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A STUDY ON THE OPERATIONALIZATION OF ENVIRONMENTAL MANAGEMENT ACCOUNTING WITHIN SIERRA MINERAL HOLDINGS LIMITED IN SIERRA LEONE

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Abstract:
This study provides an assessment of the operationalization of Environmental Management Accounting (EMA) at Sierra Mineral Holdings Limited in Sierra Leone. Explicitly, this piece of work suggests strategies for the application of environmental management accounting systems practices that have been adopted by the management and how corporate social responsibilities are adopted. This study's findings indicated a high responsiveness to the importance and effectiveness of environmental management accounting and the application of codes of best practices to environmental practice. However, the government, being the regulatory body, should require the mining company to have a mitigation plan with mapped-out strategies that would be implemented to minimize the misery of endangered species not becoming extinct in the near future, and the government should closely monitor topography and noise performance indicators. The poor performance of the company not having a well-coordinated environmental system in place and the control systems to reduce emissions to a tolerable level should also be monitored by the government as these factors have the potential to cause serious environmental degradation and will have a negative effect on human lives in the community. The management of Sierra Mineral Holdings Limited should prepare a mitigation plan with clearly mapped-out strategies with deliverable timelines on the wildlife-protected areas and Cultural Properties Protection and enhance Topography and Noise Indicators to improve the application of the Code of Best Practices and application of Environmental Management Accounting to an acceptable norm.

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Keywords: Environmental Management Accounting (EMA), operationalization, environmental stakeholders

1. Introduction

Business organizations may be classified as the "bad players" in climate change as most of the environmental issues are created by their activities, and that is the more reason why these organizations are subjected to growing pressures to reduce the environmental impacts resulting from their economic activities (Qian & Burritt, 2009). The pressure on firms comes from environmental stakeholders such as legislators, customers, green groups, the community, bankers, shareholders, and acquirers (Medley, 1997; Schaltegger & Burritt, 2006), and the pressure is both inside and outside the country which they operate to produce environmentally friendly products (Ismail *et al.*, 2014; Eltayeb *et al.*, 2010); the human factor also causes environmental degradation in the form of deforestation, pollution, and carbon emissions resulting to climate change that have a bad effect on living life on earth (Ismail *et al.*, 2014). The pressures from environmental stakeholders on organizations for their activities to be environmentally friendly and environmentally sustainable have embedded benefits that include the most common environmental strategic objective of organizations to be compliant with the statutory requirement (Dias-Sardinha & Reijnders, 2001), regulatory bodies, and business case, responding to stakeholder influences and achieving competitive advantage (IFAC, 2005; Schaltegger and Burritt, 2006; Doody, 2010; Ismail *et al.*, 2014).

The operationalization of environmental accounting is beneficial both to internal and external users. The internal users benefit from the operationalization of environmental accounting from the statutory point of view of not being found wanting for not abiding by the rules of environmental safety, which can slam them to penalty if found wanting. The operationalization of environmental accounting will attract consumers to the company's products, though it is the company's corporate social responsibility to keep the environment safe in their operational environment. In the case of external stakeholders such as the government, community, and consumers, it ensures the safety of the stakeholders as the organization complies with environmental safety. The contribution of companies to a clean environment will bring environmental progress to an economy and society hence, improved environmental performance would induce cost savings and increase sales and thus improve economic performance (Schaltegger & Synnestvedt, 2002).

Environmental costs include both internal and external costs which are connected with environmental determination and protection as well as environmental costs include all the expenditures required in order to cover the measures meant for environmental protection taken by the economic entity in order to prevent, produce, control, and register within documents those aspects regarding the environment, the impact, and the risk; the same is valid in case of eco-logical storage, treating or reconstructing. The first step in administrating waste, namely treating polluting emissions, implies modernizations

required to treat emissions and waste storage. Companies should take responsibility for the negative externalities they create and have an adverse effect on the environment through environmental degradation and society through health hazards that cause declining health conditions and physical discomfort (Mokhta *et al.,* 2016). The environmental costs include both internal and external costs incurred by companies to mitigate the adverse effect on the environment, and adherence to standards and statutory requirements are expected from companies. Otherwise, penalties are imposed on companies. Such costs should be internalized, and environmental awareness organizational culture, and skills among employees are a fundamental element in achieving eco-efficiency and economic growth (Mokhtar *et al.,* 2016). Management commitment to the implementation of environmental management accounting practice entails the concerted effort of employers and employees to achieve organizational targets and goals (Fuzi *et al.,* 2018; Gunarathne and Lee, 2015), on the other hand, management commitment involves management engagement in having companies for a clean environment and ensuring its management (Kim *et al.,* 2015).

