



Corporate ESG Practices In High-Risk Sectors: The Vale Case

Práticas Corporativas de ESG em Setores de Alto Risco: O Caso da Vale S.A.

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ABSTRACT | Objective: This study seeks to examine the Environmental, Social, and Governance (ESG) practices adopted by corporations operating in high-risk sectors, with particular emphasis on the case of Vale S.A. following the Mariana and Brumadinho disasters in Brazil. **Methodology:** The research employs a qualitative methodology, grounded in a single-case study design. Documentary analysis was conducted on sustainability reports, institutional statements, and secondary data, with the objective of identifying discrepancies between the ESG narrative promoted by the company and its actual institutional conduct. **Findings:** The findings reveal a disjunction between the ESG commitments publicly communicated and the company's operational realities. Although Vale has enhanced its ESG disclosures and reporting mechanisms, such initiatives proved insufficient to prevent reputational crises and recurring socio-environmental tragedies. The evidence suggests the prevalence of symbolic conformity, wherein governance rhetoric fails to translate into substantive organizational practices. **Practical Implications:** The study underscores the imperative of strengthening oversight and accountability mechanisms in ESG management, particularly in sectors characterized by elevated environmental and social exposure. **Originality/Value:** By analyzing a paradigmatic case within the Brazilian extractive industry, this research contributes to the broader discourse on institutional sustainability, ethical governance, and the risks of formalistic adherence to ESG frameworks.

Keywords | ESG, Institutional Sustainability, High-Risk Sectors, Corporate Governance, Symbolic Compliance

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RESUMO | Objetivo: O presente estudo propõe-se a analisar as práticas de Environmental, Social and Governance (ESG) adotadas por corporações inseridas em setores de elevado risco, com foco na trajetória da Vale S.A., após os desastres ocorridos em Mariana e Brumadinho, no Brasil. **Metodologia:** A investigação adota uma abordagem qualitativa, ancorada no método de estudo de caso único. Realizou-se análise documental de relatórios de sustentabilidade, declarações institucionais e dados secundários, com o intuito de identificar eventuais dissonâncias entre o discurso corporativo voltado ao ESG e as práticas efetivamente implementadas. **Resultados:** Os resultados evidenciam uma dissociação entre os compromissos ambientais, sociais e de governança veiculados publicamente e a realidade operacional da empresa. Apesar do aprimoramento dos mecanismos de divulgação e transparência, tais ações mostraram-se insuficientes para prevenir novas crises reputacionais e danos socioambientais recorrentes. Os achados indicam a ocorrência de uma conformidade simbólica, em que o discurso de governança não se converte em práticas organizacionais concretas. **Implicações Práticas:** O estudo destaca a urgência de aprimorar os mecanismos de fiscalização e responsabilização em torno das práticas ESG, especialmente em setores marcados por elevada exposição a riscos socioambientais. **Originalidade/Relevância:** Ao abordar um caso emblemático da indústria extrativa brasileira, o artigo contribui para o debate sobre sustentabilidade institucional, governança ética e os limites da adesão meramente formal a estruturas ESG.

Palavras-chave | ESG, Sustentabilidade Institucional, Setores de Alto Risco, Governança Corporativa, Conformidade Simbólica

INTRODUCTION

In the current business world, there is much discussion about the importance of corporate governance and ESG for companies' relationships with their stakeholders. Recent studies reinforce that these themes are no longer peripheral, but central to strategic and financial decision-making processes (Lu & Wang, 2021; Yavuz et al., 2024). Within this discussion, the works of Costa and Ferenzi (2021) highlight that sustainability is currently seen as a primary factor in decisions within globalized organizations. This view is corroborated by Nishitani et al. (2021), who argue that stakeholder pressure and regulatory environments are increasingly shaping corporate sustainability agendas.

Sustainability indices, increasingly valued and discussed in the corporate environment, gain importance in global stock exchanges, making the shares of sustainable organizations more profitable than those of organizations less concerned with this issue (Barbosa, da Silva & Morioka, 2023; Erben Yavuz et al., 2024). Empirical evidence suggests that firms with stronger ESG performance tend to have lower risk exposure and more robust long-term financial performance (Lu & Wang, 2021).

In this context, concepts such as stakeholder and ESG are fundamental. According to Freeman (1984), a stakeholder is any group or individual who can affect or be affected by the achievement of the company's objectives. According to Ferola and Paglia (2021), ESG refers to a set of business practices aimed at sustainable development as a strategic means of financial attractiveness and the construction of an integrated governance culture in organizations. It is an acronym that stands for environmental, social, and governance, and its purpose is to develop guidelines and recommendations on how to better integrate environmental, social, and corporate governance issues into asset management, securities brokerage services, and associated research functions.

The objective of this paper is to analyze the use of the ESG concept applied to the Vale do Rio Doce case, through the company's sustainability reports. Vale do Rio Doce is a mining company, and the multinational is currently present in over 20 countries (Vale do Rio Doce, 2023). Within the Vale case, it is also important to know Vale's joint venture with BHP, Samarco, which is a private mining company (Samarco, 2023). Thus, the study intends to examine the Mariana and Brumadinho disasters caused by the rupture of the mining company's dams, which occurred in 2015 and 2019, respectively.



