Coronavirus (Covid-19)

Faced with the scenario of the Covid-19 pandemic, Vale is acting to deal with its risks and impacts and adopting support measures for its employees, suppliers and society during the crisis. Vale intends to allocate a total of BRL 500 million as aid during the pandemic. Almost BRL 315 million has already been spent on the purchase of 600 tons of products from China, which arrived in Brazil at the end of March on planes chartered by the company.

First batch of donations of more than 600 tons of Vale inputs - quick test kits and personal protective equipment (PPE) - purchased in China to support the federal government and the states where our company maintains operations. Photo: Vale Archive.

Five million rapid virus-detection test kits and almost 16 million individual protection equipment were imported in order to help the Brazilian government fight the spread of the disease in the country. The company also helped build field hospitals in Pará and Rio de Janeiro, and renovate three other hospitals, two in Minas Gerais and one in Pará.

Regarding its suppliers, the company has anticipated BRL 521 million in payments to small and medium-sized companies since the beginning of the crisis caused by the Covid-19 epidemic. The company's estimate is to inject an additional BRL 411 million into the Brazilian economy in advance of payments by the end of April, totaling BRL 932 million to help approximately 3,000 suppliers from all over the country to face this moment.

Care to ensure employee safety was intensified: we adopted home office work in all situations where this is possible. To support employees and their families who face increased costs caused by quarantine and social isolation, during which food consumption tends to increase, Vale provided extra credits on its employees' food cards in Brazil.

In addition, Vale launched the "Covid-19 Challenge" in partnership with Hospital Israelita Albert Einstein and the Mater Dei Health Network, which consists of bringing together proposals from companies throughout Brazil with the aim of reducing the dissemination of Covid-19 in society. We received a total of 1,452 proposals and the selected companies will be able to receive a cost of up to USD 200,000 to scale their solution to combat the virus.

See more at http://www.vale.com/brasil/EN/people/coronavirus/Pages/news.aspx

Relationship with communities

GRI 413-1 | 413-2

Vale's social performance is guided by the principles and guidelines of the Code of Conduct; Anti-Corruption, Human Rights and Sustainability Policies; and the Sustainability Standard. According to the standard, Vale's leaders must contribute to the process of managing local stakeholders, ensuring that our relationships with them are identified, engaged and monitored.

Vale relates to local communities in the territories where it operates, and in this perspective maintains channels to listen and respond through an open and continuous dialogue with them. Based on its policies, external references and internal orientations, Vale develops plans for its relationship with and social investment in communities, executing in a participatory way the initiatives of engagement, communication, relationship, and social investments aimed at territorial development, especially in the areas of health, education and income generation.

Vale's relationship with its communities is guided by Vale's Social Performance model, which was built 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 management conflicts with communities.

Vale has its own teams that work to plan, manage and execute community relationship actions. These teams are formed by specialized professionals and are part of the structure of the Executive Board of Sustainability, Institutional Relations and Communications. There are 147 professionals working in all Vale operations in Brazil, 59 of which are working in direct contact with the communities in the field.

Strengthening the vegetable cultivation of the APA do Igarapé Gelado, one of the Community Relationship Plans developed by Vale in Pará. Photo. Erika Profeta.

The company maintained an active relationship with 1,575 communities globally. In Brazil we maintained relationships with 1,272 communities, of which 443 are priorities.

As one of our community engagement strategies, Vale elaborates and implements Community Relations Plans (PRC in Portuguese). The PRCs' goal is to mobilize social participation in defining and prioritizing social actions to be implemented in communities. Through these plans, we implement initiatives for engagement, communication, relationship building, and social investments to develop territories in a collaborative manner, especially in terms of health, education and income generation. In addition, Vale promotes spaces where communities can become involved with and participate in environmental education programs.

In 2019, 992 Global Community Relationship Plans were developed at Vale, of which 947 were developed in Brazil. These figures include the Social Investment and Relationship Plans, which are action plans that aim to meet specific demands of great relevance, including social programs and projects.

Risks to the community

GRI 413-2

All activities performed in the course of Vale operations are supported by specific procedures to maximize performance, identify the associated hazards and risks, and define critical controls that allow the risks to remain at levels tolerable to the company. Risks are classified according to the risk matrix, considering the severity and probability of each event. In the severity table, risks that have impacts on communities are evaluated and specific actions and controls are proposed to protect communities' safety. Risk management is based on implementing critical controls – preventive and mitigating – in establishing systematic and periodic inspection and maintenance procedures that ensure the reliability of the process.

The rupture of Dam I at Brumadinho led the company to rethink its strategy and processes, especially those focused on emergency actions, capable of materializing potential catastrophic risks and a set of procedures necessary to mitigate its impacts. One example is the reformulation of the Emergency Action Plan for Mining Dams (PAEBM acronym in Portuguese), which establish roles and responsibilities, the flow of communication, mitigation and evacuation actions, and identification protocols for the entire external support structure to provide care to victims when necessary.

Indirect economic impacts

GRI 203-2

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. This is why it has created internal rules and guidelines with emphasis on the Sustainability Policy and the Social Action Guide.

Vale's operational areas conduct the management of socio-economic impacts in their respective contexts and through mapping, assessment and program implementation according to legal requirements and corporate guidelines. We perform specific studies to define appropriate ways to mitigate negative impacts and potentialize positive impacts in line with local public policies.

They also consider the expectations of stakeholders through their social performance, which is based on three main dimensions: risk and impact management, stakeholder management and the generation of benefits and a positive legacy in the territories. Another aspect considered is the potential synergy between enterprises within regional scope.

The strongly modifying character of the territory, typical of mining activities, may also represent opportunities for positively transformating the affected social groups. Therefore, Vale promotes local development as the organizing axis of its actions to enhance its positive community impacts and social investment.

These actions include initiatives that prove to be a catalyst for local development, collaborating toward the territories' socio-economic and environmental development where Vale operates through the mineral cycle.

Vale establishes intersectoral partnerships by:

- Supporting the development and hiring of local labour force and suppliers;
- Deepening its knowledge and monitoring of the regions where it operates through diagnoses and socio-environmental and economic studies;
- Prioritizing risk and impact management in planning socioenvironmental expenditures and developing programs and projects focused on social needs, with a vision of long-term economic development while avoiding reactive social investments;
- Placing priority focus on socio-environmental investments and specific actions with the communities to promote the following themes: basic health care, basic education, work and income generation, social protection, science and technology, and environmental conservation, always aligned with existing public policies; and
- Establishing, whenever possible, intersectoral partnerships to help construct territorial urban development plans and the development of new economic vocations that promote the regions' long-term sustainability.

Specifically, for social investments (i.e., voluntary investments, not linked to the environmental licensing process), Vale has specific guidelines. Investments must meet at least one of the following principles: (i) adhere to the guidelines of the Sustainability Policy; (ii) manage social, environmental and institutional impacts resulting from the company's operations and/or projects and/or mineral research; (iii) contribute to sustainable development in the territories where we operate; and (iv) strengthen the company's image and the relationship with stakeholders.

In addition, investments should not finance actions that are constitutional obligations of the government, but where possible should complement them.

Among the most observed socioeconomic impacts, it is possible to mention: growth of wages and direct and indirect jobs during the implementation stage, and reduction of jobs, in the demobilization and operation stage; concentrated productive activity and the probable evolution to a situation of economic dependence on both the private and local public sectors with future impacts at the end of the economic exploitation cycles of mineral deposits; indirect impacts on the goods and services and housing markets.

Also noticed are: the higher income flow in local economies inflating prices of goods, services and housing, during the implementation stage and stabilization trends in the operation stage, but at higher levels, which may affect local communities; and growth of economic vulnerability conditions due to these inflationary processes, by greater productive specialization and demand for skilled labour, reducing the local labour market.

Other positive indirect effects such as: growth in the resources available for the development of local public policies, either through direct and indirect collections generated by growing of economic activity and even population growth, in countries where the distribution of government resources is related to the size of the population, as in Brazil; improvements in access to workforce training and working conditions; expansion of consumer markets and supply of products and services, creation of new opportunities for productive investments.

Socioeconomic impacts – GRI 203-2

Direct Impacts	Indirect Impacts
Negative	
Migration due to the presence of the enterprise, which may cause changes in the development indices of the municipalities	Increased demand for infrastructure, services and products
Land-related impacts such as real estate speculation, territorial conflicts and resettlements, affecting people and/or groups in conditions of greater socio-economic vulnerability, which may cause reduction of local productive activities	Increased housing deficit and increased demand for public health services, education, social protection and public security
Increase in the local cost of living	Pressure from society involving traditional territories
Positives	
Revitalization of the local economy through the generation of direct and indirect jobs, payment of taxes and fees and increase in the population's income level	Strengthening the community organization based on social participation in the company's initiatives and its value chain
Improvements in job opportunities, local workforce qualifications, schooling conditions, scientific knowledge and technological innovation generation	Development and hiring of workers and suppliers and increased purchases of local products and services, generating increased tax collection and investment capacity of the public authorities
	Increase in the population's income level, stimulus to expand the service sector and commercial activities, and greater formalization of the economy
	Development of programs and social investment and local development actions
Institutional strengthening of Indigenous peoples' and traditional communities' community associations	Development of programs that support the autonomy and training of these associations in public policies and management

Occurrences at railroads

In the Carajás Railroad (EFC acronym in Portuguese) and the Vitória Minas Railroad (EFVM), issues related to mobility and risk conduct a concern for Vale, which develops projects to reduce impacts on communities and relies on internal standards and documents for these occurrences. Any incidents are monitored by the company's Accident Prevention and Investigation Commissions.

In 2019, there were two situations of social response in the EFC that resulted in 16 hours of interdiction. At the EFVM, 15 events were recorded totaling 94 hours of interdiction, most of them motivated by issues related to Fundação Renova and its negotiation with those impacted by the Fundão Dam rupture, which occurred in 2015.

Last year there were performed 28 actions throughout the EFC that involved over 700 participants from the communities affected by the railroad, addressing topics such as railroad safety, preventive health, environmental education, Vale's presence in Maranhão and Pará, generation of work and income, culture and citizenship and Trem de Passageiros (passenger trains).

By 2021, the EFC will receive a construction package to reduce urban conflicts along the railroad; in the multi-year plan will amount to USD 69.4 million. The total scope of the program to reduce urban conflicts on the railroad will extend until 2026, totaling an estimated cost of USD 180.5 million.

Artisanal and small-scale mining

GRI MM8

Artisanal or small-scale mining is responsible for generating work and income for thousands of families around the world, as well as playing an important role in the socio-economic development of many countries and regions.

If illegal mining is discovered in areas close to or within its operational areas, Vale involves the government so that it can take the necessary measures and, whenever possible, provides support to regularize the activity with the responsible government agencies, offering to contribute to the transfer of best practices.

The sites that identify the risk of small-scale and artisanal mining as high or very high in self-assessment of human rights risks have to propose an action plan with improvements to reduce those risk and mitigate their impact. High and very high risks have more careful controls and greater visibility in Vale's risk governance, which provides for the participation of the company's top leadership to participate in these situations.

In 2019, 17 occurrences of artisanal or small-scale mining were recorded within or in the vicinity of the company's operations in Moatize and Pará. None of them were legalized.

Vale faces the challenge of optimizing the management of this issue in 2020, by reviewing, if necessary, our policies and other related regulations, proposing specific strategies and defining goals.

Relationship with Indigenous peoples and traditional communities

GRI 411-1 | 413-1 | 413-2 | MM5 | MM6

The relationship with these communities is essential to Vale's activities. With a large territorial presence, the company has broad and diversified connections with the communities in the areas of direct and indirect influence on its projects. Currently, Vale has a global relationship with 32 Indigenous peoples (14 in Brazil and 18 in other countries) and 48 traditional communities (45 in Brazil - mostly quilombolas and coconut-breakers, and 3 outside the country); manage the risks and impacts to respect their culture, their way of life and the environment; and leave a positive legacy for these populations through actions that contribute to their ethno-development and autonomy.

Regardless of the local contexts in which it operates, Vale follows the position of the International Council on Mining and Metals (ICMM) and rejects any discrimination or disadvantage that may be related to culture, identity or vulnerability. It aims to apply the principles to groups that present the commonly accepted characteristics of Indigenous peoples or traditional communities.

The company incorporates the topic of Indigenous and traditional communities across its various internal analysis processes to gauge project risks and feasibility, effectively considering these communities; rights and interests in decision-making.

Vale has been improving its management strategy, intensely training its own employees and third parties, and constantly reviewing processes and developing actionable tools to plan and support relationship-building initiatives with these populations. As a result, it has maintained, renewed and created agreements with Indigenous peoples to establish and preserve solid partnerships. In the same sense, it seeks to maintain open and transparent dialogue to resolve conflict and create programs and projects to benefit the communities with which it interacts.

The company maintains teams dedicated to social performance in the territories and to the permanent relationship with communities, guided by policies and rules, supported by specific tools and made up by specialized professionals, aiming at an increasingly closer and more assertive relationship with communities.

Vale's guidelines for action are based on international commitments and references related to Indigenous issues, ICMM's position on Mining and Indigenous Peoples, ILO Convention Nº. 169 and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

When planning its projects, Vale seeks to obtain the concept of Free, Prior and Informed Consent (CLPI acronym in Portuguese), which involves the aspects of good-faith negotiation between the company and the Indigenous and traditional communities under the influence of its projects. CLPI develops and expands the Process of Consultation and Informed Participation, required by the aforementioned ILO Convention Nº. 169, ensures the significant participation of Indigenous peoples and traditional communities participate significantly in decision-making when achieving an agreement.

Vale conducts specific processes of environmental licensing and risk diagnoses referring to Indigenous and Quilombola populations, carrying out studies and assessment and mitigation of impacts by specialized teams, usually coordinated by anthropologists.

In 2019, a risk management methodology was implemented in Brazil with a weekly routine of monitoring of claims and lawsuits. This allows for a better understanding of the realities of the populations with which Vale interacts. Among the main risks Vale faces are conflicts over land use.

Currently, Vale has relationship plans for all the traditional communities and Indigenous people in Brazil. These plans are managed in the stakeholders, demands and critical issues management (SDI) tool, which has a specific model for managing processes related to this subject, including: Voluntary Social Investment, Impact Studies and Diagnoses, Impact Mitigation Programs and Projects, Grievance and Social Expenditure Management.

Land use disputes

GRI MM6 | MM7

Vale's projects and operations are located in remote areas where there is presence of indigenous peoples and traditional communities – for whom access to land and its resources are essential for maintaining livelihoods - or in regions where real estate pressure leads to irregular occupation of the company's areas.

In this context, there is a risk of human rights violations. Thus, the acquisition and maintenance of land use rights by Vale involve the recognition of specific sociocultural aspects of each people and community; it's supported in the local legislation of each country and region; and it is guided by respect for Human Rights. Vale pays attention to people and/or families in situations of socioeconomic vulnerability who irregularly occupies the areas of the company.

Vale maintains permanent dialogue with indigenous peoples, traditional and local communities through a specialized team in the territories. Conflict management is carried out through the implementation of social management processes including event management.

Vale also registers irregular occupations in areas under the company's ownership or domain, such as the EFC and EFVM railroads in Brazil. The company performed the mapping of

occupations and adopts appropriate measures to maintain the physical integrity of the areas in order to ensure the safety of neighboring communities.

The main conflicts related to the irregular occupation of the company area are related to the land contexts of high complexity, marked by historical disputes and lack of legal certainty in the regularization of properties due to the occupation of territories.

In Mozambique, Vale limits the access of neighboring communities to the company's operational area to avoid exposure to risks and ensure the safety of the community. In return and aiming at mitigating the impacts arising from this restriction, it provides the natural resources required for the maintenance of livelihoods, such as water and firewood.

In Pará, Vale has been working in partnership with the public authorities to transfer 65 families to a new place to live in order to make land regularization of Campos Ferruginosos National Park possible. In the municipalities of Canaã dos Carajás, Curionópolis and Parauapebas, CVRD promotes dialogue with social movements and public authorities, with the aim of strengthening land management in these municipalities.

Inaugurated in 2011, in the municipality of Ourilândia do Norte, in Pará, the Onça Puma mine is today one of the largest iron-nickel plants in the world, with a production capacity of 220 thousand tons per year. Local community groups and Brazilian legal authorities claim a negative impact on the health of communities near the mine.

Members of the Xikrin and Kayapó indigenous communities claimed negative health impacts from nickel mining activities, which would have led to fetal deformations and other serious diseases in the Cateté River region, a tributary of the Itacaiúnas River in the state of Pará.

In September 2017, the Federal Court ordered the suspension of extraction activities in Onça Puma mines, conditioning on proof by Vale of the implementation of an economic and environmental management project to offset the indigenous communities affected by the activity. Vale filed an appeal requesting that mining activity stoppages be suspended, clarifying that the company is not releasing drainage effluents into the Cateté River and including a study of the history of the Cateté River water, including a study of the "background" of the Cateté River water already with the anomalies pointed out.

In June 2019, by court order, Vale suspended the nickel processing activities of the Onça Puma plant's nickel processing activities. The company challenged the decisions to shut down the projects, on arguments that were reinforced by seven reports by experts appointed by the Federal Court of Redemption. The reports demonstrated the lack of correlation between Vale's activities and the alleged contamination of the Cateté River.

In September 2019, the president of the Federal Supreme Court (STF in Portuguese) ordered that operations of the nickel plant in Onça Puma be resumed based on the seven expert reports that pointed out the lack of a cause-and-effect relationship between Vale's activities and the alleged contamination of the Cateté River. Moreover, the Supreme Court decided to release the court deposits to the Xikrin of Catete and Kayapó Indigenous peoples. See more here.

Resettlements

GRI MM9

To expand or implement projects, Vale needs to physically and economically displace people who live within areas where its necessary productive activities take place. This involuntary disruption can cause significant impacts on the means and ways of life of populations with socio-economic vulnerability.

Vale's resettlement processes aim to mitigate the risks of human rights violations, to re-establish standards of living at levels equivalent to or higher than those verified before the involuntary displacement, observing lessons learned and the market's best practices.

To guide this activity, Vale adopts procedures aligned with international standards of organizations such as the International Finance Corporation and the United Nations.

In 2019, Vale promoted actions to strengthen the resettlement processes already carried out, especially improving the monitoring of socio-economic indicators and programs to restore livelihoods.

The company's main initiative is to develop the Program for the Restitution of Livelihoods in Mozambique and Malawi to assist 15,500 families affected by involuntary displacement due to the Nacala Corridor installation. The program currently serves 11,200 families through successful experiences in the regional agricultural sector. It works to stimulate agricultural development through technical assistance, supply of inputs, guaranteed access to markets and income, as well as ensuring food and nutritional security for the families served.

The reform of housing at the 25 de Setembro settlement in Moatize was made possible through a partnership between Vale, local governments and the community. In the Cateme resettlement, Vale is strengthening initiatives to restore livelihoods through investments in agricultural development programs.

Vale is seeking alternatives to minimize the impacts of the expansion of Moatize Coal Mine activities on the community located in the north of Moatize Village, after a socio-economic survey that identified the existence of 1,349 families living in the concession area. In 2020, Vale will carry out a physical and socio-economic survey to resettle the Ntchenga and M'Phandwe communities in order to expand the operation involving 159 resident families.

The Vale Foundation

Vale Foundation's mission is to contribute to the integrated economic, environmental and social development of the territories where the company operates, strengthening human capital in communities and respecting local cultural identities. To this end, we develop and implement structured social programs, through the concept of Public-Private Social Partnership (PPSP), which promotes integration and dialogue between government, private initiatives and communities to maximize the impacts of voluntary social investment.