Waste costs have a double meaning: they represent material losses of the technological flow and show the efficiency or inefficiency of the technologies characterized by a productivity type index. Material flows also include water and energy. There is a second category of waste; it includes the cost of waste materials and the equivalent of the capital and labour consumed by such waste. When the economic entity's accounting implements environmental management ac-counting, two groups of experts work in the field, namely:

- The accounting group (accountants) is responsible for evaluating, surveying, and registering product sales (input-output), the incomes registered according to cost centers, and acquisition costs (sale prices, internal prices, the calculation of taxes).
- The technological group (technologists) whose responsibility is to elaborate balances for materials, water, energy, waste, and emissions expressed in physical units and as costs, to identify the costs of emissions catching equipment to implement clean technologies, to evaluate the number of labour hours, the operations required in order to distribute costs according to various levels of environment approaching.

Good knowledge of environmental costs may improve the efficiency of a waste administration policy. Accordingly, the economic entity can direct its decision towards an antipollution measure, which, at first sight, may seem more expensive but proves to be less onerous when employed. When choosing an anti-polluting technology, the savings that regard waste administration should be compared with the whole costs that emerge from adopting the anti-polluting technology. Environmental safety is the safety awareness that enables industries to conduct themselves in a secure environment to improve the company's performance (Fuzi *et al.,* 2018, Line and Albrechtsen, 2016). According to the principal polluter pays, the cost of environmental protection should be included in the price of the product, which leads to a price increase. If entities in the same field of activity do not implement the same measures regarding the environment, the

pioneering entity in environmental protection is less favoured when compared with its competitors as the sale prices of its products are higher (Vasile & Man, 2012).

This article is focused on the operationalization and adherence to Environmental Management Accounting (EMA) at Sierra Mineral Limited. This piece of work also intends to give a detailed description of how the provisions of the Sierra Mineral Limited provide assurances for each constituent of stakeholders.

2. Research Aim, Research Objectives, and Research Question

2.1 Research Aim

To determine the level of operationalization and effectiveness of EMA and to identify the Provisions made by the management of Sierra Mineral Holdings to provide adequate assurances to each constituent of stakeholders.

2.2. Research Objectives

1) To evaluate the importance and effectiveness of the operationalization of Environmental Management Accounting Systems in Sierra Mineral Holdings Limited.
2) To identify the various stakeholders' interests and the provisions made by the management of Sierra Mineral Holdings Limited for each category of stakeholders.
3) To suggest strategies for the application of Environmental Management systems in Sierra Mineral Holdings Limited.

2.3. Research Question

What are the implementation strategies of Sierra Mineral Holdings Limited for the operationalization of EMA, and what are the provisions made for each category of stakeholder?

3. Research Methodology

The research adopts exploratory and ex-post facto design and benchmarking. The exploratory design was used to gather relevant materials from existing literature and data from related articles, journals, the internet, and the data collected from the Sierra Mineral Holdings Limited records (financial, consultant reports, and management reports). The ex-post factor design was adopted. However, this does not provide the study the opportunity to control the variables as they have already occurred and cannot be manipulated. The benchmarking process for this research will be as follows: a collection of information from literature and the company (quantitative and qualitative data), and the analyses of information collected against good practice drawn from the literature this approach will help our understanding of establishing gaps between good practice and what the company has done and will inform our conclusion on the operationalization of

Environmental Management Accounting within Sierra Mineral Holdings Limited in Sierra Leone.