THEORETICAL FRAMEWORK

Corporate Governance and its Prominence in Business Administration

Corporate Governance can be explained as a system by which organizations are directed, monitored, and incentivized, involving relationships between shareholders, the board of directors, executive management, supervisory and control bodies, among other stakeholders of the organization (IBGC, 2015). It is directly linked to the management of a corporation and its relationship with its stakeholders. This understanding aligns with recent literature, which frames corporate governance as a key institutional mechanism to balance the interests of diverse actors and to foster long-term sustainability (Lu & Wang, 2021; Erben Yavuz et al., 2024).

The essence of corporate governance is based on procedures to resolve agency conflicts, resulting from information asymmetry and conflicts of interest between companies and their stakeholders (Neto, 2002). These conflicts arise from the fact that interests can become misaligned when one party, called the principal, depends on the decisions of another, called the agent, even though it is expected that the agent will act in the principal's best interest (Ortega, Silva & Rossignoli, 2019). The literature shows that effective governance mechanisms—such as board independence and audit quality—can help mitigate these agency problems and strengthen organizational accountability (Yavuz et al., 2024; Nishitani et al., 2021).

This highlights the relevance of good corporate governance practices within organizations. Such practices are disseminated in Brazil by the IBGC, which considers the following as basic principles of corporate governance: transparency, equity, accountability, and corporate responsibility. These principles are consistent with global frameworks that link governance quality with enhanced firm performance and ethical risk management (Barbosa, da Silva & Morioka, 2023; Lu & Wang, 2021).

- **Transparency:** consists of making accessible information that is, or may be, of interest to those involved, and not only that imposed by laws or regulations. Information regarding the organization's financial matters and information that may harm or reflect on the organization's value should be made available (IBGC, 2015).
- **Equity:** refers to the fair and equal treatment of all shareholders and other stakeholders, taking into account their rights, duties, needs, interests, and expectations (IBGC, 2015).
- **Accountability:** refers to reporting on activities in an explicit, concise, and understandable manner, assuming all possible consequences of actions, omissions, and acting diligently and responsibly within the scope of their roles (IBGC, 2015).
- **Corporate Responsibility:** This principle refers to ensuring the economic-financial viability of organizations in the short, medium, and long terms (IBGC, 2015).

Recent empirical evidence reinforces the notion that companies adopting robust corporate governance frameworks are better positioned to meet ESG criteria and reduce exposure to operational and reputational risks (Erben Yavuz et al., 2024; Nishitani et al., 2021).

Corporate Governance proves to be extremely important in business administration when considering an organization's risk management. Assi (2021) points out as a risk for an organization, "one or more conditions of variables with the necessary potential to cause damage to the company's tangible or intangible assets" (Assi, 2021, p.10), emphasizing that "many risks are inherent to the business, and the competence of the risk management and control professional lies in selecting which risks the company should address" (Assi, 2021, p.10).



This perspective is reinforced by recent empirical studies, which show that strong governance structures are critical in shaping effective risk oversight mechanisms and preventing both operational and reputational losses (Lu & Wang, 2021; Yavuz et al., 2024). Firms with robust governance frameworks are also more likely to proactively identify and mitigate ESG-related risks, such as environmental liabilities, human rights violations, or governance failures (Barbosa, da Silva & Morioka, 2023).

According to Ortega, Silva, and Rossignoli (2019), the adoption of good corporate governance practices improves the company's performance in the market and can minimize the risks of fraud or any type of alteration of the company's results. These results are echoed by Nishitani et al. (2021), who highlight that effective governance mechanisms—particularly board independence, transparency, and stakeholder engagement—serve as enablers for managing sustainability-related risks in complex business environments.

Aligned with these conceptions, for Costa (2008), corporate governance practices in organizations appear as tools that, when applied correctly, result in greater transparency for all company stakeholders. These practices can also reduce the information imbalance exchanged between management stakeholders, thereby enabling shareholders who do not have control over the organization's management decisions to mitigate potential losses due to some company condition. In this sense, corporate governance is not only a matter of internal control but also a strategic asset that enhances corporate resilience and long-term value creation (Erben Yavuz et al., 2024; Lu & Wang, 2021).

ESG (Environmental, Social, and Governance) in Organizations

The sustainability tripod, or “Triple Bottom Line,” has been widely disseminated in business environments in recent years. This concept was conceived by John Elkington, an English sociologist, and consists of three principles to be prioritized in an organization: economic prosperity, environmental quality, and social justice simultaneously (Costa & Ferenzi, 2021). This framework has served as the philosophical foundation for the integration of ESG principles into corporate strategy and reporting (Barbosa, da Silva & Morioka, 2023).