Vale is the main funding entity of the Vale Foundation, which also receives funds from other investors in the mining chain and private sector. Focusing on Education, Health and Income Generation, the structuring social projects implemented by the Foundation aim to strengthen local public policies. They are managed through partnerships between the Foundation and its executing partners, such as NGOs specializing in the issues in question. The Foundation is also responsible for managing museums and cultural centres linked to Vale.

The Vale Foundation reached approximately 770,000 people in 2019 through its social projects in 68 municipalities from six Brazilian states.

The indicators of results of the Vale Foundation's achievements are calculated quarterly and the results are disclosed in the Annual Activity Report. .

Main results obtained in 2019, in approximate values:

690 social projects supported

1,200 people benefited from rural development projects

1,670 health professionals trained

940 professionals who participated in the training activities of Education

77,200 students served

390 education units benefited

4,500 people served by Knowledge Stations

500,000 visits funded to four museums and cultural centers: Casa da Cultura de Canaã do Carajás, Centro Cultural Vale Maranhão, Memorial Minas Gerais Vale and Vale Museum

620 exhibitions and cultural events held, in the area of Culture

BRL50.9 million invested in voluntary social projects (own resources and donations).

In addition to its structured social projects, the Vale Foundation maintains the five Knowledge Stations (Arari, Marabá, Tucumã, Serra and Brumadinho) and Deodoro Training Centre. In 2019, the Arari Knowledge Station implemented a new Pedagogical Policy Project (PPP), focusing on the principles of Integral Education and educational territories. The Brumadinho Knowledge Station began training educators to structure the PPP, based on the same principles, which will be implemented in 2020. Integral Education and the concept of educational territories will guide the socio-educational actions of all Knowledge Stations. By defining educational methodologies, pedagogical lines, activities and models of activity application, the PPP collaborates to improve the quality of care that students receive in these spaces.

Casa Saudável Project (Healthy Home)

The Casa Saudável (Healthy Home) Program is an initiative of the Vale Foundation in partnership with the Popular Center for Culture and Development (CPCD acronym in Portuguese) that supports and strengthens the participation of rural communities in water and sanitation management, through education aimed at self-care in health, implementation of social technologies related to access to sanitary facilities, sources of safe water and food.

The technologies involved are simple and easy to replicate, including the creation of compostable dry toilets, rainwater cisterns and permaculture-based family gardens. The activities are developed by the community residents themselves, after participation in theoretical and practical workshops conducted by social educators.

Maranhão Women Network, project supported by the Vale Foundation. Photo: Fundação Vale archive.

Rede Mulheres do Maranhão (Maranhão Women Network)

The Rede Mulheres do Maranhão is made up of more than 100 entrepreneurs who collaborate to earn income. Their businesses span several sectors, from making sweets, baking goods and making clothes to processing babassu and cashew nuts and cultivating vegetables.

Through actions such as monitoring and technical advice, support for access to new markets and leverage of marketing, the initiative encourages the financial autonomy of the groups, through the qualification of work and self-management of business, impacting local development and contributing to improving the quality of life of women and their families. In addition to representing a center of female empowerment, MMR gives women a real opportunity to generate income in a vulnerable territory. The initiative is aligned with the UN Sustainable Development Goals (SDGs).

Income Generation Support Program (AGIR in Portuguese)

Created by the Vale Foundation in 2013 and present in 20 municipalities, the AGIR program is a social technology focused on on incubating and accelerating social businesses – primarily family and collective business – offering qualification, technical and managerial advisory, mentoring, direct investment, and monitoring of projects so that they thrive in an autonomous and sustainable manner. In 2019, AGIR was present in four municipalities, supporting six social businesses and benefiting 155 entrepreneurs.

Sponsorships

Vale sponsors projects in the cultural and technical-institutional areas. These initiatives take place in several Brazilian states and include musical composition, material and immaterial heritage preservation, traditional festivities, scientific research, technical events and environmental preservation initiatives.

In 2019, 96 projects were executed – 56 cultural and 40 technical-institutional – with our own and incentive funds. Young people participate in some of these projects. Created in June 2019, the Vale Música Program involves all projects sponsored in the field of music and promotes exchanges, residencies and musical experiences between orchestras and musical training projects. Many of these projects serve children and young people in vulnerable situations and represent an opportunity to train youth and increase their employability. In all, one thousand students were served by Vale Música, in six months of activities.

In September, Polo Vale Música was opened at the Brumadinho Knowledge Station. The program is developed by musicians from the São Sebastião Band with guidance from the Ouro Preto Orchestra, both partners of the Vale Música Program. Today, the project receives more than 200 children and adolescents for musical initiation in singing and choir and in band formation. The Brumadinho Knowledge Station is a social tool of the Vale Foundation that offers educational, cultural and sports activities for approximately 700 children and adolescents.

Besides, two projects were sponsored in partnership with Inhotim Museum in Minas Gerais: the Iron Runner race and the Brumadinho Gourmet event. The latter is a gastronomic event is a traditional festivity of the region, which aims to foster and enhance local cuisine by bringing renowned chefs and stimulating the city.

Projects are selected for sponsorship through an on-line platform. They arrive and are analyzed, one by one, according to criteria such as adherence to the axes of the company's policy. In the technical field, projects must be compatible with or linked to Vale's business – from topics such as engineering and geotechnics to environmental, social and law-related issues. As well, projects need to take place in areas where the company operates. They are always selected and designed in context of social considerations.

Some of these projects intrinsically have a social nature. In other cases, Vale requests that applications have a positive agenda to share something of value with society.

Human capital management

Employee profile

GRI 102-8 | 202-2| 401-1

In 2019, Vale had 149,300 employees in its workforce, of which 71,100 are our own and 78,200 are third parties. Of the total number of our own and outsourced professionals, 75.6% worked in Brazil, mostly in Minas Gerais and Pará, which together represented 70.7% of the domestic workforce. The participation of women in our own functional staff was 13%. Employees were hired locally in 67% of cases in 2019; the percentage of senior management members hired from the local community was 46%.

Employee Turnover Index

	2017	2018*	2019
General	**10.0%**	**14.1%**	**8.7%**
By gender			
Men	10.0%	14.3%	8.2%
Women	9.9%	12.9%	12.1%
By age group			
Under 30 years	15.1%**	21.2%	14.2%
Between 30 and 50 years	8.5%	12.4%	7.2%
Over 50 years old	10.8%**	13.6%	9.9%
By region			
Brazil	9.0%	16.1%	8.3%
Canada	6.9%	8.0%	9.9%
Mozambique	19.5%	15.7%	20.9%
Indonesia	4.1%	2.8%	2.1%

* Regarding the increase in the turnover rate, in 2018, the companies Vale Fertilizantes, Miski Mayo and Vale Cubatão were no longer part of the overall consolidation; the companies Biopalma and Tecnored became part of the global consolidation. That is, these entries and exits were reflected in the index. ** There was a correction in relation to the values published in the 2017 Sustainability Report.

Tubarão Unit - Maintenance technicians Fábio Nascimento and Gilcimar Cunha. Photo: Vitor Nogueira.

Relationship with entities representing employees

GRI 102-41 | 402-1 | MM4

In searching for a balanced and productive relationship with the institutions that collectively represent its employees, Vale has met with their representatives of these institutions to address the relevant issues. For the company, these meetings strengthen dialogue and transparency and contribute to the stability of operations.

All Vale employees are free to join the unions. This commitment is stated in the company's Code of Conduct. In some localities, the percentage of voluntary association with unions exceeds 50% of the workforce.

Employees may also turn to their managers to speak directly or individually on any subject, as well as to the Human Resources area or the Ethics and Conduct Office. The most common channel in the relationship with employee representatives is Vale's Labour Relations team. In Brazil, 100% of employees are covered by collective labour agreements. This a percentage that varies in other countries, according to local legislation. In total global operations, 96% of our employees are covered by collective labour agreements and negotiations. During the year, in Brazil alone, approximately 57 collective agreements were concluded with 14 unions.

Throughout 2019, the most critical issue was managing relationships with the unions of our own and outsourced workers after the failure of the Córrego do Feijão Dam. To strengthen dialogue and listening, we held expanded dialogue with unions to provide immediate access to critical information. In a second phase, we initiated negotiations to address issues arising from the dam failure and the shutdown of other operational units.

Vale communicates about structural or process changes in the company on average 4 weeks in advance. This minimum notification period is provided for in collective bargaining agreements for 33% of the companies that reported indicator 402-1 - Minimum notification period for operational change, in 2019.

Compensation and benefits

GRI 201-3 | 202-1 | 401-2 | 401-3 | 404-3 | 405-2

Vale commits to compensate its employees fairly with packages that involve competitive salaries and benefits and are compatible with local economic situations. This policy aligns with the company's attraction and retention strategy, current legislation and market practices we operate. Medical and dental care are among the benefits provided to employees; other benefits include life insurance, a private pension fund, personal accident insurance, a transportation ticket, educational formation and a meal voucher.

Vale's performance compensation balances the opportunities for growth among employees. The competitiveness of the compensation received by the our professionals is measured annually through market research.

The Board of Directors discusses and approves the goals for the period for the chief executive officer and executive officers, which are then disseminated to the teams. If goals are reached, employees receive bonuses, calculated according to their team's performance and the company's profit and loss as per the Profit Sharing Program (PLR in Portuguese). The 2019/2020 People Integrated Cycle is in progress and in 2019 a total of approximately 16,000 employees, 22.4% of Vale's global workforce, were assessed in the performance, career

and succession process, covering managers, supervisors, coordinators, specialists and staff. The other assessments will be carried out during 2020.

Vale respects local minimum wage guidelines and basic salaries do not differ between men and women who perform the same functions, according to the company's Human Resources Policy. Variations may occur due to employees' levels of seniority and maturity.

In 2019, maternity and paternity leaves complied with local laws. The retention rates of employees who returned to work after maternity and paternity leaves in Brazil were 95.6 and 88.5%, respectively[14]. Also, in Brazil, the company announced its adherence to the Citizen Company that extends maternity leave to 180 days and paternity leave to 20 days. With the extension of the leave, female employees will be able to breastfeed their babies in these first six months of life.

Career and succession

GRI 404-2

Vale's Career and Succession process aims to create a culture of meritocracy, development and mentorship with transparency and continuous dialogue, generating value for Vale's people and businesses. The process aims to (i) evaluate the deliveries made and their basis in the key behaviours expected, (ii) to assess people's competencies, and (iii) to identify employees' potential and guide their development and ability to lead their own career paths.

Based on the results of this process, the employee and manager prepare the Individual Development Plan (IDP) based on the professional's strengths and improvement mapped out and their career aspirations, seeking full performance in their current position and preparation for future challenges.

In 2019, the process contemplated employees, supervisors, coordinators, technical experts, managers and above, not only the operational technical public.

Development and qualification

GRI 404-1 | 404-3

Development and qualification guide Vale's educational strategy through a portfolio of training and evaluation that reinforces the skills employees need to work at the company. Skills may be technical, management or leadership, and may cross health and safety, environment, sustainability, human rights and respect for diversity, among others.

Valer, Vale's Corporate University, provides programs to develop its employees, as well as initiatives to train workers in the communities in which it operates. One example of a training strategy that reaches society is the Programa de Formação Profissional (Professional Training Program), which since 2003 has empowered young people to assume functions related to the operation and maintenance of equipment at Vale.

Through Valer, strategies and programs were structured to train and develop employees to meet the specific needs of its different audiences: operational technicians, specialists and leaders. Employees' technical qualifications, for example, are based on a training portfolio set out according to each operation's work function within each stage of the supply chain, called Technical Trails.

For the continued development of experts and leaders, Valer offer courses in operations, operations support, sustainability, operational excellence and soft skills (behavioural skills needed to succeed in the workplace). Valer also brings all employees globally a series of mandatory training sessions mainly related to the themes of safety, the Vale Production System (VPS), sustainability, ethics and anti-corruption.

Through Valer, strategies and programs were structured to train and develop employees to meet the specific needs of its different audiences.

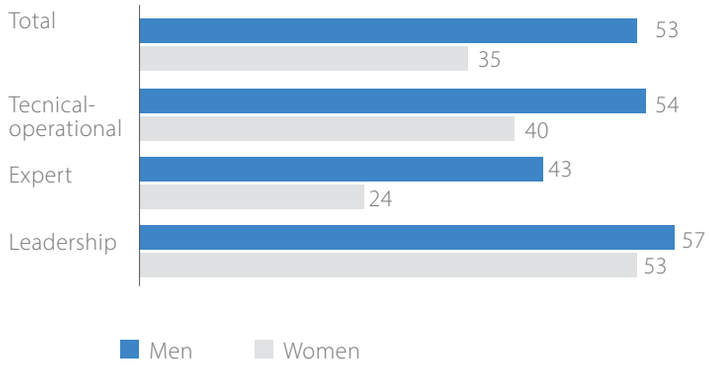
14 In 2019, 522 women took maternity leave, 385 (73.8%) returned to work after the end of the leave and 368 women (95.6%) remained in the company one year after the return from maternity leave. In relation to men, of the 2,261 employees who took paternity leave, 2,252 (99.6%) returned to work after the end of the leave and 1,993 men (88.5%) remained in the company one year after the return of paternity leave.

The year 2019 was marked by the launch of the digital learning platform, Valer Digital, for more than 20,000 employees globally. This platform provides high-quality content in various formats such as articles, videos, podcasts and on-line courses, which may be accessed at any time, from anywhere. This expands mobility, network learning, format diversification and support for self-development, according to the best market practices.

Another highlight was the Sixth Meeting of Experts, in 2019 its central theme was risk management. The event, designed to stimulate the sharing of technical knowledge among the various business areas, gathered approximately 700 employees, in Vitória (ES), in discussions on the subject, through panels, project presentation, guest lectures and exposure to new technologies.

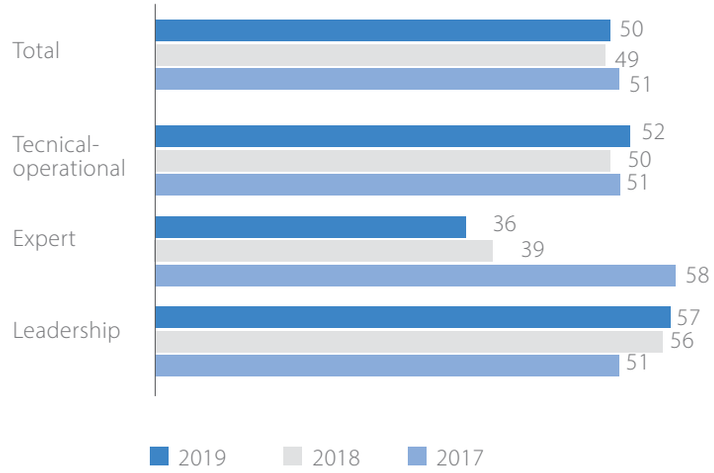
Training Hours - 2019

(annual average by functional category and gender)



Training Hours

(annual average per functional category)



Tubarão Unit - The employee Nádia Nascimento (operator of equipment) on pelletizing plant 8 of Tubarão. Photo: Vitor Nogueira.

Inclusion and diversity

GRI 405-1

Vale is committed to valuing diversity and promoting inclusion. In 2019, the company approved a global diversity strategy with four strategic drivers and commitments made by the company's leadership, such as promoting a safe environment and respect for each person's singularities, so that everyone has equal opportunity to develop their potential and freedom to expose their points of view; ensuring transparent, fair and bias-free processes to hire, evaluate, promote and engage a diverse workforce; not tolerating any kind of harassment, discrimination or prejudice; and stimulating debate and expanding awareness about diversity.

Danielly Barbosa and Rafael Silva (intern) in the new area of the storage at the port of TubarãoPhoto: Vitor Nogueira.

Four Vale strategic drivers for inclusion and diversity

To assume institutional commitment, positioning Vale as a company that values diversity and promotes inclusion.

To ensure inclusive practices, policies and processes to attract, develop and retain the best and most diverse talents.

To make leaders aware of the impact of bias in decision-making, and value the importance of building diverse teams committed to inclusion.

To engage and support employees to reach their full potential, be themselves and become ambassadors of diversity at Vale.

Also in 2019, Vale adopted the goal to double the number of women working at the company by 2030 from 13% to 26% and to increase female leadership from 12% to 20%.

The topic is monitored by the Human Resources area, to ensure it crosses all processes and promotes an inclusive workforce with equal growth opportunities throughout the company.

Among the company's main actions, we highlight leadership training initiatives; on-line training on diversity and inclusion in the internal employee education platform; measures to increase female participation in the Global Trainee Program, which has 48% women students, 57% of whom are allocated in operational areas; internal assessments based on the United Nations Women's Empowerment Principles to monitor evolution with regard to gender; the "Talento Não Tem Gênero" (Talent has no Gender) project, responsible for increasing female participation in operational units in Minas Gerais and Pará to assume positions operating large equipment; and the Ambiente Flexível (Flexible Environment) program, to boost engagement by respecting a diversity of employee needs and providing quality of life to people. In Brazil, Vale employs approximately 2,000 professionals with disabilities (PCD acronym in Portuguese), who work in both administrative and operational functions. These professionals represents 4.3% of Vale S/A. The company intends to reach 5% of professionals with disabilities in its workforce by December 2021. In the other companies of the group, we comply with the provisions of the Quota Law[15].

15 Brazilian legislation that establishes a minimum number of PCD: companies with 100 or more employees are obliged to fill the percentage of the quota of two to five percent of their positions with rehabilitated beneficiaries, or People with Disabilities (PCD), in the following proportion: up to 200 employees: 2%; from 201 to 500 employees: 3%; from 501 to 1000 employees: 4%; more than 1001 employees: 5%.

Chapter 4

Commitment to the planet

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96 **Climate Change**

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110 **Non-mineral waste**

Commitment to the planet

Respect for the environment is an essential condition to ensure the continuity of Vale's operations, which depends on these environmental resources. Nevertheless, mining has great impact on the territories and its natural attributes where it is undertaken. Therefore, within this context, Vale has developed and uses, in all areas where it operates, an environmental management system that maps environmental risks and attempts to prevent and mitigate those risks, and minimize, compensate and remediate environmental impacts caused.

However, in 2019, the rupture Córrego do Feijão Mine Dam I in Brumadinho led the company to review its behaviours, processes and relationships both with the environment and the communities. We have reviewed our policies and procedures, many of which are related to environmental aspects.

This whole process was based on a commitment to establish a new pact with society, which culminated in the adopting more challenging and ambitious sustainability goals, in line with the UN Agenda 2030[16], involving climate change, energy and forests. These goals are associated with the reduction of interference in ecosystems services that have great importance both for our operations and for the maintenance of life. Read more on page 53.

Environmental Compliance

GRI 307-1

Vale's environmental management process aims to establish responsibilities to periodically analyze and evaluate our compliance with environmental legal obligations and other requirements applicable to our activities. Internal and external teams periodically carry out environmental audits and legal compliance assessments of the environmental management system.

Despite the established management practices, Vale has received, in 2019, 74 significant fines for non-compliance with environmental laws and regulations, totaling USD 153.5 million, in addition to nine non-monetary sanctions, of which USD 125.5 million relates to the rupture of dam I at the Córrego do Feijão Mine in Brumadinho, MG. Other significant fines imposed for non-compliance with environmental laws and regulations refer to matters such as alleged non-compliance with constraints, discharge of effluents in disagreement with legislation, pollution, installation / operation of activity without the proper licenses / permits, among others.