4. Literature Review

The literature review revealed that sustainability control systems do not only play a role in facilitating top management's execution of sustainability initiatives by promoting sustainability core values and measuring sustainability performance but also by diminishing sustainability strategic risks, mitigating uncertainties associated with sustainability strategies, and acting as a control mechanism to alleviate the agency costs of shareholders (Asiaei *et al.*, 2021; Arjaliès & Mundy, 2013; Gond *et al.*, 2012; Henri & Journeault, 2010). EMA also supports companies to handle sustainability threats and opportunities and to reduce agency costs by improving the transparency and accountability of operational practices (Asiaei *et al.*, 2021; Traxler *et al.*, 2020; Wijethilake, 2017). The design of environmental accounting applies to external and internal users (Vasile & Man, 2012). Environmental administration requires the appointment of an environmental officer to safeguard legal compliance, and the officer is tasked with the supervision of emission standards, regulations, and formal company internal procedures and protocols (Schaltegger, 2002). The operationalization of environmental accounting should be seen by organizations that are prone to environmental degradation as a duty of responsibility and not a defensive mechanism, as environmental administration stresses the conservation aspect of environmental issues and nature, and organizations should not only be seen to adhere to the rules and regulations but should be actors of trustee for nature; the bureaucratic structures and procedures of organizations to operationalize environmental accounting could be reduced if organizations would take a step forward as actors of trustee for the environment (Schaltegger, 2002).

The administration of environmental administration should be part of governance responsibility this includes the senior management and board of directors; the complexity and the setting of goals to achieve environmental responsiveness should be discussed at the governance level of the organization with clearly set targets to be implemented and operationalization of environmental accounting as the meeting of not only the statutory requirement but seen as actors to prevent the environmental crisis. The senior management should monitor implementation and report to the board of directors (Kirschke & Newig, 2017). Vasile & Man (2012), in their article titled "Current Dimension of Environmental Management Accounting", stressed protection costs because other indicators such as raw materials, waste issuing and stocking, pollution of environment factors, expenditures, and the like do not show the value society has to bear but rather indicates the statutory requirement and standard to adhere to. Companies use success factors as a way to garner information requirements, improve the company's objectives in decision-making making, and measure performance to achieve goals and targets set by the organization environmental safety also assists the organization in implementing safety in EMAP to improve environmental management (Fuzi *et al.*, 2018).

Critical success factors that might affect the success of Management Accounting Practice (EMAP) have been identified in the body of literature (Fuzi *et al.,* 2018; Gunarathne & Lee, 2015); these costs are environmental cost, environmental regulation, and environmental safety; management commitment; and, focus on customer needs and satisfaction in achieving organizational goals (Mokhtar, 2013). The different ways of identifying environmental costs are also found in the literature. These costs include production processes, product costs, cost management, and savings identified in the implementation of EMAP, and the identification of these costs speedily facilitates the decision-making process (Velasquez *et al.*, 2015). Petcharat and Mula (2012) state that environmental cost measures the reduction of input materials, energy, and waste in reducing production costs. The environmental cost is one of the key dimensions of EMAP and relates to the practices of environmental management (Fuzi *et al.,* 2018). When organizations comply with environmental safety requirements as laid down by statutory requirements of various governments and international standards this will improve environmental safety. Hence, the operationalization of EMAP is related to environmental safety, as cited in the literature. Employers should ensure that the guidelines and procedures for environmental safety reduce the effects of environmental issues (Fuzi *et al.,* 2018, Taufek *et al*., 2016).

The increasing body of knowledge on academic and applied research provides a large number of contributions made to the progression of EMA in developed countries (Asiaei *et al.*, 2021; Qian & Burritt, 2009; Deegan, 2003; Schaltegger & Burritt, 2000; Bailey & Soyka, 1996; Epstein, 1996; Schaltegger, Muller & Hindrichsen, 1996; Tuppen, 1996). As evidenced in the literature, the unabated attention is due to the environmental crisis that the activities of firms (e.g. in the mining and manufacturing) that has created significant financial consequences for various organizations that need to be managed (Asiaei *et al*.., 2021; Schaltegger & Burritt, 2000). However, while EMA practices in developed countries have improved as a support mechanism to manage environmental issues, firms on the African continent are burdened with multiple challenges resulting from environmental degradation and have underutilized the environmental tools (Asiaei *et al*., 2021; Nyirenda, Ngwakwe & Ambe, 2014).