The ESG factor is increasingly influencing the decisions made by organizations regarding the practices to be adopted. The concept of ESG can be translated as a set of issues, ranging from carbon footprint to labor and corruption practices, which imply the creation of criteria and practices that guide the role and responsibility of organizations in terms of environmental, social, and corporate governance actions (Irigaray & Stocker, 2022). Recent studies have emphasized that ESG implementation enables companies to align their operational goals with stakeholder expectations while enhancing risk resilience and long-term financial performance (Lu & Wang, 2021; Yavuz et al., 2024).

The ESG factor has become a synonym for efficiency for organizations. For example, during the pandemic, it was observed that organizations showed greater concern for their employees' health and well-being. This period showed these organizations that investing in the quality of life within the workplace results in greater engagement of people who are part of the organization as stakeholders (Costa et al., 2022). This experience also supports findings by Nishitani et al. (2021), who argue that social performance metrics within ESG—such as employee welfare—are increasingly critical for organizational legitimacy and adaptability.

According to Costa and Ferenzi (2021), an organization's concern with the environment, sustainability, and sustainable development is not simple to achieve in current society, as it is a process of transformation that undergoes constant modifications and oscillations. This is because the process involves steps that must be followed to meet the needs of current generations, but in a way that does not compromise the ambitions of future generations. In line with this view, the literature suggests that ESG should be understood



as an evolving and context-sensitive framework, shaped by regulatory changes, stakeholder pressures, and institutional environments (Erben Yavuz et al., 2024; Lu & Wang, 2021).

METHODOLOGY

To achieve the objectives of this study, a qualitative, descriptive research approach was adopted. As noted by Flick (2009), qualitative research is characterized by its interpretative and contextual nature and does not adhere to a single theoretical-methodological framework. Instead, it draws upon a range of paradigms and techniques suitable for investigating complex, socially constructed phenomena. In line with Nunes, Nascimento, and Luz (2016), this study is classified as descriptive, as it aims to observe, analyze, and interpret events without intervening in or manipulating the research environment.

The data collection was carried out through documentary research, a method that involves the examination of materials that have not undergone prior analytical treatment or can be reanalyzed from a new perspective in light of specific research questions (Gil, 2002). The primary corpus analyzed consists of Vale S.A.'s sustainability and integrated reports published between 2015 and 2021. This timeframe was deliberately chosen as it encompasses the two major environmental disasters linked to the company—the Mariana (2015) and Brumadinho (2019) dam failures—and allows for an adequate assessment of the company's medium-term responses and commitments to ESG principles.

The analytical framework was structured around the three pillars of ESG—Environmental, Social, and Governance—which guided the categorization of content and interpretation of findings. The environmental dimension focused on issues such as water quality, biodiversity impacts, and remediation efforts. The social dimension addressed compensation, community rehabilitation, and public health effects. The governance dimension explored transparency, disclosure practices, and the internal mechanisms adopted by Vale to manage risks and rebuild legitimacy.

To conduct the content analysis, the study employed the method proposed by Bardin (1977), which is organized into three main phases: (i) pre-analysis, involving the selection and organization of documents; (ii) material exploration, through systematic coding of relevant content; and (iii) treatment of results, including inference and interpretation. This method is particularly appropriate for analyzing corporate communications and sustainability narratives, as it enables the identification of recurring patterns, inconsistencies, and gaps between discourse and practice.

RESULTS

2015 Sustainability Report – Initial Responses to the Mariana Disaster

Regarding the residues left by the disaster, Samarco monitored the behavior of the turbidity plume in the marine region and found no technical evidence that the material observed in the Abrolhos region, Bahia, originated from the Fundão dam accident. The tailings are mostly composed of sand from iron ore beneficiation and do not contain any chemicals harmful to health (VALE, 2015). The results of analyses requested by Samarco from SGS Geosol Laboratórios, specialized in environmental and geochemical soil analyses, concluded that the Fundão dam tailings are classified as non-hazardous. This information is based on the results of leached extracts, as the results of solubilized extracts are still undergoing analysis. Furthermore, the diagnosis made by a specialized company (ACQUA Consultoria) confirms that fish and



schools of fish continue to exist along the Doce River, which proves that marine life in the region was not harmed by the dam rupture (VALE, 2015).

The presented study was conducted from December 3 to 11, 2015, at 215 points along the watercourse and also showed that the area of the river basin affected by the accident was less than 1%. The results of new analyses carried out by the Geological Survey of Brazil (CPRM) and the National Water Agency (ANA), released on December 15, 2015, also stated that the water quality of the Doce River was compatible with the results prior to the passage of the turbidity plume. Regarding the presence of dissolved heavy metals in the water, the levels of arsenic, cadmium, mercury, lead, copper, and zinc, among others, are generally similar to the surveys carried out by CPRM in 2010 (VALE, 2015).