In Minas Gerais, the assets of the Córrego do Feijão Mine assets were rendered unviable by the rupture of Dam I in Brumadinho. The Minas Gerais environmental agency issued Notice of Infraction nº. 142031/2019 cancelling the prior license concomitant with the Installation and Operation licenses related to the operation expansion at Córrego do Feijão. Currently, issues related to the environmental licenses for these assets, including environmental remediation, are being negotiated with the responsible environmental agency.

The Provisional Authorization for Operating of Forquilha IV Dam (Fábrica Mine) was cancelled and other operational structures such dams were prohibited, resulting in the shutdown of the units, such as Maravilhas II (Pico mine) and

16 The Agenda 2030 is a plan of action to protect people, the planet and prosperity, which seeks to strengthen universal peace. The plan outlines 17 Sustainable Development Goals (SDGs), and 169 targets, to eradicate poverty and promote a dignified life for all, within the limits of the planet.

Environmental balance is an indispensable condition for the continuity of Vale's activities. Photo: NITRO visual Stories.

Vargem Grande (Vargem Grande mine); Forquilhas I, II and III, Grupo, Marés II (Fábrica Mine), B3/B4 (Mar Azul Mine). Fábrica Mine and Mar Azul are paralyzed since 2019. The units of Capão Xavier/ Mutuca, Capitão do Mato and Pico are operating dry. All these units are located in the state of Minas Gerais.

Vale Technological Institute (ITV in Portuguese)

Sustainable development requires knowledge about the territory where the company operates. With this orientation, ITV Sustainable Development was founded in 2009, in Belém (PA), with the mission to generate options for the future through research and development, in order to expand and meet the knowledge demands of this territory.

The research carried out at ITV is oriented towards social and environmental issues that challenge the mining chain, primarily in the territories where Vale operates. 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 use of land and socioeconomics.

In addition to research, ITV is involved in training people through the professional Sustainable Use of Natural Resources in Tropical Regions master's program. So far, 85 masters have graduated, 45% of whom are Vale professionals. In 2019, ITV created the Resident Master's Student Program with the purpose of boosting and influencing local professionals' training on topics related to the 17 Sustainable Development Goals (SDGs), offering ten scholarships.

Throughout the year, ITV contributed a total of BRL 40 million invested in 17 research initiatives with projects that contribute to biodiversity knowledge and conservation of. Read more at www.itv.org.

The flora of Carajás

Carajás' ferruginous canga has been the subject of a research developed by 145 researchers from 30 institutions in the country and abroad. As a result, the Carajás region now has one of the best studied floras in the country, which contributes to its conservation. A total of 1,094 distinct species in 164 families have been identified.

One of the aspects that made the work unique was the collection of plant samples for producing genetic identifiers known as DNA bar codes through sequencing, which resulted in the production of a reference library for flora, allowing species and their evolutionary relationships to be rapidly and objectively identified.

The results also enabled the development to be developed to use of plant DNA existing in the soil, as a new molecular tool for environmental monitoring. The results of the flora research published in 169 articles in four issues of the journal Rodriguésia, from the Botanical Garden of Rio de Janeiro, and in another 10 additional works. The same approach is being applied in the study of the flora of the Amazon Forest and the cave biota.

The Vale Fund

In 2020, the Vale Fund completes 10 years of activities as the company's voluntary investment in global sustainability agendas. The Vale Fund sponsors and controls the non-profit Public Interest Civil Society Organization (OSCIP in Portuguese). Its governance includes a Management Board with decision-making and deliberative authority in addition to a Fiscal Council that monitors and approves its financial activities. Annually, the organization undergoes an external audit to verify its investments and expenses.

Currently, the focus of the Vale Fund is to be an investment and development body that supports businesses that have a social and environmental impact. Its actions take place in three main axes: (i) creating and developing financial instruments for impact; (ii) accelerating impact businesses that foster social and environmental innovation; and (iii) strengthening the ecosystem. In addition to the above axes, the organization develops and applies methodologies to measure, understand and manage social and environmental impacts and always acts collaboratively with industry organizations.

Among other the main projects and actions supported by the Vale Fund in 2019, the following stand out:

Conexus Challenge – Created by the Sustainable Connections Institute, this seeks to strengthen the ecosystem of sustainable foresst and rural businesses by developing the economic potential of community organizations. Currently, it has an on-line platform in which 1,080 community businesses are mapped in Brazil. Conexus offers business acceleration activities, mentoring, market connections, as well as financial investments;

Partners for the Amazon Platform (PPA in Portuguese) Acceleration and Investment Program – This initiative of the North-American cooperation agency USAID aims to strengthen businesses that value sociobiodiversity and combat illegal deforestation and predatory activities; It supports initiatives to support sustainable agriculture and livestock, sustainable forest management and production, sociobiodiverse products, as well as promoting education regarding well-being and environmental conservation. The program works through an annual call notice for business selection and offers mentoring in strategic issues. For 2020, 15 businesses have been selected to be accelerated and funds around BRL 4.8 million in investments have been mobilized.

Amazon Logistics Lab – Created and developed by the Climate Ventures Institute, the Amazon Lab – Logistics and Commercialization Challenge for Sociobiodiversity Products – aims to strengthen the impact businesses in the Amazon with innovative solutions to unlock logistics and commercial barriers. In 2019, the project launch resulted in accelerating 10 solution prototypes;

Group of Foundations and Institutes for Impact – Known as FIIMP (its acronym in Portuguese), the group promoted its second round of learning modules in 2019 to support ecosystem intermediaries from different phases of the entrepreneur's journey. Six intermediaries were selected that which promote impact businesses that work with issues related to the environment, youth, outskirts, race, education and health. These initiatives will receive technical and financial support;

Latin American Network of Venture Philanthropy – This initiative, led by the International Venture Philanthropy Center (IVPC) and supported by the Vale Fund, seeks to create a network in Latin America to help local businesses practice more strategic philanthropic and social investment to bring greater positive social and environmental impact;

Guarantee fund and credit instruments – By understanding that access to financial resources and credit is a bottleneck that can prevent sustainable businesses from advancing, the Vale Fund worked in 2019 to model financial instruments that meet companies' various needs at different phases. Mechanisms include (i) a hybrid reimbursable credit financial instrument with the potential to attract private investors; (ii) an endorsement mechanism that facilitates access to credit or credit recovery for sustainable producers from existing banking facilities, such as the National Programme for the Strengthening of Family Farming (PRONAF in Portuguese); as well as (iv) an impact investment platform serving the internal public.

Currently, the focus of the Vale Fund is to be an investment and development body that supports businesses that have a social and environmental impact.

For 2020, the Vale Fund plans to consolidate its restructuring process as an instrument to foster and invest in businesses with social and environmental impact.

Biodiversity

GRI 304-2 | 304-4 | MM2

Vale has been seeking to increasingly integrate biodiversity management and ecosystem services into its strategy and business, as these services are essential and intrinsic to the company's operations and life on the planet. The company's guidelines regarding biodiversity, as it is a cross-cutting topic, are reflected in its Sustainability Policy.

In 2019, Vale prepared a 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 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 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 not having considerable biodiversity losses.

In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to projects' final completion, seeking to evaluate possible interferences in natural heritage areas, protected areas, as well as sensitive habitats and species. 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.

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.

The main impacts of Brumadinho were the loss and fragmentation of natural habitats, altered aquatic and terrestrial environments, and changes in chemical element levels that resulted in loss of native, domestic and exotic fauna and flora specimens.

In 2019, 4,454 species were recorded in habitats affected by Vale's operations or close to them; 2,374 were fauna and 2,080 were flora. Out of this total, considering the main categories of threat (vulnerable, near-threatened, endangered and critically endangered), 111 are on the Brazilian Ministry of the

Carajás National Forest.
Photo: NITRO visual Stories.

Environment's list of threatened species and 114 were on the International Union for Conservation of Nature's (IUCN) International List. The detailed data, with all categories analyzed according to IUCN methodology, are presented in the table "Species included in red lists," below.

It is important to highlight that most of these species, as well as the habitats that support them, are the target of compensation programs and conservation actions promoted by Vale in its own conservation units, and/or are supported by Vale-sponsored conservation research and knowledge generation.

In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to projects' final completion.

Species included in red lists (both national and international) whose habitats are affected by our operations

Categories	MMA (2014)	IUCN (2018)
Least Concern (LC)	0	322
Data Deficiency (DD)	6	24
Vulnerable (VU)	50	53
Near-threatened (NT)	0	35
Endangered (EN)	47	22
Critically Endangered (CR)	14	4

Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Hierarchy of Impact Mitigation (HMI) focusing on risks and impacts, whether potential or detected, considering important attributes of the territory and working to continuously improve our processes.

In 2019, 54 operational units were analyzed regarding their need for management plans due to legal requirements and/or the value of biodiversity. Out of this total, 46 were found to require management plans (85.2%) and 49 of the plans have already been implemented (including areas with more than one plan). In only one unit, the required plan is still to be implemented. The plans mainly cover actions related to mitigation, restoration and compensation of impacts, as well as monitoring actions.

For more information on species conservation, recovery and restoration, visit http://www.vale.com/esg/en/Pages/Biodiversity.aspx

Biodiversity in impacted areas

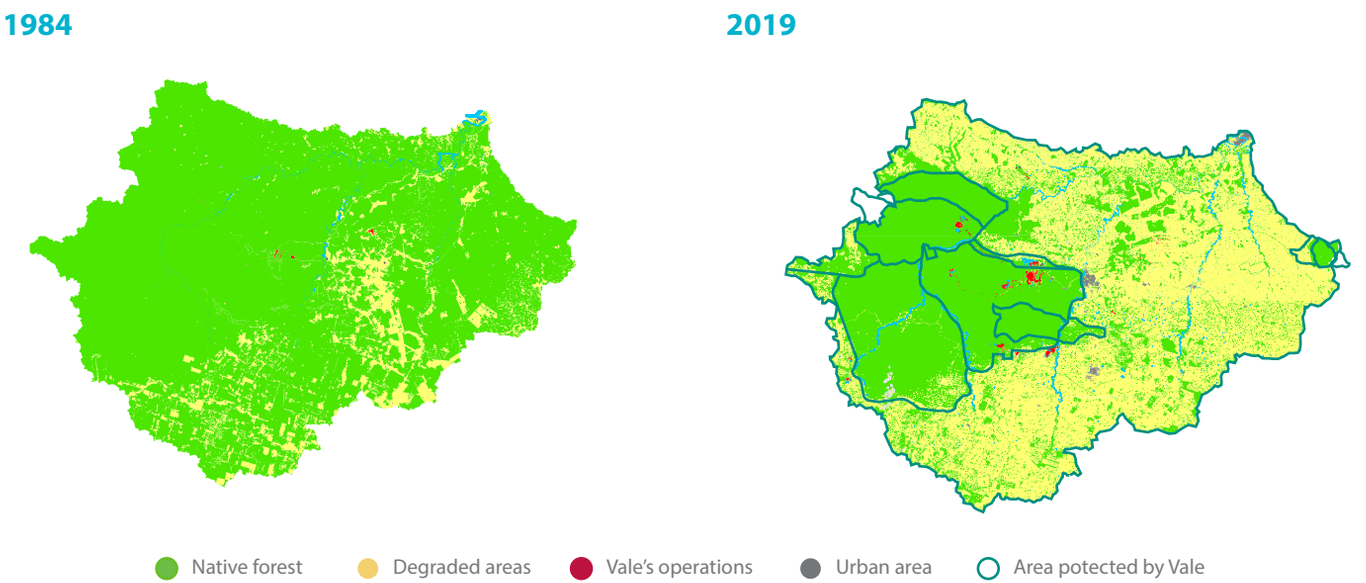
GRI 304-1 | 304-3

Vale's operations currently occupy around 1,400 km², operating in several regions, including areas of high cultural value and high relevance to biodiversity. Some of our operations are located within conservation units, but the company always respects the legal determinations levied against each defined category and their creation decrees.

In Carajás we operate sustainable conservation units in the Carajás National Forests (Minas Serra Norte and Complex S11D Eliezer Batista) and the Tapirapé Aquiri (Salobo Mine). These units allows anthropic activities in joint development biodiversity conservation. Aware of our role in the region, we strive to protect the conservation units while carrying out mining activities. Area impacted by Vale's activity within the conversation units in Carajás involves only 1.5% of the entire area that the company helps to protect.

Maps in the figure beside present this information, also showing the evolution of occupation and land use and vegetation cover in the last 33 years. The positive contribution of protection actions in partnership with the environmental agency for the conservation of native vegetation and biodiversity is highlighted.

In Minas Gerais, some of our operational units located in the Quadrilátero Ferrífero are located in the Environmental Protection Area South Metropolitan Region of Belo Horizonte, also a category of conservation units of sustainable use.



Impacted Areas and Categories of Relevance/Value for Biodiversity

Categories/Relevance	Km²
Total impacted area	1,389.23
Total impacted area in Wilderness	918.04
Total impacted area in Hotspots	361.21
Impacted areas in protected areas	245.49
Impacted areas adjacent to protected areas*	427.21
Impacted areas in priority areas for conservation outside protected areas	108.54
Impacted areas adjacent to priority areas for conservation outside protected areas*	168.80

*To calculate the adjacent area, we considered the buffer of 10 km, generated from the external boundaries of the protected areas and priority areas for conservation of the surroundings, and evaluated its overlap in relation to the area of the operational unit.

Environmental analyst José Camilo evaluates the recovered areas around the Carajás National Forest. Photo: NITRO visual Stories.

To avoid significant biodiversity losses and leaving a positive legacy, Vale operates on several biodiversity conservation fronts, linked to both legal requirements and voluntary actions. The company attempts to protect or help to protect, in its own or third-party territories, more than 8,500 km² of natural areas worldwide, equivalent to about six times the total areas occupied by the operating units. The company has the ambition to act as a global catalyst for protection of natural environments and reforestation.

The protected areas contribute to conservating native fauna and flora species, including endemic and endangered species, as well as important habitats for their survival. Areas of high relevance to biodiversity are also protected, as presented next.

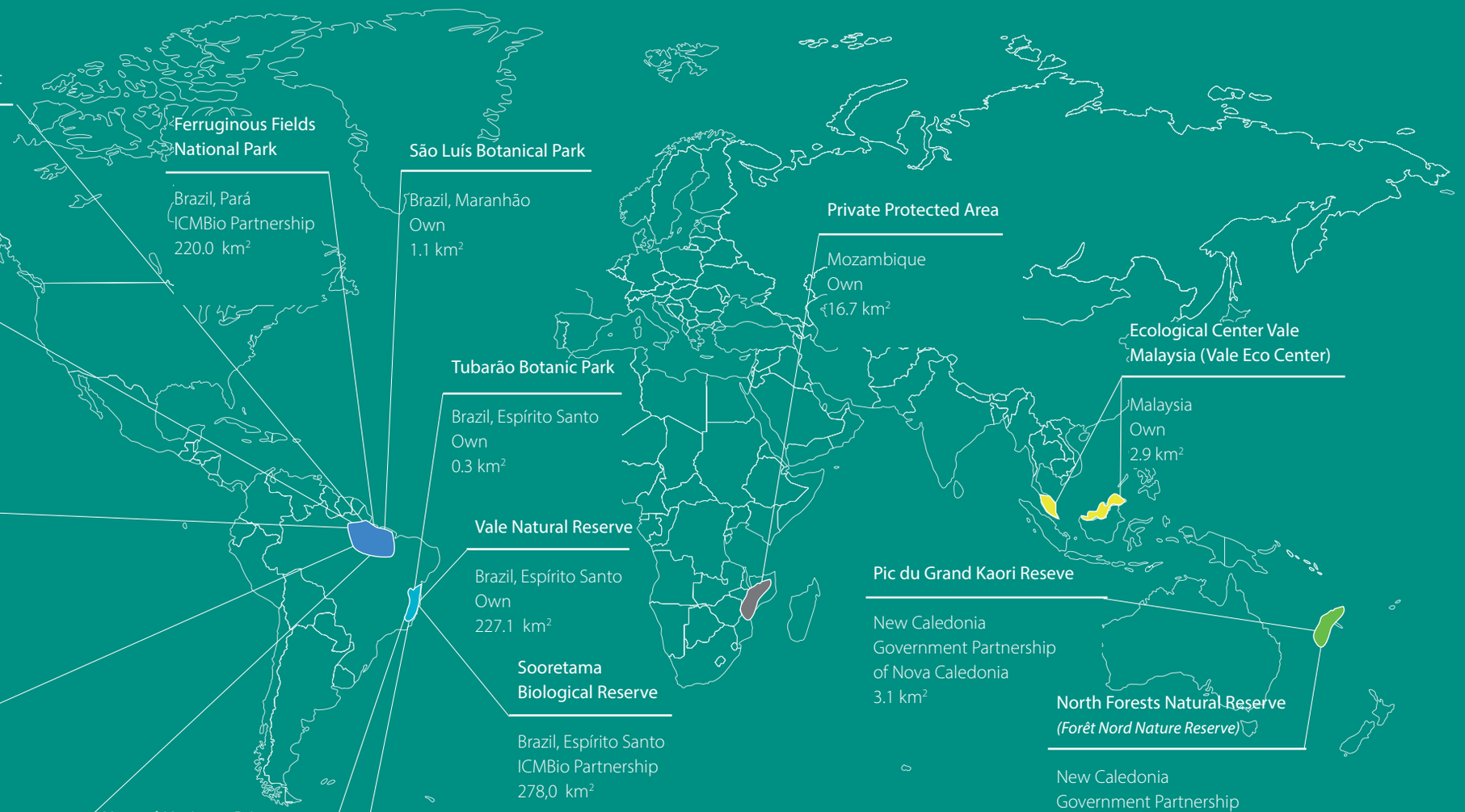
Protected areas and categories of relevance/value for biodiversity

Categories/Relevance	km²
Areas protected by Vale or areas that Vale helps to protect	8,526.19
Protected area in Wilderness	7,864.1
Protected area in Hotspots	645,4
Protected area in priority areas for conservation	8,252.47
Protected area adjacent to priority areas for conservation	250.9

The following infographic details the areas that Vale attempts to protect, which includes our owned areas and third party areas. These conservation actions are the result of both legal requirements and compensation stemming from projects implementation and operation, as well as voluntary actions. Among our conservation partnerships with third parties, the following stand out: investments in land regularization, infrastructure and ecosystem protection (fire breaks, fences, fire prevention and fire hunting and fighting), as well as research and innovation.

Protected area

Area: 8,526.19 km²



Carajás National Forest
Brasil, Pará
ICMBio Partnership
3910.0 km²

Tapirapé-Aquiri National Forest
Brazil, Pará
ICMBio Partnership
1142.4 km²

Itacaiúnas National Forest
Brazil, Pará
ICMBio Partnership
1365.9 km²

Tapirapé Biological Reserve
Brazil, Pará
ICMBio Partnership
992.0 km²

Igarapé do Gelado Environmental Protection Area
Brazil, Pará
ICMBio Partnership
232.7 km²

Ferruginous Fields National Park
Brazil, Pará
ICMBio Partnership
220.0 km²

Natural Heritage Private Reserves (NHPR) in Quadrilátero Ferrífero of Minas Gerais
Brazil, Minas Gerais
Own
128.0 km²

São Luís Botanical Park
Brazil, Maranhão
Own
1.1 km²

Tubarão Botanic Park
Brazil, Espírito Santo
Own
0.3 km²

Vale Natural Reserve
Brazil, Espírito Santo
Own
227.1 km²

Sooretama Biological Reserve
Brazil, Espírito Santo
ICMBio Partnership
278,0 km²

Protection area related to four small hydroelectric power stations (PCHs
Brazil, Minas Gerais
ICMBio Partnership
3.3 km²

Private Protected Area
Mozambique
Own
16.7 km²

Ecological Center Vale Malaysia (Vale Eco Center)
Malaysia
Own
2.9 km²

Pic du Grand Kaori Reseve
New Caledonia
Government Partnership
of Nova Caledonia
3.1 km²

North Forests Natural Reserve
(Forêt Nord Nature Reserve)
New Caledonia
Government Partnership
of Nova Caledonia
2.7 km²

Biome

- Amazon Forest
- Savana
- Atlantic Forest
- Forest and Maquis Shrubland
- Sundaland

Carajás National Forest.
Photo: NITRO visual Stories.

In Carajás, in partnership with the Chico Mendes Institute for Biodiversity Conservation (ICMBio), Vale has been supporting the Fire Prevention and Combat Program since 2010, and has helped to intensify and improve it. Vale has provided educational campaigns focused on prevention, training courses for brigadiers and firebreak maintenance, and has mobilized financial resources in logistics, technology and technical knowledge. In the Quadrilátero Ferrífero, Vale also supports fire brigades that work to prevent and combat fire in our own and third-party protected areas.

In Brazil, in Espírito Santo, Vale maintains almost 230 km^2 of protected Atlantic Forest in the Vale Nature Reserve, which maintains an agreement with ICMBio to protect more than 270 km^2 of the Sooretama Biological Reserve.

In Malaysia is the Vale Eco Center, which opened to the public 2015, which protects 2.9 km^2 of forest environments of high conservation interest. In addition, the site develops educational actions with the local community.

Cavities and rock fields

Vale interferes in areas of cavities and ferruginous rock fields during mining activities: these formations are present in about 40% of iron ore reserves. The company collaborates to conserve these areas by providing policies and support to maintain conservation units, as well as research that expands knowledge about the species present in the region. Caving is a strategic subject, with specific annual goals expressed in internal indicators (KPIs), developed in synergy with the production areas. The management of endemic flora associated with rock fields is a strategic priority with relevance in licensing processes.

Recovery of degraded areas

The recovery of degraded areas (RAD in Portuguese) is a process inherent to mining, predicted by Vale throughout different phases of its enterprises, from planning, through operations, to the closure of its activities.

Impacted and recovering areas (GRI 304-3)	km2
Deployment of full permanent recovery areas	9.92
Deployment of full interim recovery areas	1.88
Total area of suppression	9.83
Deployment of recovery in Wilderness areas	3.04
Recovery deployment in Hotspots	8.94
Suppression in Wildeerness areas	3.93
Hotspot Suppression	5.05
Areas protected by Vale or areas that Vale helps to protect	8,526.19

Opening and closing balance (GRI MM1)	km2
Impacted areas (opening balance)	627.62
Impacted areas in the reference year	9.80
Areas in permanent recovery in the reference year	9.32
Impacted areas (closing balance)	628.10

Dams management

Although the proper management of tailings storage facilities was always considered a critical aspect for Vale, the company has redoubled its efforts to increase the rigor of the process Risk Management following the rupture of Dam I at the Córrego do Feijão mine, in Brumadinho (MG).

Since then, the company has revised its dam management model, starting by the implementing a new governance model with global reach. One of the initial steps was to create a corporate area called the Tailings Department within the new Executive Office of Safety and Operational Excellence, which reports directly to the company's CEO. The department leads policy development, studies and actions with the objective of making safety management and monitoring of dams more effective, including internal and external audits and other quality processes related to geotechnics. One of the initiatives implemented is the Registration Engineering model (EOR in Portuguese) that will act as a permanent technical support throughout the dam life cycle. The EOR is a governance initiative that is aligned with the main international dam management guidelines, mainly from the Mining Association of Canada (MAC).

Another action taken was the adequacy of the dam safety management system to the three-line defense model adopted by Vale for its risk management. Within this logic, the 1st Line of Defense is formed by the risk owners and business processes executors in project and administrative and support areas of the company. They are directly responsible for identifying, evaluating, monitoring and managing risk events in an integrated manner. The 2nd Line of Defense corresponds to the areas of occupational safety, risk management, standardization, legal compliance and specialized areas such as operational excellence and asset management, supervising and supporting the First Line of Defense. The 3rd Line of Defense is composed of areas totally independent from the administration, which are the Internal Audit and the Ethics and Conduct Office.

Taking into account their respective areas of operation, these areas produce evaluations and inspections that result in an exempt validation and that includes the effectiveness of risk management, internal controls and compliance.

Other structural actions to improve dam management were:

- Technical analysis of all dams' history and current conditions, with preparation of studies "As-Is", paying special attention to structures whose original projects do not have the required data completion and precision (most of these structures were acquired by Vale in past mergers);
- Additional reinforcement to increase the safety factor of the dam when necessary;
- Creation of the Independent Committee for Extraordinary Dam Safety Advisory (CIAESB in Portuguese), reporting directly to the Board of Directors;
- Formation of a specific Executive Committee for geotechnical risks;
- De-characterization of upstream dams, according to state and federal legislation, to remove the function of these dams and reintegrate the areas into the environment;
- Projects to develop alternative methods of tailings deposition to avoid new dams construction of or the need to elevate existing ones;
- Implementing and operationalizing Geotechnical Monitoring Centres (CMG in Portuguese);
- Implementing of the Basic Geotechnical Guidelines (DBG acronym in Portuguese), a tool that aims to improve the routine safety management of geotechnical structures and give their owners greater visibility on their performance.

To intensify the frequency of monitoring its structures, Vale has implemented the Geotechnical Monitoring (CMG) at the Águas mine Claras, in Nova Lima (MG) and Itabira (MG), with the monitoring 24 hours a day, 7 days week, from a group of dams, including upstream.

Geotechnical Monitoring Center in the Águas Claras Mine in Nova Lima (MG).
Photo: Vale Archive.

New standard and compliance with legislation

There are several policies and standards regarding dam safety for our Ferrous, Coal and Base Metals areas. During 2019, Vale maintained intense contact with the International Council on Mining and Metals (ICMM) and has participated actively in preparing the Global Tailings Standard, a new standard for dam management, with publication scheduled for the second quarter of 2020. Vale is committed to meeting the new standard and adopting established best practices.

After the rupture of Dam I at Brumadinho, a group of investors active in extractive industries, led by the Church of England Pensions Board, created the Investor Mining and Tailings Safety Initiative, which over the course of 2019 consulted more than 700 extractive companies through the ICMM, thus consolidating a global database on about 1,900 dams. Vale responded to all requests for information made by the initiative and is committed to this relevant commitment to contributing to greater safety and transparency in the industry.

In the specific case of the state of Minas Gerais, after the events of Brumadinho, legislative changes required Vale to update all dams' Emergency Plans. This began to include aspects such as defining and structuring specific emergency care management for each complex; evaluating and increasing emergency care resources, especially in units with dams at emergency levels 1, 2 or 3; completing the implementation of sound warning systems (sirens) in potentially impacted communities present in the Self-Rescue Zone (ZAS); and supporting civil defenses to prepare municipal contingency plans.

Other initiatives included establishing the Tailings Review Board in Base Metals operations, as well as upgrading dam instrumentation to enable remote monitoring capabilities. In addition, the use of new satellite monitoring technologies has been tested to increase surveillance routines.

Dam emergency levels

Emergency situations are considered those resulting from adverse events that affect dam safety and may cause damage to its structural and operational integrity, the preservation of life, health, assets, and the environment. The emergency should be assessed and classified according to the levels below:

Level 1 - When an anomaly is detected that results in the maximum score on the state of conservation or when any other situation could potentially compromise the safety of the facility, which requires special daily inspections.

Level 2 - When the results of actions taken in the referred Level 1 anomaly are classified as "uncontrolled" or "unextinguished," requiring further special inspections and interventions.

Level 3 - When a situation of impending or imminent failure is occurring.

Stability Condition

Vale periodically reviews external and independent companies, with the objective of assessing the physical and hydraulic safety conditions of the dams. In compliance with federal legislation (Ordinance DNPM 70.389/17), twice a year, in March and September, the Regular Safety Inspection is carried out with the elabouration of the respective report (RISR acronym in Portuguese) that subsidizes the safety evaluation of the structure and results in a Stability Condition Statement (DCE acronym in Portuguese), which can be positive or negative.

In September 2019, 82 positive DCEs were issued from the facilities in Brazil's operating units. Two facilities improved their stability conditions and, therefore, obtained positive DCEs in the second half of the year, after a negative assessment in March: Dam 5, from the Águas Claras Mine and Taquaras Dam, from the Mar Azul Mine, both in Nova Lima (MG).

By the end of 2019, considering the legal demands, 19 dams were declared to have a negative stability condition: Pontal System, Campo Grande, Doutor, Marés II, VI, Sul Superior, Sul Inferior, Maravilhas II, Dike B, Capitão do Mato, Vargem Grande, Capim Branco, B3/B4, Forquilha I, Forquilha II, Forquilha III, Forquilha IV, and Igarapé Bahia Group and Water Collection. The Pontal System consists of 7 facilities: Pontal Dam (main dam), Dike 2, Dike 3, Dike 4, Dike 5, Minervino Dike; and and the stability of Cordão Nova Vista Dike, and Dikes 2, 3 and Minervino were not guaranteed. Together with the National Mining Agency (ANM), the Pontal System is counted as the only facility to have a stable condition. Read more here.

In addition to its legal obligations, Vale's good practice is to audit all of its dams annually, including those that are small and do not fit in the current legislation. In this sense, four structures that were not legally required to be audited according to ANM criteria, and, according to the criteria of the state legislation in Minas Gerais, only needed to be audited in 2021 due to their low potential for environmental damage, were audited and had negative DCE emissions: Alto Jacutinga, Mata Porcos, Prata and Captação Trovões. In the March 2020 cycle, the Alto Jacutinga and Prata dams already had the emission of the positive statement, returning the conditions of stability.

De-characterization

Vale is leading the de-characterization of its raised upstream facilities. All de-characterized structures will be reintegrated into the environmental context, seeking to ensure environmental performance compatible with the territory in which they are located.

Another action adopted by the company is the construction of containment structures downstream of dams that are at emergency level 3, with the goal of reducing the risks of impacts to people and the environment. The assembled structure acts as a barrier to contain tailings in the event of dam failure. These structures are made of concrete or stones. The choice of material takes into account the geological characteristics of the region and the emergency character of the works. Currently, the dams that are receiving containments are: Sul Superior (Barão de Cocais), B3/B4 (Macacos, Nova Lima), Forquilhas I and III (between Ouro Preto and Itabirito).

Progress of the process

Vale has completed the construction on a containment structure for the Sul Superior Dam in the city of Barão de Cocais, while the construction of containment structures for the B3/B4 and Forquilha dams will be completed in the first half of 2020, increasing safety conditions in the downstream areas of the dams and allowing the de-characterization work to begin next.

During the construction works of the dams downstream, the focus is on workers' safety. Auto Rescue Zone (ZAS) residents were removed preventively for their protection. Vale reinforced the evacuation plan, emergency training and air rescue drills. In addition, we monitor teams around the clock and all workers accessing risk areas use geolocation equipment.

In addition, after the rupture of Dam I at Brumadinho, Vale intensified its dam monitoring and has been carrying out preventive evacuations in the Auto Rescue Zone (ZAS) of the dams at Emergency Levels 2 and 3.

Of the structures to be decharacterized, Vale completed de-characterization of the 8B sediment dam, located in the Águas Claras mine, in Nova Lima in December 2019.

Measures to improve the safety factor of the structures:

- Lowering the surface water level of the reservoirs;
- Drilling of wells to remove the underground water contribution;
- Construction in 2019 of about 15 km of channels for diversion of rainwater contributions in reservoirs.

Mobilization to eliminate risks:

- Investment of USD 2.6 billon for de-characterization;
- More than 4,500 workers at the peak of the works (December/19);
- About 60% of this workforce is hired locally;
- 16 large companies hired.

Measures implemented to improve dam safety:

- Implementation and operation of the Geotechnical Monitoring Centers in Nova Lima and Itabira, with professionals dedicated to monitoring information 24 hours a day, 7 days a week;
- In 2019, about 1,000 new monitoring instruments were acquired, including piezometres, inclinometres, water level and flow metres;
- Investments in videomonitoring systems, analytical videos, radars, topographic robotic stations, amplification of microsimic networks (geophones), drones and satellite tracking.

Emergency Action Plans for Mining Dams (PAEBMs in Portuguese)

In case of a dam emergency, all actions contained in the Emergency Action Plan for Mining Dams (PAEBM) will be implemented promptly. This plan defines the immediate actions to be carried out in an emergency situation in order to minimize loss of life and social, economic, and environmental impacts.

Throughout 2019, Vale reviewed its facilities' emergency plans. To update these plans, we reviewed the social data of the potentially affected population, located downstream of these facilities, as well as all meeting points and escape routes, striving to optimize the emergency plan in each of the locations.

All information was incorporated into the Emergency Action Plans for Mining Dams (PAEBM), which were filed in February 2020 with the City Halls, Environmental Agencies, municipal, state, and federal civil defenses. To date, there are 93 structures with revised plans, with interference in 18 municipalities in the Self-Rescue Zone (ZAS) and 39 municipalities in the Secondary Safety Zone (ZSS).

Mining residues

GRI MM3

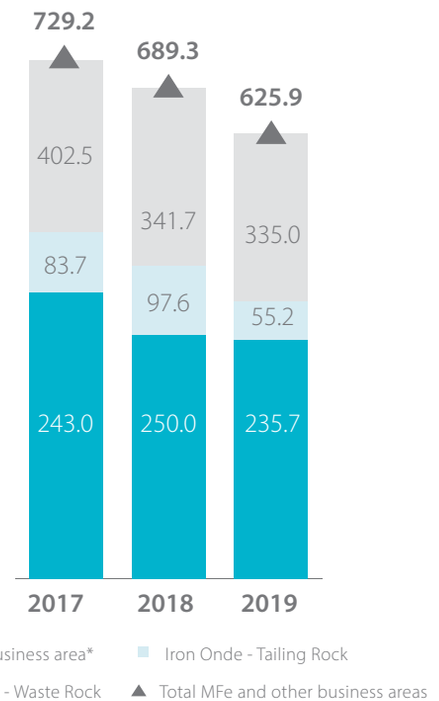
Residues and waste rocks, i.e., waste from mining, are a consequence of mineral extraction activity. Mining waste is deposited into piles, dams and mines, according to safety management systems in effect. These deposits are subject to regular stability inspections and an audit program.

In the Iron Ore Department, Vale has 124 tailings dams and three drained piles registered with the National Mining Agency (ANM), mostly located in the state of Minas Gerais.

In Vale's Base Metals operations, there are 356 dam structures: 56 of them are tailings dams and 14 are inactive dams. Most of them are in Canada and have their performance is publicly reported according to the Canada Mining Association's Tailing Dams Management Guideline.

In Brazil, the Base Metals operations of the South Atlantic have 16 structures – two of them are large tailings dams, located in the Sossego and Salobo Mines in Pará.

Total mineral and metallurgical waste
in millions of tonnes



*Other businesses include tailings and waste rock from coal, copper, nickel, manganese and slag (manganese alloy). Taillings and waste rock of potassium and fertilizer by-products were considered in 2017.

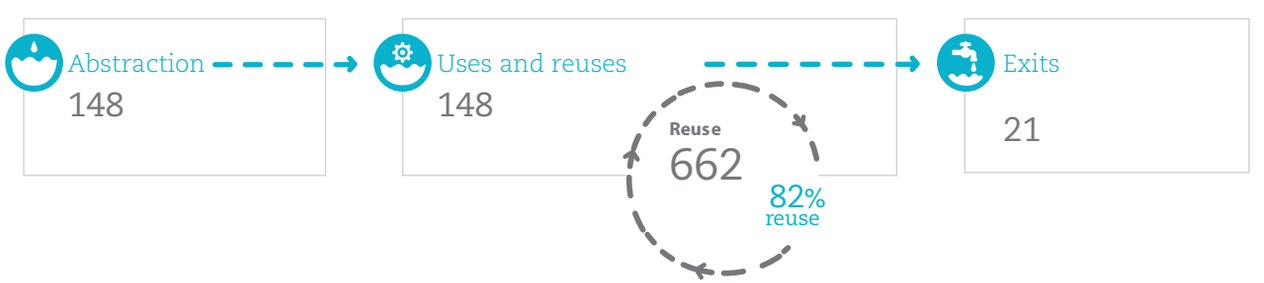
Water resources and effluents

In mining, water is a fundamental component and present in all phases of a project, from conceptual design to post-closure. It can also become a risk factor when there is excess or scarcity – in both mining and mining-related infrastructure, such as dams – causing floods, for example, and effluent generation, in the first case, and generating conflicts in the second.

Vale, with the launch of Water Goal[16] in 2018 (base year 2017), aligned with the United Nations SDGs, has aimed to strengthened initiatives addressing governance and the execution of actions in its operational units.

16 Pursuant to this Goal, Vale aims to reduce by 10% the specific use (fresh water collected and used in the processes per produced ton) by 2030, which means less new water for its production – 2017 Sustainability Report, page 86.

Hydric balance
(in millions of m^3)

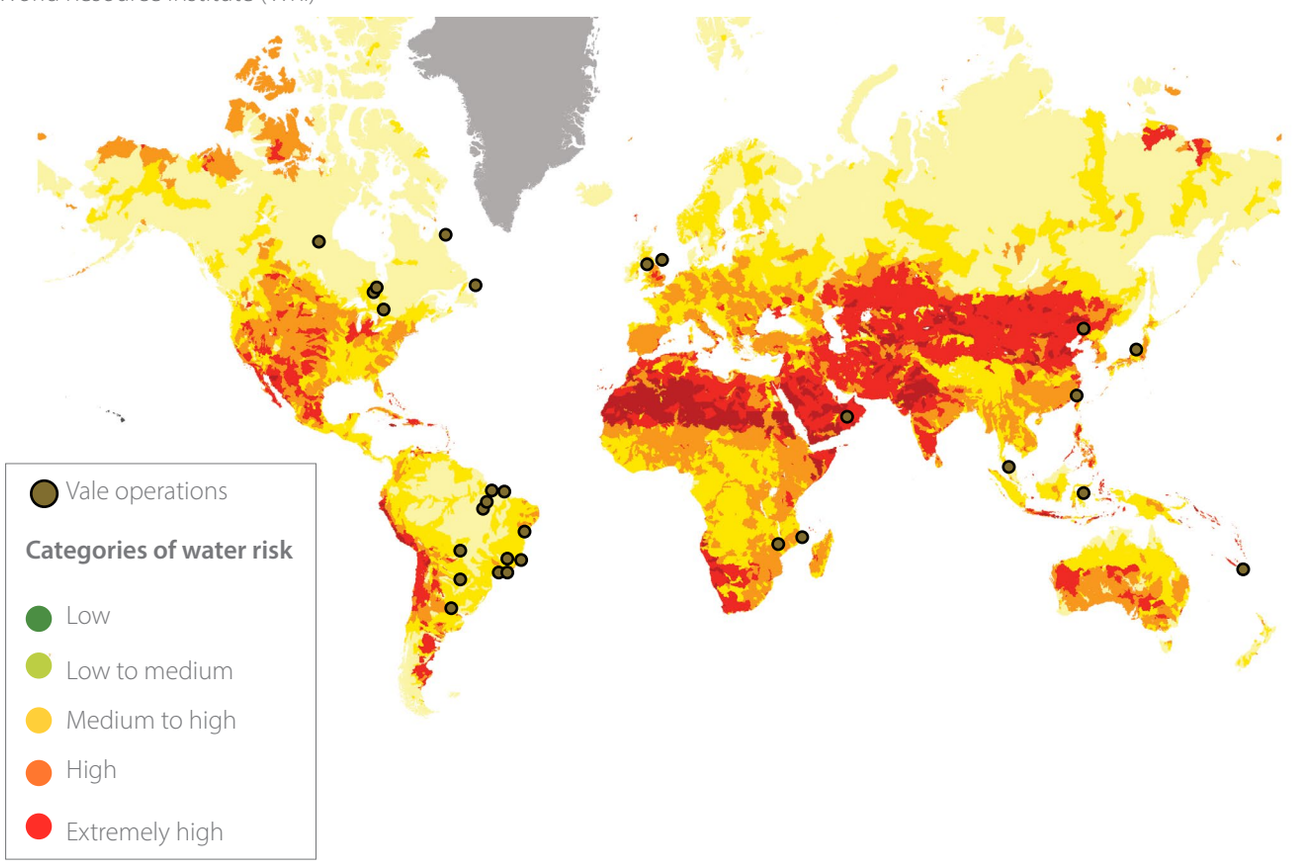


Highlight goes to the 8.4% reduction in the specific use of water (base year 2017); review of the Global Water and Effluent Management Standard, according to International Council on Mining and Metals (ICMM) guidelines; creation of Water Resources and Effluents committees in the operational units; and, also, the acquisition of additional water variable monitoring instruments (around 620 additions since 2018).