According to Samarco, 99% of the families in Mariana and Barra Longa displaced by the accident were housed in rented houses or with relatives in 2015, and all residences rented by the company were equipped with furniture, appliances, household items, and linen. Before the affected families moved in, the company also supplied the houses with food, cleaning and personal hygiene products, and drinking water (VALE, 2015). In January 2016, each family of deceased or missing persons due to the accident received R\$100,000 (US\$31.6 thousand) from Samarco as an advance payment for compensation. For those who lost their homes, Samarco provided R\$20,000 (US\$6.3 thousand), with 50% of this amount not being considered an advance payment for compensation (VALE, 2015).

Samarco provided financial compensation to residents through emergency financial aid, via a card for families who lost their monthly income due to the accident. A monthly payment of one minimum wage was made for each family, plus an additional 20% of the minimum wage for each dependent, and a basic food basket valued at R\$338.61. Thus, according to the report, in the Doce River region, 811 fishermen and other riverside dwellers received these cards (VALE, 2015). From 2016 onwards, Vale states that R\$240 million per year will be allocated to compensatory actions. This annual amount is already included in the total for the first six years. Another R\$500 million will be made available by the company, also as a compensatory measure, for basic sanitation works, which will be carried out by the impacted municipalities until the end of 2018 (VALE, 2015).

2016 Sustainability Report – Institutionalization of Repair Mechanisms

One year after the Mariana accident, Vale continues to develop reports regarding the disaster repair actions. Vale reported in its report that it understands certain questions about the Mariana accident persist, and some of them may still have no answers, and investigations are still ongoing. A little over a year later, much has been done to repair, restore, and rebuild the affected areas (VALE, 2016). In 2016, Vale established the Renova Foundation, which aimed to execute the repair and compensation actions for the impacts associated with the Fundão dam rupture, which occurred on November 5, 2015. These actions were stipulated in the Transaction and Conduct Adjustment Term (TTAC) signed between Samarco, its shareholders Vale and BHP Billiton, the Federal Union, the States of Minas Gerais and Espírito Santo, and various public authorities at federal and state levels (VALE, 2016).

The TTAC established 42 programs for socio-environmental and socio-economic repair in affected territories across 40 municipalities in a stretch of approximately 650 km. The Renova Foundation has been implementing the programs, taking into account the governance system established in the TTAC and in the Conduct Adjustment Term (TAC Governance), the latter signed in 2018 between the signatories of the TTAC, the Federal Public Ministry, the State Public Ministries of Minas Gerais and Espírito Santo, and the



Public Defender's Offices of the Union and the States of Minas Gerais and Espírito Santo (VALE, 2016). This foundation originated from an agreement between Samarco and its shareholders, Vale and BHP Billiton Brasil Ltda. (BHPB). On March 2, 2016, an agreement was signed between the Federal Union, the states of Espírito Santo and Minas Gerais, and other Brazilian governmental authorities for US\$5.8 billion, for the implementation of repair and compensation programs for the areas and communities impacted by the dam rupture (VALE, 2016).

The responsibility for dam safety management is assigned to dedicated and qualified company teams. Vale intends to operate its dams using advanced engineering techniques, following rigorous controls, systematically monitoring their performance, and evaluating safety conditions through annual external audits. Regarding laws and regulations, Vale states that dam management complies with Law nº 12.334/10, which established the National Dam Safety Policy, and two DNPM ordinances. Ordinance nº 416/2012 creates the National Mining Dam Register and provides for the Mining Dam Safety Plan (PSB) and the presentation of the dam stability condition declaration. Ordinance nº 526/2013, in turn, establishes conditions for the presentation of the Mining Dam Emergency Action Plan (VALE, 2016). According to Vale, 145 dams in the ferrous area were audited, with the stability condition declarations filed within the deadline, aiming to meet Vale's safety management requirements and legal parameters, including the new Joint Resolution of the State Secretariat for Environment and Sustainable Development (Semad/Feam) nº 2.372/2016, which establishes guidelines for carrying out an Extraordinary Technical Audit of Upstream Tailings Dam Safety, and Decree nº 46.993/2016, which deals with the issuance of the corresponding stability condition declaration (VALE, 2016).

2017 Sustainability Report – Expansion of the Renova Foundation's Programs

In view of the Mariana accident, Vale's CEO, Fabio Schvartsman, states that the organization is committed to continuing actions to mitigate the consequences of the Fundão dam rupture in Mariana, Minas Gerais (VALE, 2017). Thus, the Renova Foundation ended 2017 with 42 programs foreseen in the TTAC underway (socio-environmental and socio-economic) and claims that the initiatives are organized into three thematic axes: People and Communities, Land and Water, and Reconstruction and Infrastructure. Each of the three axes has areas of focus in the recovery and compensation process for the impacts caused by the dam rupture. The initiatives are developed according to the assessment of socio-environmental and socio-economic impacts, and the objective is to ensure that the actions and measures established by the programs have scientific basis and relate proportionality and efficiency (VALE, 2017).