In 2019, Vale maintained its water reuse rate at the 2018 levels: 82%. In its management strategy, Vale states that this is a way to collect less water from the environment.

The effluents generated in Vale's operating units come from industrial uses and human consumption. These effluents are reused in the company's processes whenever possible and, in 2019, 32.8 million m^3 were disposed of in the environment, according to release standards established by local laws.

Risks related to water stress – Aqueduct
Font: World Resource Institute (WRI)



Climate Change

GRI 201-2

Climate change is one of humanity's main risks today. Increasing demands from society, the market and other stakeholders, in addition to competitiveness issues, reinforce Vale's commitment to contribute to a low-carbon economy.

Vale recognizes that climate change represents one of society's greatest challenges and is committed to contributing to solutions that limit temperature increases to 2°C, as defined in the Paris Agreement. In this regard, in 2019, the Board of Directors of Vale updated the organization's carbon neutral mining strategy[17].

Vale aims to act actively to induce the neutrality of greenhouse gas emissions in the steel, metallurgical and shipping chains. In this context, the company's main commitment is to become carbon neutral in its operations (scopes 1 and 2) by 2050.

In 2018, the target was set to reduce the intensity of greenhouse gas emissions by 16%. In 2019, although absolute emissions were approximately 11% lower, the intensity of emissions grew 8%[18] compared to the base year of 2017.

In 2019, the company published a group of sustainability goals (link to the governance part - goals), including new commitments to reduce reduce greenhouse gas (GHG) emissions, bolder than goals established previously in 2018, aiming to become a carbon neutral mining company.

- To reduce the absolute emission of scopes 1 and 2 in 2030, aligned with the Paris Agreement[19];
- To become carbon neutral (scope 1 and 2) by 2050;
- To adopt a shadow price of USD 50 per ton of CO_2 equivalent, to be used in the economic feasibility studies of projects;

- To adopt a shadow price of USD 10 a ton of CO_2 equivalent for carbon sequestration in forest restoration and reforestation projects;
- To adopt a target for scope 3 emissions.

To make this contribution, Vale has set a Global Policy on Mitigation and Adaptation to Climate Change, which describes the guidelines on the subject, encompassing commitments to manage and reduce the company's GHG emissions. The policy is being updated and comments were submitted during a public consultation conducted through the Vale's website were considered. See more here.

The Low Carbon Forum was also created to manage the implementation of the Vale Carbon Neutral strategy. The Forum is coordinated by the Sustainability Executive Board with the support of the Executive Boards: Coal, Strategy and Mineral Exploration, Business Support, Ferrous, Basic Metals and with the participation of Vale's CEO. The meetings are held monthly with the participation of the broad leadership and technical teams that deal with the topic on a day-to-day basis. Vale's goal is, throughout the climate change management process, to develop a portfolio of low carbon projects made possible by the internal carbon price, in addition to a better understanding of regulatory risks and their impacts; better understand and communicate material risks and opportunities for climate change in business; change Vale's energy consumption matrix through higher consumption of renewable energy sources; and reduce the carbon footprint of their products.

One of the main current programs of the company is PowerShift, which seeks to boost innova-tion and technologies for the effective reduction of GHG emissions in operations, in partner-ship with suppliers, academia and large companies. The main pillars of the program are the decarbonization of production processes, such as mining, railroad, metallurgical processing and navigation, through electrification, alternative fuels and processes. Several field tests are scheduled for the coming years, in order to validate technologies under real operating conditions.

As part of the strategy, and in line with the recommendations of the Task Force on Climate Related Finnancial Disclosures (TCFD), Vale conducted a preliminary scenario analysis of its business resilience in the three climate change scenarios, considering the scenarios of the International Energy Agency (IEA). Every year, Vale publishes the CDP report, aiming to provide transparency on the main material risks and opportunities for Vale.

The construction of climate-related scenarios allows Vale to identify indicators to monitor the external environment and more quickly recognize changes in the scenarios, allowing an agile adaptation to current needs. As a result, the company invests in businesses and technologies that support the growth of a low-carbon economy and provide solutions for the supply chain and society as a whole.

The future emissions estimate, as well as the direct and indirect financial impacts of carbon prices, allows greater flexibility in the way in the approach of the theme and in the planning of more economical mitigation strategies, according to the planning of short- and long-term of the company.

As part of strategy to neutralise GHG emissions, Vale has estimated the financial implications of carbon pricing mechanisms and is working on assessing physical risks to operations. There is an effort to raise internal awareness in operations about these risks and promote new solutions to mitigate climate change and increase the resilience of operations.

Vale has established an approach for quantifying the inventory of land use emissions in order to determine, on an annual basis, the total carbon stocked, emitted or sequestered in the forest territories that Vale owns, the forest areas that the company protects and areas of protection in partnership. The quantification of carbon stock and sequestration was carried out according to the IPCC (2019)[20] methodology, considering data availability and considering the biomes of the areas. To estimate the carbon stock it was considered the amount of carbon stored in the biomass above and below the soil.

Considering the total areas protected by Vale and in partnership, plus Vale's forest properties, the company has a total of 1 million hectares of forest, which represents a carbon stock of approximately 600 million tons of CO_2e. By carrying out this calculation annually, Vale will be able to assess the evolution of emissions/ sequestration due to the use of land.

For the physical risks of climate change, Vale has developed, in partnership with the Vale Technology Institute, impact maps based on the analyses of the Intergovernmental Panel on Climate Change (IPCC). These maps allow us to identify the main changes in rainfall and temperature indices throughout Brazil, including in the regions where we operate, due to climate change. This tool helps to manage physical risks in operational areas.

Vale's Global Climate Change Policy demonstrates its commitments to managing GHG emissions in its processes and value chain. Climate change indicators were incorporated into the sustainability analysis carried out in Vale's capital projects, influencing technology selection and project design.

17 Vale Carbon Neutral Strategy

18 The increase in emissions intensity occurred mainly due to operational impacts resulting from the rupture of Dam I (reduced production with less use of installed capacity) and ramp up in coal operations.

19 Aligned with the Science Based Target Initiative (SBTI) methodology. Preliminary assessment, together with the SBTI, indicates that the goal of reducing absolute emissions should be 33% by 2030, with a base year of 2017. Small adjustments to this percentage may occur during the process of submitting and validating the target in progress.

20 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories - Volume 4: Agriculture, Forestry and Other Land Use, Chapter 4: Forest Land

Battery Powered Underground Equipment, in Sudbury, Canada. Photo: Vale Archive.

Since 2011, Vale has maintained the Value Chain Carbon Program to integrate the issue into the procurement strategy, which includes supplier training and the inclusion of a voluntary clause in contracts, requesting GHG information, recommended for categories of supplies classified as emission-critical.

Participation in initiatives

Among the initiatives for transparency climate change-related that Vale participates, stand outs the the Task Force on Climate related Financial Disclosures (TCFD), an initiative to develop reporting guidelines on risks and opportunities related to climate change. Since 2016, Vale has contributed technically to the construction of the TCFD Framework through the public consultation process and by being one of the first signatory companies.

The table below shows the main advances made by Vale in relation to the recommendations proposed by the TCFD.

From the changes in rainfall patterns and temperatures, it was possible to identify the main vulnerable assets and potential changes in the intensity and frequency of operational risks previously identified by the company's risk management process.

In addition, Vale prepares its annual inventory of emissions under the GHG Protocol standards, submitted to external audit, and reports it annually to CDP.

In Brazil, Vale participates in international discussion meetings, including technical discussions on economic instruments, to encourage the global reduction of GHG emissions, and collabourates to prepare policies and strategies aimed at transition to a resilient, low-carbon economy. One example is the involvement with Adaptaclima - a government platform to disseminate knowledge about adaptation to improve access to information and connect stakeholders in Brazil. In addition, Vale follows international discussions on climate change, especially those of the United Nations Framework Convention on Climate Change (UNFCCC).

Key elements of the disclosures on climate risks and opportunities recommended by the TCFD		
TCFD Recommendation	***Disclosure* Vale**	**Reference**
1. Governance - transparency regarding the governance of risks and opportunities related to climate change		
1.1. Description of the supervision of the Board of Directors	Sustainability Committee and Board of Directors responsible for validation sand low-carbon monitoring of guidelines.	Chapter "Governance" or "Sustainability Governance". CDP item C1
1.2. Role of executives in mapping and managing the agenda	Low Carbon Forum, with monthly meetings to assess the deployment and implementation of the Vale Carbon Neutral strategy. This forum is coordinated by the Executive Officers for Sustainability and Institutional Relations, with the support of the Executive Officers for Coal, Strategy and Mineral Exploration, Business Support, Ferrous and Base Metals, and with the participation of Vale's CEO and CFO. The meetings involve top management and technical groups from the business and corporate areas.	Chapter "Climate Change and Energy". CDP item C1.2
Strategy - current and potential impacts on the company's business, strategy and financial planning		
2.1. Transparency on risks and opportunities identified in the short, medium and long term	Preliminary and qualitative assessment of potential transition and physical risks, as well as low carbon opportunities. The studies will be further developed over 2020.	Chapter "Climate Change and Energy". CDP items C2.4, C2.5
2.2. Impact of identified themes on portfolio and strategy	Adoption of ongoing internal carbon pricing (shadow price) of USD50/$_t$CO2 and in line with what is required to limit temperature increase to 2°C, to be integrated into analyses of capital projects, current projects, budget cycle and strategic planning in 2020.	Chapter "Climate Change and Energy". CDP items C2.4, C2.5

Key elements of the disclosures on climate risks and opportunities recommended by the TCFD		
TCFD Recommendation	***Disclosure* Vale**	**Reference**
2.3. Business Resilience to Climate Scenarios	Initial exercise prepared in 2018 in relation to EBITDA sensitivity to International Energy Agency scenarios, including 2°C scenario. Preliminary analysis of physical risks of temperature increase and rainfall regime prepared by Instituto Tecnológico Vale. Sensitivity analysis to climate scenarios in progress within the current Strategic Planning cycle, based on the scenarios of the International Energy Agency.	Chapter "Climate Change and Energy" CDP item C3.1
3. Risk management - process of identification, evaluation and management of corporate risks		
3.1. Process for mapping and assessment of climatic risks	Environmental and climate change issues are embedded in the corporate risk management process. Physical risks related to impacts that climate change may have on Vale's assets and their surroundings, as a result of increased temperature, altered rainfall patterns, increased extreme events and rising sea levels, for example, affecting Vale's operations[21]. Other risks, such as possible impacts of climate legislation on the company's activities, through the imposition of limits on the emission of greenhouse gases by sector and increases in direct and/or indirect costs due to carbon pricing, are also among the risks identified by the company.	Chapter "Climate Change and Energy" CDP Item 2.2

21 The Vale Technological Institute has regionalized (downscalling) the global warming models referenced by the Intergovernmental Panel on Climate Change (IPCC) to the Brazilian reality. This allowed Vale to identify changes in rainfall regimes and volumes and temperature variations for all operations in Brazil. The CPR models 4.5 and 8.5 were regionalized.

Key elements of the disclosures on climate risks and opportunities recommended by the TCFD		
TCFD Recommendation	***Disclosure* Vale**	**Reference**
3.2. Climate risk management process	The main climatic risks are part of the company's risk management process. In addition, the monitoring of the main risks is also communicated in the framework of the Low Carbon Forum	Chapter "Climate Change and Energy" CDP Item 2.2
3.3. Integration into the corporate risk management process	Climate risks mapped by the different areas within the scope of Corporate Risk Management (CRM), and included in the Operational and Business Risk matrices Regulatory and physical risks included in risk factors (20F)	20 F Chapter "Risks Management"
4. Metrics and goals		
4.1. Metrics Reporting used to monitor climate risks and opportunities	Absolute emissions and intensity Energy consumption, intensity and matrix profile Water and land use	Chapter "Climate Change and Energy: Performance and Energy" "Water Resources and Effluent"
4.2. Transparency regarding scopes 1, 2 and 3 emissions	Emissions reporting scopes 1, 2 and 3 in the Sustainability Report, ESG Portal and CDP Questionnaire	Chapter "Climate Change and Energy: Performance"

Key elements of the disclosures on climate risks and opportunities recommended by the TCFD		
TCFD Recommendation	***Disclosure* Vale**	**Reference**
4.3. Setting goals clearly	In December 2019, Vale assumed more ambitious goals in its climate agenda, with 2017 as the base year. These are the goals: • Achieve carbon neutrality in scopes 1 and 2 by 2050 • Reduce scopes 1 and 2 emissions by 33% by 2030, a level compatible with a global temperature increase of up to 2 ºC. This target is linked to the variable remuneration of all Vale employees • Produce 100% of the electricity consumed globally from renewable sources by 2025 in Brazil and globally by 2030 • Establish ambition to reduce scope 3 emissions • Recover and protect 500,000 hectares by 2030	Chapter "Global Sustainability Goals" and "Climate Change and Energy" CDP item C1.3

In Brazil, Vale participates in international discussion meetings, including technical discussions on economic instruments, to encourage the global reduction of GHG emissions.

Performance

GRI 305-1 | 305-2 |305-3 | 305-4 | 305-6

As mentioned above, the annual performance in GHG emissions is part of the variable remuneration of all Vale employees. The company's total GHG emissions[23], the sum of scopes 1 and 2, totaled 12.6 million tons of CO_2 equivalent, a reduction of 13,6% when compared to 2018.

Vale's direct GHG emissions (Scope 1) were about 13.3% lower in 2019 compared to 2018, totaling 11.3 million tCO_2e. Indirect emissions from electricity purchase (Scope 2[23]) were reduced by 16.6% in 2019, totaling 1.3 million tCO_2e, mainly due to the reduction in electricity consumption.

The reduction of scope 1 and 2 emissions, today still closely associated with production, is due especially to the impact of outages on mines and pelletizers in MG, due to the rupture of Dam I of the Córrego do Feijão mine, in addition to other dams in the process of de-characterization. Emissions reduction is also attributed to the impacts on the production of Base Metals due to the strategy of focusing on the optimization of its production flows, cost reduction programs and improvements in the performance of assets, with the objective of increasing the operations competitiveness, especially those of the North Atlantic Base Metals.

22 Vale's inventory is developed considering an operational control approach, including the following greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC) and sulfur hexafluoride (SF_6). The methodologies, guidelines, global warming potentials, emission references and factors adopted in the inventory are published annually in Vale's response to the CDP Climate Change questionnaire.

23 Scope 2 emissions in 2019, accounted by the Market Based methodology, totaled 0.76 million tCO_2e. These emissions, unlike the accounting by the Location methodology, presented above, consider Vale's energy acquisition contracts as well as concession contracts for its own assets, attesting their renewable origin through certificates or declarations from generators. In 2019, from the total energy contracted and consumed via GRID, by Vale's operations in Brazil, we deducted a total of 7 TWh, from renewable sources.

Despite the drop in absolute emissions verified in 2019, the continuity of the ramp up of São Luís (Maranhão State) plant, based on fuel oil, stands out, as well as market demands for pellets with a higher amount of limestone, in addition to the continuity of the ramp ups of Moatize coal operations in Mozambique.

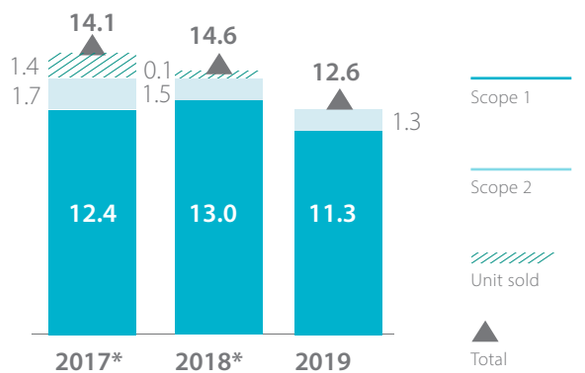
Throughout the year, the continuous improvement in the energy efficiency of both railroads in Brazil stands out, in addition to the successful ramp-up of the S11D Eliezer Batista Complex, which, despite its important increase in production, contributes to the reduction of specific emissions per ton given to its smaller dependence on Diesel fuel per ton produced, when compared to other Vale mining complexes.

In regards to biogenic (renewable) emissions, 406 thousand tons of CO2 in 2019, there was a reduction of 13% when compared to 2018, most of these emissions originated from the burning of renewable fuels and a small portion referring to the removal of vegetation from non-native areas. Despite the reduction in total value, the biogenic emissions from the burning of fossil fuels increased, a result that demonstrates the increase in the proportion of biodiesel in commercial diesel fuel in Brazil and Indonesia, both in mobile or stationary sources. We also removed 30.9 thousand tons of CO2 from the atmosphere through revegetation of impacted and/or compensation areas.

As it can be seen in the Total Emissions by Source chart for 2019, there is a strong correlation between our energy consumption matrix and GHG emissions, since about 66% of the company's emissions are related to use of energy as a source of combustion or to the use of electricity.

Scope 3[24] emissions, indirect GHG emissions calculated along the value chain, include up-stream emissions (related to goods and services purchased or acquired) and downstream emissions (related to goods and services sold). In 2019, these emissions totaled approximately 563 million tCO2e in the year, a result 4% lower than in 2018[25]. Around 97% of these down-stream emissions are due to the processing and use of products sold by Vale.

Vale's total GHG emission
(million tCO_2e)



* The 2017 and 2018 results were adjusted due to data review, certified by a third party, according to the GHG Protocol calculation methodology.

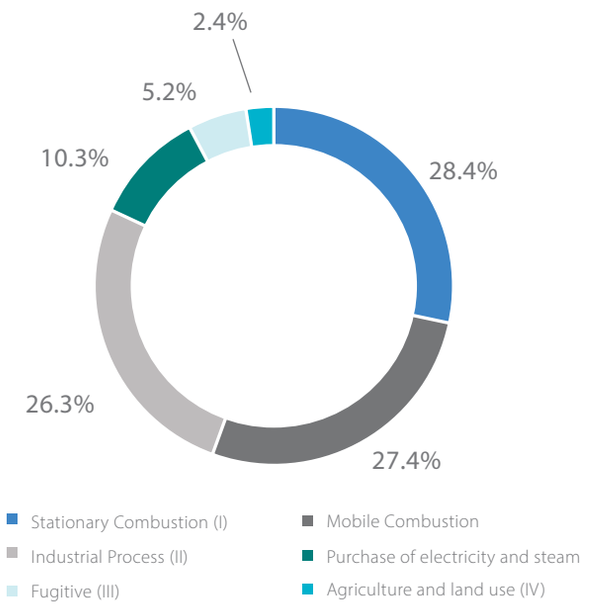
Emissions of ozone-depleting substances (ODS) totaled around 0.74 ton in 2019, an increase of about 73% over 2018, due to the data report review. These emissions refer to the use of refrigerant gases and other fluids controlled by the Montreal Protocol.

All GHG emissions inventoried by Vale are subject to external third party verification.

24 Energy consumption outside the organization considered Scope 3 categories 4, 7 and 9, totaling 192 thousand TJ in 2019.

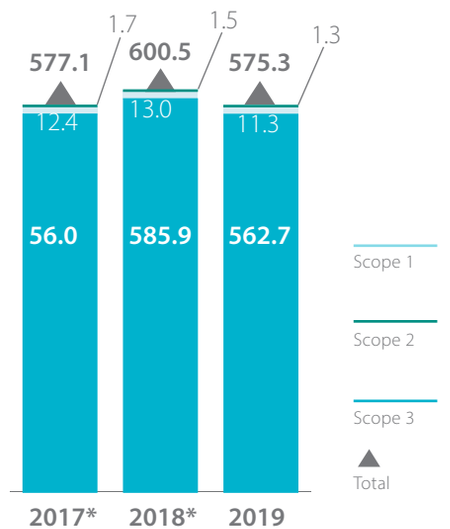
25 Vale's historical Scope 3 emissions for the years 2017 and 2018 were recalculated to exclude emission sources from units sold and include 100% of products sold.

Total emission (Scope 1 and 2) by source



(I). Stationary Combustion: fuel consumptions and use of explosives.
(II). Industrial Process: burnt iron ore pellets, Nickel and co-products and Ferroalloys.
(III). Fugitive: Coal Mining, Post Mining and HFCs Refrigerant Gases.
(IV). Emissions from fertilizer application and land use changes.

Total GHG Emissions
in millions of tCO_2e



* The results for 2017 and 2018 were adjusted due to the data review, the limit adjustment (units sold), certified by a third party, according to the GHG Protocol calculation methodology.

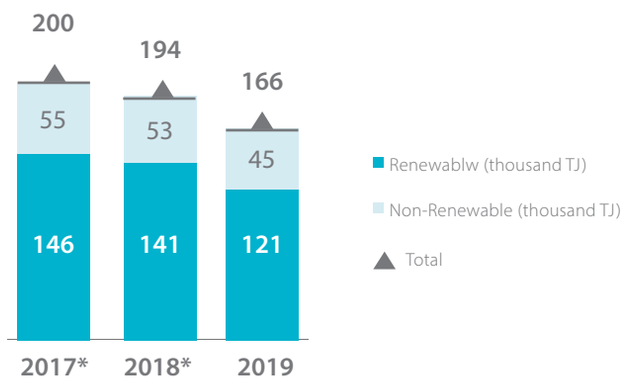
Energy

GRI 302-1 | GRI 302-2 | GRI 302-3 | GRI 302-4

Energy management and supply are priorities for Vale, given the uncertainties associated with regulatory changes and the risks of increased tariffs. The company seeks throughout its chain, from supply to final consumption management, to ensure security of supply and competitiveness in the energy available for operations.

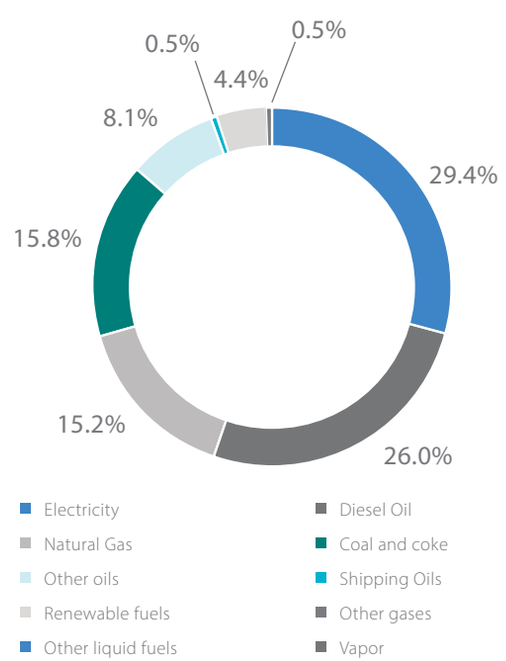
In 2019, despite the reduced energy consumption, the composition of the energy matrix continued to be composed of percentages similar to those of 2018, including that for consumption of renewable sources, which currently represents 27% of the company's matrix. The specific emission from energy use was slightly higher when compared to the previous year, totaling 49.9 tCO_2e/TJ. With regard to energy intensity, 2019 value corresponds to 4.4 thousand TJ / billion USD revenue.

Participation in Renewable Source 2019
(in thousand TJ)



* The 2017 and 2018 results were adjusted due to data review, certified by a third party, according to the GHG Protocol calculation methodology.

Energy consumption matrix by source 2019



Distribution of energy consumption by source	%	mil TJ
Non renewable fuels	**66%**	**109.9**
Coal and coke	16%	26.2
Diesel oil	26%	43.2
Navigation oil[I]	0%	0.8
Other oils[II]	8%	23.4
Natural gas	15%	25.3
Other gases[III]	1%	0.9
Tthoer liquid fuels[IV]	0%	0.2
Renewable fuels[V]	**4%**	**7.3**
Electricity consumed - Own Generation (Indonesia and Canada)	**6%**	**9.5**
Electricity consumed Purchased (GRID)		
Electricity NR GRID	6%	9.8
Electricity RE GRID	16%	27.3
Electricity consumed Purchased (OFF GRID)		
Electricity NR OFF GRID	10%	1.0
Electricity RE OFF GRID	10%	1.0
Energy use		
Eletrical energy consumed NR	0%	0.1
Eletrical energy consumed RE	0%	-
Energy Consumed Renewable Steam	**0%**	**-**
Energy Consumed Non Renewable Steam	**0%**	**-**
Refrigeration Consumed Purchased	**0%**	**-**
Heat consumed Purchased	**0%**	**-**
Total	100%	165.8

(I) Marine diesel, IFO, MGO, MDO; (II) Fuel oil, GMP oil, HFO, light distilate oil, residual oil; (III) LPG, HLR, propane, fuel gas; (IV) Gasoline, methanol, kerosene and jetfuel; (V) Biodiesel, Biomass, Chip, Charcoal, Ethanol

Electricity represented 29,4% of Vale's energy matrix, with emphasis on the consumption by operations in Brazil (27,8 mil TJ), Indonesia (8,5 mil TJ) and Canada (6,4 mil TJ). In order to meet this demand, the company maintains a portfolio of contracts and its own generation, formed mainly by renewable energy, emphasizing on hydroelectric plants.

Vale's electricity consumption matrix is now one of our main competitive advantages in the climate change agenda. The company has about 78% of renewable sources globally [see the Table of Energy Consumption Distribution by Source, above] and more than 84% in Brazil.

Our portfolio of electricity generation in Brazil is 100% renewable, based on hydroelectric generation. In 2019, the installed capacity in the country was 1.8 GW, coming from generation assets directly and indirectly controlled by us. Vale currently has direct stakes in three hydroelectric plants and three small hydroelectric plants in operation. Through a 55% stake in Aliança Geração de Energia S.A. ("Aliança Geração"), the company has an indirect stake in seven hydroelectric plants located in Minas Gerais and in the Santo Inácio wind complex, located in the state of Ceará, which started its operations in December 2017. There is also an indirect 4.6% stake in Norte Energia S.A. ("Norte Energia"), a company incorporated to develop and operate the Belo Monte hydroelectric power plant in the state of Pará, which started operations in April 2016 and reached full operation in November 2019. Part of the electricity generated by these assets is supplied to Vale's operations through energy purchase agreements signed with our subsidiaries.

In Canada, 69% of Vale's consumption is served by the grid, which is partially renewable (52%). The remaining 31% is obtained mainly from other sources of renewable generation. We have our own hydroelectric plants located in Sudbury, which consist of five generating units with a 55 MW total installed capacity. In 2019, these assets generated 13% of the electricity required by operations in Canada. Additionally, six diesel-fueled generators, with production ranging from 12 to 14 MW, met 100% of the electricity demand from Voisey's Bay operations in 2019.

In Indonesia, most of the energy requirements for PTVI's electric furnaces is provided by its three hydroelectric plants on the Larona River: (i) the Larona plant has an average generation capacity of 165 MW, (ii) the Balambano plant has an average capacity of 110 MW and (iii) the Karebbe plant, with 90 MW average generation capacity. These plants help reduce nickel production costs and reduce CO_2 emissions, ensuring renewable hydroelectric energy consumption.

Goal

In 2019, Vale anticipated its goal for self-sufficiency in clean energy in Brazil from 2030 to 2025, making it more challenging, since in recent years the self-production of clean energy was around 60% in Brazil and 55% globally. In addition, the 2030 target now has global coverage.

To achieve this goal, the company, among other actions, has structured a roadmap of initiatives, which involves restructuring the current generation portfolio to implement projects and partnerships to insert wind and solar energy sources. An example of these initiatives was the approval in 2019 to implement the Acauã and Gravier wind farms, which together have an installed capacity of 180 MW. In 2021, when they start commercial operation, they will allocate 55% of the energy generated to Vale, via Aliança Geração, increasing the share of wind energy in the electric matrix. It is also worth noting that, in 2018, Vale signed long-term stock option and energy supply contracts for the Folha Larga Sul Wind Farm, a 151.2 MW project in Campo Formoso (Bahia State), which is expected to start commercial operation in the second half of 2020.

Energy efficiency

GRI 302-4 | 305-5

Most GHG emissions are directly linked to energy consumption in operations. Therefore, the company established the Energy Efficiency Program, aimed at ensuring the consolidated accounting of results, multiplication of experiences, and continue and scale consumption optimization actions across operations.

The program has already started and focuses on constructing a management model that will involve centralized governance to standardize key processes that define an

In 2019 Vale reduced about 54% of its particulate matter emissions from fixed sources.

organizational structure, implement multidisciplinary teams in the units, define KPIs to be monitored monthly in all business boards and map initiatives to reduce energy consumption. The teams have already been deployed in the Serra Sul complexes, in the northern region of Brazil and at Vargem Grande, Mariana and Itabira in the state of Minas Gerais. It is expected that by the end of 2020 the program will be implemented across Vale globally.

Vale expects this program to foster energy-efficiency initiatives throughout the company to achieve high energy performance throughout the production chain and to contribute to achieving GHG emission targets.

The N5S mine at the Carajás Complex. Photo: Ricardo Teles.

Particulate matter, SOx and NOx emissions

GRI 305-7

Vale invested about USD 102 million in operational improvements and in the adoption of new atmospheric emissions control and management technologies in 2019. The objective of these investments is to continuously improve operations to reduce impacts on the environment and communities.

The mining sectors' main atmospheric emissions are particulate matter (PM), sulfur oxides (SOx) and nitrogen oxides (NOx). Vale uses two methodologies to calculate these emissions: consolidating the results of direct monitoring of the source and calculating by means of emission factors multiplied by fuel consumption. In addition, we monitor air quality around the industrial units, according to the applicable legislation, and report to the competent agencies.

Ivan Assunção Rodrigues (operational analyst) in the 3D ore reclaimer simulator at the CCT (Technical Training Center). Photo: Vitor Nogueira.

Emissions of particulate matter

To reduce diffuse emissions[26] of particulate matter in its operating units, Vale has improved its sprinkler systems, uses dust-suppression products, encloses conveyor belts and transfer houses, and employs wind fences[27] and slope revegetation, among other measures. Vale also applies technologies such as fabric bag filters, gas scrubbers and electrostatic precipitators for point emissions sources[28].

The operations that cause the greatest impacts on neighboring communities due to particulate matter emissions are the Tubarão Complex (Vitória/ES), the Moatize Mine (Mozambique) and the Vitória-Minas Railroad (EFVM).

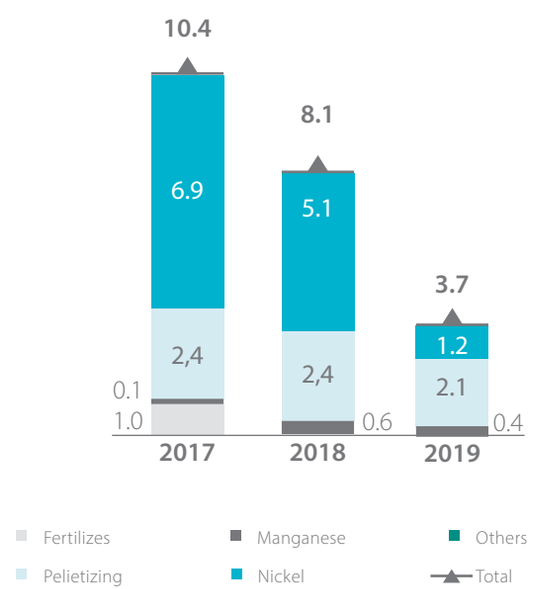
Although Vale has not identified a single target for emission reductions, each operating unit has its own annual emission reduction targets and plans, which impact its employees' remuneration. The units with significant emissions report atmospheric emissions monitoring data quarterly.

The main improvement actions to reduce atmospheric emissions in 2019 were related to implementing new controls and improving existing ones in the Moatize, Simões Filho (BA) and Tubarão Complex units. In the latter, we started by implementing the Environmental Master Plan (PDA in Portuguese), a set of initiatives that reinforce our commitment to sustainable operations.

Another initiative was the pilot project for using artificial intelligence tools to analyze and predict environmental monitoring, allowing a more effective preventive control in the Tubarão Complex units and in the South and Southeast corridors (MG) and Moatize Mines.

Through partnerships with universities, Vale has collaborated to develop an efficient PET-based dust suppressor, which is in the testing phase. The project is part of our collaboration with the Federal University of Espírito Santo (UFES in Portuguese). Another initiative, together with the Federal University of Pará (UFPA) – Tucuruí, is focused on dust control during ore handling, using laboratory tests to evaluate dust emissions around conveyor belts, wagons and storage piles.

Particulalate Material Emissions
(in thousand tons)

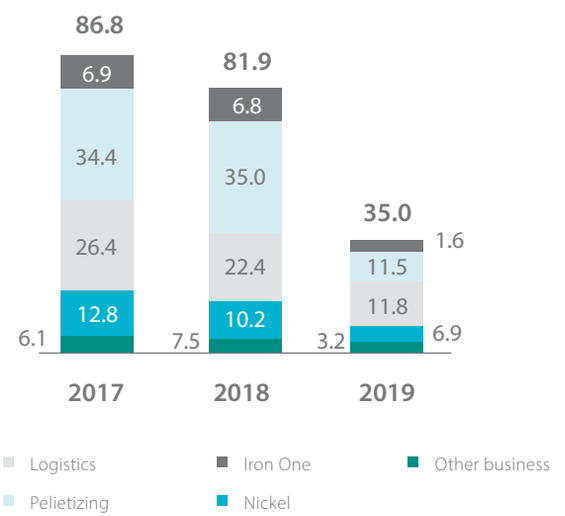


26 Diffuse sources are not fitted with structures to direct or control the flow of emissions, which hinders their quantitative monitoring.
27 Artificial wind barriers that surround product storage yards and reduce dust drag.
28 Point emission sources are stacks or ducts designed to disperse pollutants in the atmosphere.

In 2019 Vale reduced about 54% of its particulate matter emissions from fixed sources, mainly due to the reductions achieved in the PTVI (Indonesia) operational unit. In the PTVI unit, the environmental controls of Dryers 1 and 2 were improved and the operation was interrupted for 2 months. It is also worth mentioning the reduction of emissions from the Thompson unit (Canada), due to the shutdown of the smelter chimney.

At the Tubarão unit (Vitória), operational improvements in the electrostatic precipitators were implemented in Plant 8, and there were also stoppages due to production drops in Plants 1 and 2 and maintenance works in Plant 6. It is also important to highlight the outages of the pelletizing operations of Vargem Grande and Fábrica after the Brumadinho dam rupture.

NOx Emissions
(in thousand of tons)



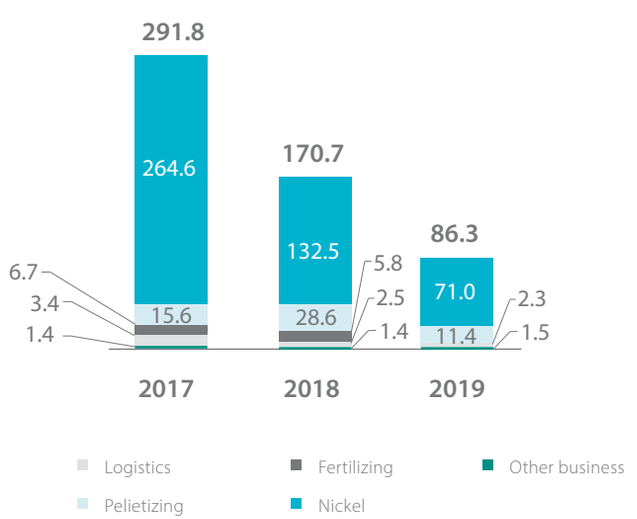
Nitrogen oxides (NOx) and Sulfur oxides (SOx) emissions

NOx and SOx emissions come mainly from combustion processes and are mostly present in our pelletizing, logistics and nickel operations. In some fixed sources, exhaust gases are directly monitored to determine the amounts emitted. Emissions from sources that cannot be monitored are calculated from emission factors that consider raw materials, inputs and fuels consumed.

Vale maintains a its policy to improve operational processes and control systems and to achieve increases in productivity, seeking to adopt fuels with lower emission factors and developing operational improvement and control projects to reduce these emissions.

In 2019 Vale updated its factors to calculate its NOx and SOx emissions, and this revision significantly reduced all non-measured fuel-related sources. In addition, it is important to highlight that the reductions observed in NOx (57%) and SOx (55%) emissions are due to various units' shutdown after the Brumadinho dam rupture.

SOx Emissions
(in thousand of tons)



Non-mineral waste

Vale's management of non-mineral waste is focused on three fronts: reducing waste generation, mainly due to the awareness and performance of operational areas; valorizing waste, inserting actions and projects in new production chains and new technologies for final destination; and controlling and developing new waste recipients, through strict environmental assessment processes to reduce the risks of inadequate waste disposal.

Vale generated 698,000 tons of waste in 2019, a 5.6% increase when compared to 2018. About 6.7% of these wastes are classified as hazardous. We sustainably distributed 52,0% of the waste through reprocessing, recycling and reuse.

Actions

The Waste Recipients Audit Program evaluates all companies that receive waste from Vale in Brazil. During 2019, 61 audits were carried out in a total of 265 actively registered companies.

In recent years, Vale has developed partnerships to use manganese slag and nickel slag in cement plants and as asphalt sub-base, as well as to use off-road truck tires to manufacture of plates, belt carriers for recycling, rubber parts and oils used in the Carajás Mine and in the port of São Luís (MA).

Two examples of Vale's waste disposal achieving socio-environmental gains are the use of wood packaging materials in the Coopvila Cooperative in São Luís, which manufactures parts and furniture from this material, and the donation of about 300 tons of plastic, paper and cardboard to recycling cooperatives in Minas Gerais.