In one year of activities, completed in August 2017, the Foundation presented tangible results regarding the commitments assumed in the TTAC signed between Samarco and its shareholders (Vale and BHP Billiton Brasil) with the Union, the states of Minas Gerais and Espírito Santo, and other Brazilian governmental authorities (VALE, 2017). Since the rupture of the Fundão Dam, approximately US\$ 858 million have been allocated to the recovery process, with US\$ 160 million paid in compensation, 101 impacted tributaries rehabilitated, over 500 springs fenced, 2.3 thousand sacred fragments rescued and preserved, 47 thousand hectares undergoing forest restoration, over 23 thousand registrations of affected people, and about 700 infrastructure works completed, among others (VALE, 2017). The Foundation operates through programs fully funded by its maintainers. Vale, as a subsidiary maintainer, currently appoints three members to the Board of Trustees and their respective alternates. In 2017, Vale applied US\$ 199 million to the activities of the Renova Foundation (VALE, 2017).



The company has a new corporate governance model, which will be structured on three pillars: clarity of roles, transparency, and stability. The company declares that it intends to ensure a path of growth associated with the generation of sustainable value (VALE, 2017). In 2017, Vale underwent a significant restructuring in its top management, with changes in its presidency and some executive directorships. There was also the creation of the Executive Directorate of Sustainability and Institutional Relations and the Sustainability Committee, demonstrating greater company concern with the topic (VALE, 2017). Finally, concerns within Corporate Governance are internalized in the activities developed by the company's units and are governed by various internal norms and guidelines, such as the Sustainability Policy, Climate Change Mitigation and Adaptation Policy, Human Rights Policy, and Anti-Corruption Policy. According to Vale, these procedures also reflect commitments made with multilateral organizations and industry associations, meeting international standards and certifications (VALE, 2017).

2018 Sustainability Report – The Brumadinho Disaster and Early Recovery Measures

In its initial pages, the report mentions the Brumadinho disaster caused by the rupture of another Vale dam. According to Vale's board of directors, for the first time, the company's safety and conduct standards were questioned by government entities and society in general. Given this, Vale prioritized aid to the people and communities affected by the dam rupture, while also ensuring full adherence to the investigation of the causes of the rupture by specialized agencies (VALE, 2018).

Four months after the rupture of Dam I, the company evaluated, with data from about 1.5 million analyses of water, soil, tailings, and sediment, that the Paraopeba River could be recovered. This environmental recovery will depend on a set of actions, including the containment of solid tailings near the former structure. This study was conducted by specialized laboratories and consultancies hired by Vale, involving approximately 250 professionals (VALE, 2018).

The company maintains 67 water and sediment monitoring points, with daily water and weekly sediment sample collections, in addition to five continuous turbidity monitoring points, in locations that did not suffer the consequences of the Dam I rupture in Brumadinho, in the Ferro-Carvão stream, in the Paraopeba and São Francisco rivers, in the Retiro Baixo and Três Marias reservoirs, as well as nine other tributaries of the Paraopeba. Thus, Vale reports that the surface water quality results for the Paraopeba River obtained so far demonstrate that the greatest changes for metals were recognized in the first 70 km from the dam rupture, linked to the physical presence of tailings in the river water (VALE, 2018).

Along with the physical and chemical studies carried out on water and sediments presented by Vale, evaluations of potential effects of tailings on aquatic biota are underway, through ecotoxicity studies in organisms present along the Paraopeba and São Francisco basins, including their mouth in the Atlantic Ocean. In addition, Vale also has other monitoring programs, such as air quality, flora, and fauna, which are underway to evaluate potential impacts along the Paraopeba river basin (VALE, 2018).

On January 31, 2019, the registration process began for people deemed eligible by the company to receive the emergency donation of R\$ 100,000, intended for families who had deceased or missing relatives due to the dam rupture. In addition, Vale ensures voluntary donations to those affected by the disaster, as well as providing financial support such as funeral assistance to the families of fatal victims; reimbursement or direct costing of extraordinary expenses of the state of Minas Gerais; payment of a basic food basket for each family unit in the communities of Córrego do Feijão and Parque da Cachoeira, for 12 months;



maintenance of salaries of missing employees; childcare assistance of R\$ 920.00, considering children up to 3 years old of deceased workers, among other aids, projects, and actions (VALE, 2018).

Vale announced the creation of three new Extraordinary Independent Advisory Committees (CIAE). The first was the Extraordinary Independent Investigation Advisory Committee, or CIAEA, created on January 27, 2019, with the objective of investigating the causes of the Dam I rupture as efficiently as possible. The second Committee was created on the same date and named the Extraordinary Independent Support and Repair Advisory Committee, or CIAEAR, and this committee is dedicated to monitoring assistance measures for those affected and the recovery of the area devastated by the rupture of Dam I in Brumadinho (VALE, 2018). The third committee was formed to advise Vale's Board of Directors on diagnosing the safety conditions, management, and risk mitigation related to Vale's dams. The committee's objective is to make recommendations for measures to be taken to reinforce the safety conditions of the dams (VALE, 2018).