We sustainably distributed 52,0% of the waste through reprocessing, recycling and reuse.

Chapter 5

Economic Performance

113 **Financial performance**

114 **Relationship with investors**

115 **Environmental, social and governance (ESG) on investor relations agenda**

Economic Performance

GRI 201-1 | 201-2 | 203-1 | 203-2

Vale's mission as an organization is to create value for its shareholders and for society through sustainable action and in compliance with ethical and compliance standards. For this reason, occurrences such as the rupture of Dam I in Brumadinho are unacceptable and require a complete review of the company's planning and procedures.

The year of 2019 was atypical in Vale's history. In addition to bearing the costs of actions to repair damage of all kinds caused by the rupture of Dam I at the Córrego do Feijão Mine, which involved – and will involve indefinitely – efforts by the company's entire functional body, Vale's iron ore production capacity was significantly impacted by operations stoppage at the Brucutu, Vargem Grande, Alegria, Timbopeba and Fábrica Mines. Iron ore production totaled 302.0 Mt, down 21.5% from 2018, and pellet production was 41.8 Mt, 24.4% lower than the previous year.

These circumstances led us to develop a broad compensation program, apply compensation actions, suspend shareholder and variable compensation programs for executives and, above all, accelerate the de-characterization of upstream tailings dams, in addition to investing in technologies to reduce the generation of tailings and find new disposal solutions.

For the future, Vale plans to significantly reduce the use of dams and will invest in alternatives that would allow wet processing operations to be replaced by safer and more sustainable processes. Dry processing will likely reach 70% of iron ore production in the coming years by 2023. In the next five years, Vale plans to invest USD 1.8 billion to increase the use of filtering and dry stacking by more than 50% of in the remaining wet processed volume. The company will also plans to increase the development of new technologies, such as New Steel's dry magnetic separation of iron ore, currently in the testing phase.

Iron mine in Congonhas (MG), Brazil. Photo: Leo Drumond.

Financial performance

In 2019, Vale recorded a loss of USD 1.683 billion, compared to net earnings of USD 6.860 billion in 2018. The reduction of USD 8.543 billion, partially offset by a lower loss from exchange rate variations in the year (USD 2.555 billion), is mainly due to:

- provisions and expenses incurred related to the rupture of the Brumadinho dam, including the de-characterization of dams and reparation agreements (USD 7.402 billion);
- a record of impairment and onerous contracts with no cash effect, mainly related to the Base Metals and Coal segments (USD 4.202 billion);
- provisions related to the Renova Foundation and to the de-characterization of the Germano dam (USD 758 million).

Pro-forma EBITDA (excluding provisions and current expenses related to Brumadinho) totaled USD 18 billion, USD 1.4 billion higher than 2018, mainly due to higher prices (USD 5.991 billion) and favorable exchange rate variations (USD 571 million), which were partially offset by lower volumes (USD 2.796 billion), higher costs, expenses and other factors (USD 1.404 billion) and shutdown expenses due to Brumadinho and other factors (USD 968 million).

In relation to free cash flow from operations, in 2019, Vale generated USD 8.105 billion and, thus, made possible the repurchase of USD 2.270 billion of bonds, with gross debt totaling USD 13.056 billion in 2019, a reduction of USD 2.410

Value generated and distributed (in USD million)
GRI 201-1

	North Americas, except Canada	Canada	Soth America, except Brazil	Brazil	Europe	Africa	Australia	Middle East	Total
Receipies		1,742.0	4.0	3,130.0	29,315.0	-	3,379.0	-	37,570.0
Direct Economic Value Generates	-	**1,742.0**	**4.0**	**3,130.0**	**29,315.0**	**-**	**3,379.0**	**-**	**37,570.0**
Operations costs	-	3,093.0	41.0	10,411.0	4,585.0	1,874.0	910.0	273.0	21,187.0
Wage and benefits of employees	-	737.0	9.0	1,186.0	23.0	89.0	103.0	42.0	2,189.0
Research and Development	-	77.0	20.0	252.0	3.0	47.0	44.0	-	443.0
Payments to capital providers	-	-	-	3,806.0	-	-	-	-	3,806.0
Government Payments	1.5	(120.6)	4.3	3,487.7	98.4	(1.7)	231.9	5.7	3,510.4
Enviromental Expernditures	-	99.5	0.7	248.8	5.1	26.9	162.4	5.1	548.5
Social Expernditures	-	3.6	0.2	168.9	-	9.0	8.4	0.1	190.2
Distributed Economic Value	**1.5**	**3,889.5**	**75.2**	**19,560.3**	**4,517.7**	**2,044.3**	**1,459.7**	**325.9**	**31,874.2**
Accumulated Economic Value	**1.5**	**2,147.5**	**(71.24)**	**(16,430.34)**	**24,797.3**	**2,044.3**	**1,919.3**	**325.9**	**5,695.8**

billion in relation to the previous year. Cash Flow also led to an increase in cash and cash equivalents to USD 8.176 billion, surpassing in USD 2.452 billion in the fourth quarter of 2018, and a reduction in net debt to USD 4.880 billion, to USD 4.770 billion below the same period being the lowest value since 2008.

Interests paid on loans totaled USD 921 million in 2019, the lowest level since 2010 and 45% below the peak of USD 1.663 billion in 2016. These data reflect the process of strengthening the company's balance sheet in the last three years. In December 2019, Vale completed the syndication of the USD 3 billion revolving credit line, which will be available for the next five years. The new line, together with the existing line of USD 2 billion, which expires in 2022, preserves the total amount available in revolving credit lines of USD 5 billion, providing a liquidity cushion for Vale and allowing the management of efficient cash.

In December 2019, Vale announced the declaration of payment of interest on equity in the gross total of BRL 7.253, corresponding to BRL 1.414364369 per outstanding common share and per preferred share of special class issued by Vale.

Relationship with investors

Tendo suas ações negociadas nas bolsas de valores de São Vale shares are traded on the São Paulo (B3) and New York (NYSE) stock exchanges, so we seeks to maintain a constant dialogue with the market and investors, providing information to suport investment decisions.

In Brazil, Vale shares are traded in the Novo Mercado segment of B3 S.A., which represents adherence to best practices in the Brazilian market. During the year, Vale's shares increased 7% in comparison to the 32% rise in the Ibovespa. Vale's American Depository Receipts (ADRs), traded on the New York Stock Exchange, increased by 1%.

Vale's relationship with shareholders and investors is guided by its Disclosure of Information, Shareholder Remuneration, Securities Trading and Related Party Transactions Policy, as well as by its Risk Management Policy [PRT1], among others.

Our Disclosure of Information Policy aligns with the regulations of market regulatory agencies, such as the Securities and Exchange Commissions in Brazil (CVM) and the USA (SEC), within which Vale has securities issued. This policy and others are based on basic principles such as transparency, symmetry of information, fair treatment and respect for investors' rights, and adherence to the best global investor relations practices in compliance with the specific legislation of the countries where Vale issues securities.

Environmental, social and governance (ESG) on investor relations agenda

The year 2019 was a turning point for Vale. The Brumadinho event initiated and accelerated several vital initiatives. We have intensified actions already in place to strengthen our relationship with key stakeholders. For instance, we hold regular meetings with investors and investor representative organizations around the world to discuss a range of strategy and governance topics, including our approach to ESG matters. We have held periodical webinars with ESG investors featuring different speakers, such as Marcelo Klein on the reparation efforts and Carlos Medeiros on governance improvements towards risk management. All these presentations can be found on our website. Considering the webinars and ESG-specific non-deal roadshows, close to 380 interactions with ESG stakeholders have been held since 2018.

In 2019, most of the demands for information from investors and capital market regulatory agencies arose due to the rupture of Dam I at the Córrego do Feijão Mine, in addition to the usual market demands.

380 interactions with ESG stakeholders

Engagement with 70% of our free float

5 ESG webinars, 3 of them in partnership with UNPRI

Considering the webinars and the non-deal specific roadshows of ESG, were almost 380 interactions with ESG stakeholders since 2018.

For more information on Vale's economic performance, please visit: http://www.vale.com/EN/business/reports/4t19/Pages/default.aspx

Letter External Reader – Sergio Besserman

Professor at the Department of Economics of PUC/RJ

The Sustainability Report 2019 Vale begins by reaffirming the top priority of responding to the impacts caused by the rupture of Dam I at the Córrego do Feijão mine and communicating changes in its governance and risk management models in the Board of Directors' Letter. This attitude supports the company's apology.

The actions for repairing the damage caused by the rupture of the Brumadinho dam are presented first and in a separate chapter. The extent of the tragedy, the priority given to the company's engagement and to the accountability of the remedial actions justify this decision in 2019. In the future, however, it seems to me that the report could emphasize the internalization in the company's culture of the lessons of the dramatic event, integrating Brumadinho in a transversal manner in order to make it even more explicit that the event initiated the transformation process of the company.

It is noteworthy the detailed account of the company's voluminous and effective actions of reparation, and the ambition to bring closer relations with the community, an objective also recorded in the report for relations with all communities of the social, economic and environmental ecosystems to which Vale belongs.

Two points in the report deserve highlighting: good practice in supporting actions to promote local development with specific socio-environmental and economic studies, which shows a company that values knowledge as a tool for action, and recognition that dialogues with communities are a complex process for building trust in relationships which, in addition to being indispensable in the resolution of conflicts, are also an added value to the company's reputation, its competitiveness, and the objective of economic and social development of the populations and territories involved.

In this context, Vale has the tools to strengthen the dialogues with communities through socio-environmental diagnoses and studies that present the dimensioning of impacts and an assessment of the path ahead to reach different stages of development or recovery/compensation, allowing to narrate and value the actions of other social actors and share with local societies the advances of the process and its difficulties.

It is important to note the emphasis given to the theme of inclusion and diversity in the company and, specifically in the case of gender inequality, the definition of goals on the contingent of workers and leadership. I note the absence of mention of senior leadership.

The strategic pillars defined and the proposal of a new pact with society aimed at sustainable development in the regions where Vale operates and on the planet are achieved with great technique in the KPI sustainability goals program and in the reporting of the means to achieve the objectives.

The "Commitment to the Planet" is assumed as a condition for Vale's operations and environmental management systems, compliance, promotion of technological innovation and financing that support the achievement of the goals are presented in a transparent manner.

The target for Water was maintained as in 2018. The Socioeconomic contribution goal could not be other than generic, but it could advance in concreteness throughout the process in territories under the influence of the company.

The most notable point of the report, auspicious for sustainable development in Brazil and the world, is the company's decision to significantly raise the ambitions of the goals related to Energy, Forests and Climate Change.

The goal of zeroing greenhouse gas emissions by 2050 in line with the Paris Agreement, synergic with the goals for Energy and Forests, deserves highlighting. It indicates the understanding that the value and competitiveness of the company are at stake. The transition to a low carbon economy is imperative and implies a major change in the relative price structure of the global economy and the value of assets.

The report shows Vale as a company that gathers the critical mass to pursue the goal not yet commented on in this letter: "Eliminate the main ESG gaps in regard to best practices".

Scope

GRI 102-45 | 102-46 | 102-49

In order to define the content and scope of this Sustainability Report, aligned with the Material Aspects and Limits methodology, Vale relied on the materiality matrix resulting from the mapping of indicators. The work took into account stakeholder expectations and interests regarding the Company's significant economic-financial and socioenvironmental impacts. The ability of these themes to influence investment assessments and decisions was also considered.

Regarding the scope, the report includes information on the performance of companies over which Vale has operational control and holds a participation of over 50%. References to "Vale" or "the Company" in this report are generally limited to Vale S.A. and its subsidiaries. Whenever a controlled subsidiary is specifically mentioned in this report, the information provided in respect of that entity will be limited to it only.

In January 2019, Vale concluded the acquisition of New Steel Global NV (New Steel), a company that develops innovative iron ore processing and beneficiation technologies through a dry process. New Steel currently owns patents in 56 countries for Fines Dry Magnetic Separation (FDMS), a dry processing concentration technique that we intend to use in our operations in the future. In August 2019, we concluded the acquisition of Ferrous Resources Limited, a company that owns and operates iron ore mines near our operations in Minas Gerais, Brazil. The transaction immediately increased our production of high-quality pellet feed. Also in 2019, Vale redeemed and cancelled all preferred shares class A of MBR, which were held by Banco Bradesco BBI S.A. consolidating a 98.3% equity position in MBR. MBR is a subsidiary of Vale that owns assets for production, transportation and port shipment of iron ore integrated into our Southern System and accounted for the production of approximately 59 Mt of iron ore in 2018. (Learn more about this at the 20-F Report and the Investors section of www.vale.com).

Within its subsidiaries, Vale seeks to ensure that policies and standards are implemented, according to applicable legislation, in line with its internal policies and standards. In the direct or indirect affiliated companies in which Vale (i) owns between 20% and 50% of the voting capital, or (ii) holds more than 50%, but without control, including cases of shared control, Vale expects these companies to implement and follow policies and standards aligned with the Company's. However, due to the lack of control, Vale cannot guarantee that these companies fully comply with all their policies, procedures and controls.

External Verification

GRI 102-56

Statement by SGS ICS certificadora Ltda. (SGS) Regarding the sustainability activities provided In "Sustainability Report 2019" given to Vale S.A.

Nature and scope of assurance

The SGS was hired by VALE S.A.to carry out the third-party assurance of their Sustainability Report 2019. The assurance scope, based on assurance methodology of sustainability reports of SGS, comprises the disclosure verification under GRI standards in 2019.

The information provided in "SUSTAINABILITY REPORT 2019" and its presentation is a sole responsibility of VALE S.A. management structure. The SGS is not involved in the preparation of any material, including the in the said report, such as risk analysis, materiality tests and other critical issues that may affect severally the VALE S.A. business. We are liable for giving our opinion of the GRI disclosures and their texting, data, charts and statement within the assurance scope in order to keep the VALE S.A. stakeholders informed.

The SGS Group has developed a set of assurance protocols for Sustainability Communication based on the best practices provided in GRI Sustainability Reporting Standards and the assurance standard - ISAE3000. Such protocols offer different assurance levels depending on context and capacity of organization, in this case VALE S.A.

This report was assured considering our protocols to assess the content authenticity and its alignment with the requirements of GRI Sustainability Reporting Standards, (Universal Standards 101, 102 and 103) and the requirements of Topic-specific Standards (GRI 200, GRI 300 and GRI 400) according to the material issues identified by VALE S.A.through our process detailed herein. Furthermore, the sectorial disclosures - GRI G4 Mining and Metals and Sustainable Development Framework: Assurance Procedure of ICMM – International Council on Mining and Metals. Based on this context, the "SUSTAINABILITY REPORT 2019" is considered as "Comprehensive option".

The assurance process suggested by VALE S.A. comprised a combination (i) visit to Vale business unit where the indicator, data and process concerning to sustainability and collection of GRI disclosures were reviewed, and the interviews with key personnel were carried out and the operational process were followed up, (ii) reviews of documents submitted by VALE S.A and crosschecking with information placed by company on indicators system – Credit 360 and (iii) review of the issues of the said report in order to align them with GRI standards. The accounting information and Greenhouse gases inventory - GHG (audited by SGS in another process) concerning to "The 2018 Sustainability Report" of VALE S.A. was not assessed as part of this assurance process. So, both pieces of information were assessed in different audit process.

Once it is performed at a plenty of Vale S.A., units the audit process enabled a more accurate assurance direct in the information source, in addition to provide inputs for the Company's Sustainability Management System enhancement, generating value to the assurance process traditionally performed by companies, where the audit teams are restricted to data and information check at their head offices.

The SGS team had the opportunity to complete the assurance stages at the following plants: Ponta da Madeira Complex in the state of Maranhão (Brazil), Mariana Complex in the state of Minas Gerais (Brazil), Sudbury Complex in the Canadá, Iron and Nickel mining, pelletizing plant, marine, port and rail terminal operations were visited. It is worth mentioning that the visits also included checks for GHG. Mine of nickel PTVI Sorowako (Indonesia), Corporate in the state of Minas Gerais and in the state of Rio de Janeiro (Brazil), due to the Covid-19 pandemic, and following the recommendations of the World Health Organization (WHO), were remotely verified by the SGS team.

Impartiality and competence statement

The SGS Group is global lead in inspection, analysis and verifications services, operating in more than 140 countries and rendering services that includes management system certification, audits and trainings on quality, environmental, social and ethic segments, sustainability assurance reports and greenhouse gases verification. The SGS attests your independence against VALE S.A., stating that is exempt from interest conflict with the organization, their subsidiary and stakeholders.

The assurance team was composed according to members' expertise, experience and competence for this activity, the team is composed of:

- An Audit Lead on Assurance of Sustainability Report, a Lead auditor on Socioenvironmental programs a Lead Assessor of Greenhouse Gases (GHG).
- An Auditor on Assurance of Sustainability Report, Lead Assessor of Greenhouse Gases (GHG), Lead Auditor on Socioenvironmental programs, Lead Auditor on Environmental, Quality and Sustainable Events Management System.
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gas Effect (GHG) and Climate Change Program, Lead Auditor on Socioenvironmental programs.
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gas Effect (GHG) and Climate Change Program.
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gas Effect (GHG) and Lead Auditor on Environmental, Quality and Health and Safety Management Systems.
- An Audit Lead on Assurance of Sustainability Report, a Lead auditor on Socioenvironmental programs a Lead Assessor of Greenhouse Gases (GHG), Lead Auditor on Ecuador Principles.

Assurance opinion

A wide assurance was applied for and the work performed was sufficient and adequate for a solid assurance. Regarding the verification performed on methodology, process and data provided by VALE S.A., we attest the information and data provided on disclosures of "SUSTAINABILITY REPORT 2019" are reliable and a true and accurate representation of the sustainability activities performed by VALE S.A.in reference year 2019. The assurance team thinks the report can be used by company's stakeholders as part of their processes of company evaluation. The organization selected the Comprehensive Option, which meets their needs.

In our opinion, based on what was found in company units and on documents provided by VALE, the report content meets fully the GRI standard requirements, including those in Sectorial Appendix for Mining and Metals and Sustainable Development Framework: Assurance Procedure of ICMM – International Council on Mining and Metals.

Recommendations, findings and conclusions of assurance

The disclosures of VALE S.A. Report, "SUSTAINABILITY REPORT 2019", is aligned with Sustainability Reporting Standards, (Universal Standards 101, 102 and 103) and with the requirements of Topic-specific Standards (GRI 200, GRI 300 and GRI 400), "Comprehensive Option". It is important to highlight the subject matters and its limits were dully set in accordance with the Reporting Principles and indicated over the report and/or reference list.

We recognize VALE S.A. is commitment and dedicated effort in the social and environmental actions undertaken after the rupture of Dam I at Córrego do Feijão mine in Brumadinho, Minas Gerais, and in the search for new opportunities to improve its internal activities to add sustainable value to the company. The review and significant change in the material topics presented in the "SUSTAINABILITY REPORT 2019" reaffirmed VALE S.A. is commitment to sustainability and its stakeholders

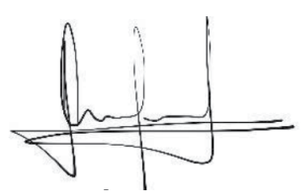
In terms of contribution to improvement and development of future sustainability reports and to more-effective assurance process, we recommend to VALE S.A. that:

- Disclose the objectives and goals of all material issues. Our understanding of best practice is to use the report as an important source of sustainability information for all stakeholders to support them in their decisions.
- Develop better internal dissemination and use of lessons learned from the new materialization process to mature points of contact with areas responding to the disclosures, and with stakeholders for future progress on the sustainability path.
- For the reporting context, continue searching for a summarized report, without poor content. Try to highlight the important gains of the sustainability area that consolidate itself against the management and strategy every year.Finally, SGS congratulates VALE S.A. for the initiative of carrying out the assurance of their report, for the historical commitment to sustainability and wish the significant advances on this matter are kept over the coming years.