2019 Sustainability Report – Environmental and Social Commitments in the Paraopeba Basin

A program for the repair and development of Brumadinho and municipalities in the Paraopeba Basin was established, which will develop structural actions to fully repair the damages caused to families, the environment, and society in Brumadinho and the affected region by 2025. According to Vale, the objective of this program is to ensure respect for Human Rights, based on three pillars: Socioeconomic, Environmental, and Infrastructure. Environmental repair occurs in two aspects: socio-environmental and municipal compensation. Actions aimed at socio-environmental repair related to the Physical Environment have unfolded into monitoring and studies of water quality, sediments, residues/tailings, as well as air quality, noise, and vibration, among others. This aims to establish a close interface with the Engineering area, due to emergency and containment works, one of the priorities being the recovery of the Paraopeba river basin and its surroundings (VALE, 2019).

This operation was divided into four parts: preservation of local flora and fauna, removal of tailings on land and within the river, directing them to safe and controlled areas, containment of tailings to prevent them from reaching the river during rainy periods, and monitoring and recovery of water and soil quality. Regarding water quality after the dam rupture, there are approximately 90 daily water quality monitoring points between the Paraopeba River and the mouth of the São Francisco River (VALE, 2019).

In addition, actions aimed at the Biotic Environment were adopted, distributed in five main foci: Terrestrial Fauna, Aquatic Fauna, Biodiversity Monitoring, Vegetation Suppression, and Degraded Area Recovery. In this sense, Vale also proposed a plan for the reconstruction of local flora, through reforestation and environmental reintegration in the impacted area, making it possible to re-vegetate approximately 12 hectares in 2019 (VALE, 2019).

Regarding reparations with the Brumadinho society, Vale focused on organizing the reparation and compensation process with the communities affected by the rupture and evacuations. The company's challenge, since then, has been to implement actions where community participation is fundamental to mitigate the impacts of the rupture and evacuations. Open, transparent, and clear dialogue was and continues to be a guiding principle of action within a continuous learning cycle. The company has provided full support to minimize the impact on the lives of people who lost or had to leave their homes due to the dam rupture (VALE, 2019).



From the very first moment, when approximately 360 affected people were accommodated in hotels, inns, and friends' and relatives' homes, until the choice of temporary housing, Vale has sought to conduct the entire process with respect, care, and agility. In Brumadinho, 98 families are already in temporary housing, with social rent subsidized by Vale, in addition to benefits such as rent, IPTU, water and electricity bills; gas assistance; basic food basket for affected families, among other aids, projects, and actions (VALE, 2019).

In the last quarter of 2019, two external evaluations were carried out with the objective of seeking references that would contribute to the company's mission of repairing damages to affected people and territories. One of them, executed by Fundação Dom Cabral, resulted in a study that contributed to the qualification of the reparation process, considering the dimensions of governance, social participation, prevention and mitigation of social and economic impacts and risks in evacuated territories and those affected by the dam rupture (VALE, 2019).

2020 Integrated Report – Local Development and Health Investments

Starting in 2020, the former Sustainability Report is presented only as an “integrated report”. In this report, the company understands that it is necessary to create opportunities to diversify local realities, expanding income and employment generation for the affected populations. According to Vale, these actions aim to ensure the social, economic, and environmental sustainability of the affected locations, through initiatives that promote local development, such as investments in agriculture, tourism, environment, and sustainability (VALE, 2020).

Specifically for Brumadinho, the implementation of the Propositive Study by the National Institute of Science and Technology in Public Policies, Strategies and Development (INCT) of Strategies for the Transformation of Brumadinho is foreseen. This is one of the external evaluations that underpin the Integral Reparation Plan and directs the company towards the objective of diversifying the municipality's economy, to reduce Brumadinho's dependence on mining and create mechanisms that support a transformation of the local reality (VALE, 2020).

The report points out that Vale made an effort to strengthen healthcare through training, equipping, and supporting health management. Since 2019, the Health Cycle Program - a methodology of the Vale Foundation for strengthening primary care - has been implemented in the municipalities of Brumadinho. By the end of 2020, 800 professionals had been trained and 3,200 pieces of equipment had been donated to 122 Basic Health Units (VALE, 2020). Another point of this report specifically concerns the infrastructure offered to the population of Brumadinho. This year, the Family Health Unit and the municipal daycare center in the Parque da Cachoeira community, the municipal daycare center in the Cohab neighborhood, the renovation works at the Polysportive Gymnasium Complex, and eight cemeteries were completed, all in the municipality of Brumadinho (VALE, 2020).

In addition to financial compensation, the Comprehensive Assistance Program for the Affected (PAIA) was carried out until the end of 2020. Regarding this program, approximately 3,000 people, belonging to 1,700 family units, received specialized support for real estate purchases, financial education, resumption of agricultural activities, rural technical assistance, micro-entrepreneur assistance, among others (VALE, 2020).

More than 50 hectares of degraded areas have been recovered since the beginning of activities. In 2019, biodiversity in the area was monitored, considering both aquatic and terrestrial areas, continuing environmental studies of the area to understand the real effects of the rupture and, with ongoing mitigating actions, seeking possible environmental remediation (VALE, 2020). Finally, the company declared



itself aware that even after the mitigating actions declared in this and previous reports, there was still dissatisfaction from those affected by the dam rupture regarding the pace of the indemnification processes and uncertainties about the timeframe for these families to return to their homes. However, Vale claims it continues to work to advance on these central issues, while also declaring progress in the construction and execution of compensation and development plans for communities evacuated or relocated due to the disaster (VALE, 2020).

2021 Integrated Report – Reforestation, Water Quality, and Governance Adjustments

Even though it is named an integrated report, we can observe an ESG-related approach, as it demonstrates continued collaboration with communities to rebuild infrastructure and develop livelihoods. Various actions were promoted, such as the construction of a community center for victims' families, serving about 100 people per day since February 2021. Additionally, the company claims to support income generation for small entrepreneurs, professional training in civil construction or gardening, and expansion of productive capacity for 300 farmers. A sewage collection and treatment system was also implemented in the Pires community, Brumadinho, capable of serving 500 people (VALE, 2021). For environmental repair, 26 hectares (out of a total of 140) were reforested with the planting of approximately 30,000 native species seedlings from the region (VALE, 2021).

By the time the report was published, about 600 kg of fruits and seeds from 80 different species had been collected. Thus, thousands of seedlings were produced, including at the Vale Natural Reserve in Linhares (ES), for planting in Brumadinho. Preliminary results from monitoring the recovering areas indicate the existence of disperser and pollinator species that aid the recovery process of the area affected by the rupture (VALE, 2021). Water quality monitoring of the Paraopeba River is a central factor for repair operations along the entire basin. As long as raw water is not suitable for abstraction, riverside populations and rural producers along the river continue to receive a constant supply of mineral water, water trucks, and water from new drilled wells, for animal watering and irrigation (VALE, 2021).

Vale argues that the Mediated Indemnification Program (PIM) was installed for the payment of emergency financial aid and individual indemnities. This became a challenge since informal workers, such as fishermen, cart drivers, washerwomen, and artisans, had no way to prove the damages caused by the rupture (VALE, 2021). From a corporate governance perspective, Vale highlights that the Brumadinho and Mariana disasters caused by the organization transformed the global vision on the use and management of mining dams. Since then, the company claims to have worked on the de-characterization or elimination of upstream structures in Brazil and advanced in the development of technologies for tailings reduction (VALE, 2021).

DISCUSSION

It is enriching for the debate to contrast the actions that Vale reports in its reports, analyzed in this work, with the reality experienced by the populations of Mariana and Brumadinho. To this end, newspaper articles were used to clarify the situation of the residents of the areas affected by the disasters. Thus, the first information to consider, regarding the measures adopted by Vale for the recovery of damages caused after the environmental disasters provoked by the organization, is that according to the newspaper *El País*,



the UN issued a statement in November 2016 signed by experts confirming that the measures adopted by the authorities and the mining companies involved in the Mariana tragedy “do not correspond to the scale of the disaster and the socio-environmental, economic, and health consequences” (El País, 2016).

Furthermore, the *El País* report also reveals that, according to Ibama, the mining company complied with only 5% of its recommendations for the necessary repairs. The article shows that the 40 million m³ that leaked after the rupture of the Fundão dam have not yet been removed by the company and remain spread over a radius of 115 km in the region. With the arrival of the rainy season, there is a high risk that this mass of mining tailings will shift again, further polluting the Doce River basin. According to Ibama’s president, Suely Araújo, the works to contain the waste are delayed, and she also states that the turbidity (presence of suspended particles) of the water near the dam rupture site is above the normal level (El País, 2017).

Despite the 2015 report stating that there was no damage to marine life or the water quality of the Doce River, a report published in November 2017 by *El País* titled: “Mariana Disaster: the fishing village where fishing is forbidden” exposes the real situation of marine life and the condition of Mariana’s fishermen. The report shows that since the Mariana disaster, the municipality’s fishermen have been unable to work (El País, 2017). The report highlights that with the prohibition of fishing, the interviewed individuals, Ausimara Passos and her husband, Seu Flôr, had to close their fish shop that had operated for decades in Regência, Espírito Santo. According to the *El País* article, Regência is “a small fishing village in Espírito Santo, 120 km from Vitória, where the Doce River flows into the Atlantic Ocean” (El País, 2017, p.1).

The interviewed fisherman reports his situation regarding the indemnities paid by Vale to the fishermen affected by the disaster. The fisherman states that he supported ten children with fishing in the river, had an income of R\$ 5,000, and now lives on a Samarco card of R\$ 1,200. Furthermore, Seu Flôr also mentions that some fishing companions who worked informally have not yet received the emergency aid provided by the mining company, controlled by Vale and BHP (El País, 2017). Unlike the sea, fishing was not prohibited in the river in the region; however, the accident harmed the fishermen, as there was a distrust among the population about the contamination of river fish. According to fisherman Carlos Alberto Parentes: “No one wants fish anymore. This mud cut our freedom” (El País, 2017).