April 14th, 2020
Executed by and on behalf of SGS

Fabian Peres Gonçalves

Business Manager - Sustainability



Caio César Ferreira de Faria

Lead Auditor for Sustaianbility Report

GRI Content Index

GRI 102-55

Materiality Disclosures Service
Vale S.A.
Abr 2020

For the Materiality Disclosures Service, GRI Services reviewed that the GRI content index is clearly presented and the references for Disclosures 102-40 to 102-49 align with appropriate sections in the body of the report.

The service was performed on the English version of the report.

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
GRI 101: Foundation 2016					
GRI 102: General disclosures 2016 - Organizational profile					
102-1 Name of the organization	42				
102-2 Activities, brands, products, and services	42		EM-MM-000.A		
102-3 Location of headquarters	42				
102-4 Location of operations	42				
102-5 Ownership and legal form	42				
102-6 Markets served	42 and more information can be found at Form 20F - 2019, Section: Lines of Business section (page 46).				
102-7 Scale of the organization	42 and more information can be found at Form 20F -2019, Section: Results of Operations (page 102).			8	
102-8 Information on employees and other workers	76		EM-MM-000.B		
102-9 Supply chain	10 and more information on-line at http://www.vale.com/EN/suppliers				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
102-10 Significant changes to the organization and its supply chain	The information can be found at Form 20F -2019, Section: Significant Changes in Our Business (page 17).				
102-11 Precautionary Principle or approach	The information can be found at Form 20F -2019 , Section: Operational Risks (page 36).				2, 4
102-12 External initiatives	The information can be found on-line at vale.com (http://www.vale.com/EN/initiatives/Pages/default.aspx)				10
102-13 Membership of associations	134 and more information can be found at Institutional partnerships on-line at vale.com (http://www.vale.com/brasil/EN/aboutvale/institutional-partnerships/Pages/default.aspx)				9
GRI 102: General disclosures 2016 - Strategy					
102-14 Statement from senior decision-maker	6-8				2
102-15 Key impacts, risks, and opportunities	42				2, 4
GRI 102: General disclosures 2016 - Ethics and integrity					
102-16 Values, principles, standards, and norms of behavior	42		EM-MM-510a.1	16	1, 2
102-17 Mechanisms for advice and concerns about ethics	55		EM-MM-510a.1	16	1, 2 , 4
GRI 102: General disclosures 2016 - Governance					
102-18 Governance structure	45			16	1, 2 ,4
102-19 Delegating authority	46			16	1, 2 ,4
102-20 Executive-level responsibility for economic, environmental, and social topics	46			16	1, 2 ,4
102-21 Consulting stakeholders on economic, environmental, and social topics	55			16	1, 2, 10
102-22 Composition of the highest governance body and its committees	46			5, 16	1, 2

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
102-23 Chair of the highest governance body	46			16	1, 2
102-24 Nominating and selecting the highest governance body	46			5, 16	1, 2
102-25 Conflicts of interest	51, 58 and more information at Form 20F -2019, Section: Conflicts of Interest (page 146).			16	1, 2
102-26 Role of highest governance body in setting purpose, values and strategy	46			16	1, 2
102-27 Collective knowledge of highest governance bod	46			4	1, 2
102-28 Evaluating the highest governance body's performance	46			16	1, 2
102-29 Identifying and managing economic, environmental, and social impacts	46			16	1, 2
102-30 Effectiveness of risk management processes	58 and more information can be found at Form 20F -2019, section: Risk Management (page 122).			6, 16	1, 2, 4
102-31 Review of economic, environmental, and social topics	46			16	1, 2, 4
102-32 Highest governance body's role insustainability reporting	The information can be found at Form 20F -2019, Section: Advisory Commitees to the Board of Directors (page 141).			16	1, 2
102-33 Communicating critical concerns	The information can be found at Reference Form, Section: 21. Information disclosure policy (page 689).			16	1, 2, 10
102-34 Nature and total number of critical concerns	55			16	1, 2, 10
102-35 Remuneration policies	The information can be found at Reference Form (page 466)				1, 2
102-36 Process for determining remuneration	The information can be found at Reference Form (page 466)				1, 2
102-37 Stakeholders' involvement in remuneration	The information can be found at Reference Form (page 466)				10

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
102-38 Annual total compensation ratio		Information subject to specific confidencial restrictions: Vale does not disclose the amount of paid salaries.		8,10	1,2
102-39 Percentage increase in annual total compensation ratio		Information subject to specific confidencial restrictions: Vale does not disclose the amount of paid salaries.		8,10	1,2
GRI 102: General disclosures 2016 - Stakeholder engagement					
102-40 List of stakeholder groups	10, 55				10
102-41 Collective bargaining agreements	77			8	3
102-42 Identifying and selecting stakeholders	10, 55				10
102-43 Approach to stakeholder engagement	10, 55				10
102-44 Key topics and concerns raised	10, 55				10
GRI 102: General disclosures 2016 - Reporting practice					
102-45 Entities included in the consolidated financial statements	More information can be found at Vale 20-F FY2019/Lines of Business (page 46)				
102-46 Defining report content and topic Boundaries	9, 117				
102-47 List of material topics	10				
102-48 Restatements of information	9				
102-49 Changes in reporting	9, 117				
102-50 Reporting period	9				10
102-51 Date of most recent report	9				
102-52 Reporting cycle	9				10
102-53 Contact point for questions regarding the report	9				10

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
102-54 Claims of reporting in accordance with the GRI Standards	9				
102-55 GRI content index	121				
102-56 External assurance	118				
GRI 201: Economic Performance 2016					
103-1 Explanation of the material topic and its Boundary	112				
103-2 The management approach and its components	53, 55, 112				
103-2 The management approach and its components	112				
201-1 Direct economic value generated and distributed	113			2, 8	9
201-2 Financial implications and other risks and opportunities due to climate change	96, 112		EM-MM-110a.2	13	4, 6
201-3 Defined benefit plan obligations and other retirement plans	77			3	3
201-4 Financial assistance received from government	No government assistance was received				
GRI 202: Market Presence 2016					
103-1 Explanation of the material topic and its Boundary	77				
103-2 The management approach and its components	77				
103-3 Evaluation of the management approach	77				
202-1 Ratios of standard entry level wage by gender compared to local minimum wage	77			5	3
202-2 Proportion of senior management hired from the local community	77			8	3
GRI 203: Indirect Economic Impacts 2016					
103-1 Explanation of the material topic and its Boundary	69				
103-2 The management approach and its components	53, 55, 69				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
103-3 Evaluation of the management approach	69				
203-1 Infrastructure investments and services supported	53, 112			7, 9, 11	9
203-2 Significant indirect economic impacts	69, 70, 112			1, 2, 3, 8	9
GRI 205: Anticorruption 2016					
103-1 Explanation of the material topic and its Boundary	59, 60				
103-2 The management approach and its components	53, 55, 59, 60		EM-MM-510a.1; EM-MM-510a.2		
103-3 Evaluation of the management approach	59, 60				
205-1 Operations assessed for risks related to corruption	59			16	1
205-2 Communication and training about anti-corruption policies and procedures	59			16	1, 2
205-3 Confirmed incidents of corruption	59			16	1
GRI 206: Anti-competitive Behavior 2016					
103-1 Explanation of the material topic andits Boundary	59, 60				
103-2 The management approach and its components	53, 55, 59, 60				
103-2 The management approach and its components	59, 60				
206-1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	There were no legal actions for competitive behavior, antitrust and monopoly practices.			16	1
GRI 302: Energy 2016					
103-1 Explanation of the material topic and its Boundary	104				
103-2 The management approach and its components	104		EM-MM-130a.1		
103-3 Evaluation of the management approach	104				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
302-1 Energy consumption within the organization	104			7	6, 8
302-2 Energy consumption outside of the organization	104			7	6, 8
302-3 Energy intensity	104			7	6, 8
302-4 Reduction of energy consumption	104, 106			7	6, 8
302-5 Reductions in energy requirements of products and services	Disclosure not applicable to mining setor.			7	6, 8
GRI 304: Biodiversity 2016					
103-1 Explanation of the material topic and its Boundary	85-86				
103-2 The management approach and its components	53, 55, 85, 86		EM-MM-160a.1		
103-3 Evaluation of the management approach	85, 86				
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	87			14, 15	2, 7
304-2 Significant impacts of activities, products, and services on biodiversity	85		EM-MM-160a.1; EM-MM-210b.2	14, 15	7
304-3 Habitats protected or restored	87, 91			14, 15	6, 7
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	85			14, 15	7
GRI 305: Emissions 2016					
103-1 Explanation of the material topic and its Boundary	96, 97				
103-2 The management approach and its components	53, 55, 96, 97		EM-MM-110a.2		
103-3 Evaluation of the management approach	96, 97				
305-1 Direct (Scope 1) GHG emissions	103		EM-MM-110a.1	3, 12, 13, 14, 15	6

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
305-2 Energy indirect (Scope 2) GHG	103			3, 12, 13, 14, 15	6
305-3 Other indirect (Scope 3) GHG emissions	103			3, 12, 13, 14, 15	6
305-4 GHG emissions intensity	103			3, 12, 13, 14, 15	6
305-5 Reduction of GHG emissions	106			3, 12, 13, 14, 15	6
305-6 Emissions of ozone-depleting substances (ODS)	103		EM-MM-120a.1	3, 12, 13, 14, 15	6
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	107		EM-MM-120a.1	3, 12, 13, 14, 15	6
GRI 307: Environmental compliance 2016					
103-1 Explanation of the material topic and its Boundary	82				
103-2 The management approach and its components	82				
103-3 Evaluation of the management approach	82				
307-1 Non-compliance with environmental laws and regulations	82			16	6
GRI 401: Employment 2016					
103-1 Explanation of the material topic and its Boundary	76				
103-2 The management approach and its components	76				
103-3 Evaluation of the management approach	76				
401-1 New employee hires and employee turnover	76			8	3
401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	77			8	3
401-3 Parental leave	77			8	3
GRI 402: Labor/Management Relations 2016					
103-1 Explanation of the material topic and its Boundary	76				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
103-2 The management approach and its components	76				
103-3 Evaluation of the management approach	76				
402-1 Minimum notice periods regarding operational changes	77			8	3
GRI 404: Training and Education 2016					
103-1 Explanation of the material topic and its Boundary	77				
103-2 The management approach and its components	77				
103-3 Evaluation of the management approach	77				
404-1 Average hours of training per year per employee	78			8	3
404-2 Programs for upgrading employee skills and transition assistance programs	78			8	3
404-3 Percentage of employees receiving regular performance and career development reviews	77, 78			8	3
GRI 405: Diversity and Equal Opportunity 2016					
103-1 Explanation of the material topic and its Boundary	80				
103-2 The management approach and its components	80				
103-3 Evaluation of the management approach	80				
405-1 Diversity of governance bodies and employees	80			5	3
405-2 Ratio of basic salary and remuneration of women to men	77			5	3
GRI 406: Non-discrimination 2016					
103-1 Explanation of the material topic and its Boundary	55-56				
103-2 The management approach and its components	53, 55, 56				
103-3 Evaluation of the management approach	55, 56				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
406-1 Incidents of discrimination and corrective actions taken	61			5, 8, 16	3
GRI 408: Child Labor 2016					
103-1 Explanation of the material topic and its Boundary	63				
103-2 The management approach and its components	53, 55, 63				
103-3 Evaluation of the management approach	63				
408-1 Operations and suppliers at significant risk for incidents of child labor	65			3, 8, 16	3
GRI 409: Forced or Compulsory Labor 2016					
103-1 Explanation of the material topic and its Boundary	63				
103-2 The management approach and its components	53, 55, 63				
103-3 Evaluation of the management approach	63				
409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labor	65			3, 8, 16	3
GRI 410: Security Practices 2016					
103-1 Explanation of the material topic and its Boundary	63				
103-2 The management approach and its components	53, 55, 63		EM-MM-210a.2; EM-MM-210a.3		
103-3 Evaluation of the management approach	63				
410-1 Security personnel trained in human rights policies or procedures	65			16	3
GRI 411: Rights of Indigenous Peoples 2016					
103-1 Explanation of the material topic and its Boundary	72				
103-2 The management approach and its components	53, 55, 72		EM-MM-210a.3		
103-3 Evaluation of the management approach	72				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
411-1 Incidents of violations involving rights of indigenous peoples	72			11	3
GRI 412: Human Rights Assessment 2016					
103-1 Explanation of the material topic and its Boundary	63				
103-2 The management approach and its components	53, 55, 63				
103-3 Evaluation of the management approach	63				
412-1 Operations that have been subject to human rights reviews or impact assessments	64			16	3
412-2 Employee training on human rights policies or procedures	63			16	3
412-3 Significant investment agreements and contracts that include human rights clauses or that underwent human rights screenin	64			16	3
GRI 413: Local Communities 2016					
103-1 Explanation of the material topic and its Boundary	68, 69				
103-2 The management approach and its components	53, 55, 68, 69		EM-MM-210b.1		
103-3 Evaluation of the management approach	68, 69				
413-1 Operations with local community engagement, impact assessments, and development program	68, 72			8, 11	9, 10
413-2 Operations with significant actual and potential negative impacts on local communities	68, 69, 72			8, 11	9,10
GRI 415: Public Policy 2016					
103-1 Explanation of the material topic and its Boundary	59, 60				
103-2 The management approach and its components	53, 55, 59, 60				
103-2 The management approach and its components	53, 55, 59, 60				
103-3 Evaluation of the management approach	59, 60				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
415-1 Political contributions	Under Brazilian law, we do not make any contributions of any kind to political and / or political parties.			16	1
GRI 419: Socioeconomic Compliance 2016					
103-1 Explanation of the material topic and its Boundary	64				
103-2 The management approach and its components	64				
103-3 Evaluation of the management approach	64				
419-1 Non-compliance with laws and regulations in the social and economic area	64				9
Mining and metals sector guidance:					
Biodiversity					
103-1 Explanation of the material topic and its Boundary	91				
103-2 The management approach and its components	91				
103-3 Evaluation of the management approach	91				
MM1 - Amount of land (owned or leased, and managed for productions activities or extractive use) disturbed or rehabilitated	91		EM-MM-160a.3	6, 12, 15	6, 7
MM2 - The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place	85		EM-MM-160a.3	14, 15	2, 6, 7
Effluents and Waste					
103-1 Explanation of the material topic and its Boundary	85, 86				
103-2 The management approach and its components	85, 86				
103-3 Evaluation of the management approach	85, 86				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
MM3 - Total amounts of overburden, rock, tailings, and sludges and their associated risks	95		EM-MM-150a.1; EM-MM-150a.2; EM-MM-150a.3; EM-MM-160a.2.	3, 6, 9, 12	6
Labor/Management Relations					
103-1 Explanation of the material topic and its Boundary	95				
103-2 The management approach and its components	95				
103-3 Evaluation of the management approach	95				
MM4 - Number of strikes and lock-outs exceeding one week's duration, by country	77		EM-MM-310a.2	16	3
Rights of Indigenous Peoples					
103-1 Explanation of the material topic and its Boundary	72				
103-2 The management approach and its components	72				
103-3 Evaluation of the management approach	72				
MM5 - Total number of operations taking place in or adjacent to indigenous peoples' territories, and number and percentage of operations or sites where there are formal agreements with indigenous peoples' communities	72		EM-MM-210a.2.	11	3
Local communities					
103-1 Explanation of the material topic and its Boundary	72				
103-2 The management approach and its components	72				
103-3 Evaluation of the management approach	72				

GRI Standard / Disclosure	Page/Answer	Omission	SASB Indicators	SDGs	ICMM Principles
MM6 - Number and description of significant disputes relating to land use, customary rights of local communities and indigenous peoples	72		EM-MM-210a.1	11	3
MM7 - The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and indigenous peoples, and the outcomes	72		EM-MM-210a.3	11	9, 10
Artisanal and Small-scale					
103-1 Explanation of the material topic and its Boundary	71				
103-2 The management approach and its components	71				
103-3 Evaluation of the management approach	71				
MM8 - Number (and percentage) of company operating sites where artisanal and small-scale mining (asm) takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate these risks	71			1, 2, 3, 6, 8, 12	4, 6, 9
Resettlement					
103-1 Explanation of the material topic and its Boundary	73				
103-2 The management approach and its components	73				
103-3 Evaluation of the management approach	73				
MM9 - Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process	73		EM-MM-210b.1; EM-MM-210b.2	11	3

Appendix I: Entities and Associations

GRI 102-13

Academia Brasileira de Ciências (ABC)

Associação de Comércio Exterior do Brasil (AEB)

Associação dos Terminais Portuários Privados (ATP)

Associação Nacional dos Transportes Ferroviários (ANTF)

Brazil Canada Chamber of Commerce

Canadian Institute of Mining

Centre National de Recherche Technologique Nickel et Son Environnement (CNRT Nickel)

Centro Brasileiro de Relações Internacionais (Cebri)

Childhood Brasil

Columbia Center on Sustainable Investment (CCSI)

Comitê Consultivo de Empresas e Indústria da OCDE (Biac)

Confederação Nacional da Indústria (CNI)

Conselho Empresarial Brasil-China (CEBC)

Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável (Cebds)

Conselho Empresarial Brasil-Japão (CEBJ)

Conselho Empresarial de Responsabilidade Social da Federação das Indústrias do Rio de Janeiro (FIRJAN), via Fundação Vale

Conselho Empresarial do BRICS

Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável (CEBDS)

European Association of Metals (Eurometaux)

European Steel Association (Eurofer)

Extractive Industries Transparency Initiative (EITI)

Fórum Intergovernamental sobre Mineração, Minerais Metais e Desenvolvimento Sustentável (IGF)

Fundação Centro de Estudos do Comércio Exterior (Funcex)

Global Business Coalition on HIV/Aids, Tuberculosis and Malaria (GBC)

Global Business Initiative on Human Rights

Grupo de Institutos e Fundações de Empresas (Gife), via Fundação Vale

InPacto - Instituto Pacto Nacional pela Erradicação do Trabalho Escravo

Instituto Brasileiro de Mineração (Ibram)

Instituto Latino-americano de Ferro e Aço (Ilafa)

International Chamber of Commerce (ICC)

International Council on Mining & Metals - (ICMM)

Mining Hub

UN Women (Women's Empowerment Principles)

Rede de Soluções de Desenvolvimento Sustentável (SDSN)

The Cobalt Development Institute

The Indonesian Mining Association (IMA)

The Mining Association of Canada (MAC)

The Nickel Institute

Voluntary Principles on Security and Human Rights

World Business Council for Sustainable Development (WBCSD)

World Economic Forum (WEF)

Presented by
Sustainabilty, Communication an Institutional
Relations Department

Technical support
Key Associados - Soluções Sustentáveis - Consultoria e Treinamento Ltda

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SGS ICS Certificadora Ltda.

Editorial coordination, layout and graphic production
Approach Comunicação

Cover
Alberto Flores Avenue Bridge, in Brumadinho, near the confluence of the Ferro-Carvão stream and the Paraopeba river, and where there are Vale's sediment containment works, such as sheet piles and the ETAF.

Photos
Vale Image Bank

We thank all employees who were directly or indirectly involved in the preparation of this report

Sustainability **Report 2019**

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