From a more current perspective of the case, in a 2021 report, the *G1* news portal provides information about the housing of people affected by the dam rupture in Mariana, showing that, as of that date, the families of the victims of the rupture had not received new homes. The report showed the family of social mobilizer Samara Maria Quintão, who was one of the victims of the Fundão dam rupture in Mariana, and who now lives in a house Samara bought with her own money. The resident claims to have received a very low amount as part of the compensation paid by Vale, and she adds that she does not have the same freedom she had in the district of Bento Rodrigues and charges the mining company with the delivery of housing for those affected by the accident (G1, 2021).

The health issues triggered by the accidents cannot be ignored. In a report by the René Rachou Institute – Fiocruz in Minas Gerais (2019), Brumadinho’s health secretary, Junio de Araujo Alves, reported that the actions of SUS (Unified Health System) professionals were tireless. In this sense, the secretary states that the epidemiological profile of Brumadinho’s population changed as a result of the disaster. He also highlights that the increase in mental disorders is very worrying, and the secretary also provides data on the distribution of anxiolytics, which he says is 80% higher than before the accident (René Rachou Institute – Fiocruz, 2019). In the same report, the general coordinator of Public Health Emergencies at the Health Surveillance Secretariat, Rodrigo Frutuoso, also spoke about the epidemiological change, referring to Barra Longa, one of the municipalities affected by the mud from the Mariana dam rupture, and states that the population was



affected by parasitosis, dermatitis, depression, mental disorders, among other health issues (René Rachou Institute – Fiocruz, 2019).

The reports above show only a part of the situation of the residents affected by the disasters caused by Vale. They also demonstrate a critical gap between ESG disclosure and effective practice—a phenomenon observed and criticized in recent literature. While ESG frameworks have become central to corporate reporting, their implementation often lacks effectiveness when not supported by strong governance, external accountability, and stakeholder engagement mechanisms (Barbosa, da Silva & Morioka, 2023; Nishitani et al., 2021).

Moreover, the case exemplifies how companies may employ ESG discourse without structurally transforming their decision-making logic or reparative strategies. Recent studies have shown that such symbolic adoption of ESG, when decoupled from genuine corporate governance practices, tends to result in reputational risk and stakeholder mistrust (Lu & Wang, 2021; Erben Yavuz et al., 2024). The testimonies of the residents of Mariana and Brumadinho contrast sharply with Vale’s sustainability narrative, echoing scholarly critiques that stress the importance of aligning ESG disclosures with substantive organizational change (Yavuz et al., 2024).

Even when some of the measures described in Vale’s reports were implemented, the data suggest they were not sufficient to mitigate the profound economic, environmental, and psychosocial damages. This underscores the need for companies, especially in high-impact sectors such as mining, to move beyond compliance and toward meaningful stakeholder-centered governance (Lu & Wang, 2021).

FINAL CONSIDERATIONS

This study sought to critically examine the ESG actions developed by Vale S.A. to mitigate the damages resulting from the environmental disasters caused by the rupture of the Fundão (2015) and Brumadinho (2019) dams. Based on an analysis of the company’s sustainability and integrated reports, the research aimed to assess the coherence between the ESG strategies disclosed by the organization and their actual effectiveness in addressing the social, environmental, and governance-related consequences of the disasters. Additionally, the analysis incorporated external reports and testimonies from affected residents to contrast corporate narratives with lived experiences.

The findings indicate a persistent misalignment between the measures reported by Vale and the reality experienced by the affected communities. While the company disclosed a variety of compensatory and remedial initiatives across the ESG spectrum, evidence suggests that these actions were often delayed, insufficient, or lacking in transparency and community engagement. For example, although Vale reported that 811 fishermen received financial assistance, the amounts were not proportional to their previous incomes, and informal workers were frequently excluded from aid. Likewise, despite statements asserting the absence of environmental damage, skepticism among local populations regarding the quality of river fish remains strong. Moreover, while reforestation efforts were documented, the scale of these actions falls significantly short when compared to the magnitude of the environmental degradation, as underscored by the United Nations (El País, 2016).

These inconsistencies reflect broader criticisms in the literature regarding symbolic ESG adoption and the gap between disclosure and genuine accountability. The Vale case illustrates how ESG narratives can serve to protect corporate reputation while failing to deliver tangible reparative justice to impacted



stakeholders. This reinforces the importance of robust governance structures and independent oversight mechanisms in ensuring that ESG frameworks are not merely rhetorical, but transformative in practice.

It is also important to note that this research did not include a detailed examination of Vale's ESG-related actions directed at Indigenous and traditional communities affected by the disasters. Although the company's reports mention specific measures for these groups, such content was outside the scope of the present analysis. Therefore, future studies should explore these dimensions more deeply, particularly considering the intersectionality of environmental justice, ethnicity, and territorial rights.

In sum, the analysis suggests that, despite formal ESG commitments, Vale's actions were insufficient to fully remediate the human, environmental, and governance impacts of the disasters. The case underscores the urgent need for more rigorous, transparent, and stakeholder-centered approaches to ESG implementation, especially in high-risk sectors such as mining.

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