5. Operationalization of Environmental Management Accounting

The environmental management accounting system can be defined as the process of identification, collection, calculations (estimation), analysis, internal reporting, and use of information regarding materials and energy, environmental costs, as well as other data regarding costs within the decisional process in order to adopt convenient decisions capable of contributing to environment protection (Vasile & Man, 2012).

The main objective of environmental accounting is to use the data garnered for management decision-making concerning environmental standards and statutory compliant requirements of stakeholders (customers, government, local community, and the like), and the accounting provides the sustainable development of the activity, the

contributions of high level acknowledge on environ-mental taxes, capital expenditures, and exploitation generated by using certain pollution control equipment (Vasile & Man, 2012). Environmental costs can be analyzed either from the point of environmental protection or according to their connection with the flux of materials and energy, and environmental ac-counting provides the sustainable development of practices and policies on pollution control, choosing the materials that ensure cost minimization, and looking for possible recycling alternatives (Vasile & Man, 2012).

According to Vasile & Man (2012), there are stages an economic entity should follow to operationalize an EMA, such as getting the support of top management, defining the limits of the system that is going to be implemented, identifying the significant influences the economic entity exerts upon the environment; determining, according to the case, the already registered forms of impact upon the environment; defining environmental costs; gathering the analysis team; reviewing the existing accounting system; identifying the opportunities of profit or savings (expenditure cuts) which are not considered yet; issuing proposals regarding the modification of the existing accounting system; testing the system of environmental management accounting. Three aspects should be considered to determine the most efficient methods of implementing environmental accounting that should be embedded in the routine activities of an organization; these activities include identifying the significant issues regarding the environment that the economic entity wants to quantify through cost associations (environmental cost objects); identifying relevant data to include these objects within costs; defining the systems of collecting those data.

The identification and collection of accurate physical and financial data enhance the decision-making process within the economic entity and the same is true for data collection for EMA decision-making as it increases efficiency and improves the management approach in carrying out businesses. Environmental accounting provides additional information to the management by identifying and quantifying measures such as obligations associated with the significant influences exercised upon the environment, the cost of legal stipulations in the field, the benefits (or cost savings) achieved as a result of implementing the environmental management systems; the economic advantages of other initiatives (an increase of efficiency and improvement in carrying out businesses) (Vasile & Man, 2012).

Vasile & Man (2012) in their research identify the benefits that come along with the implementation of environmental management accounting that can either be direct or indirect:

- the decisional process is the beneficiary of improved informational support: the separate registering of environmental costs (which are hidden by the classical accounting systems) is going to determine the improvement of data provided to decisional staff and consequently influence profitableness increase;
- improving price policy;

- support during the process of data reporting: the identification of environmental costs supports the economic entities in collecting data about the environmental impact which is required by internal/external reports;
- new opportunities are discovered: while the analysis of environmental costs can identify new opportunities, they may be employed for making savings through resources recycling or re-using them for other activities;
- increase of competitive advantage: due to the incipient stage of development of environmental management accounting, its use, and proper advertising may determine a competitive advantage of a certain economic entity;
- improvement of the economic entity's image: the efforts meant to decrease environmental costs represent a valuable image capital;
- attracting and motivating the staff: it is generally considered that in case an economic entity tries to evaluate the effects its operations have upon the environment, it attracts better-qualified employees; as a result, it will be the beneficiary of a highly motivated staff;
- social benefits: the efforts of diminishing costs and the influences upon the environment (that are going to create a 'cleaner environment) will generate benefits for the entire mankind.

Quantifying costs under environmental accounting is quite different from the approach used under the traditional method of accounting that classifies costs according to materials and direct labour, indirect production expenditures, distribution costs, administration general costs, and research/development costs (Vasile & Man, 2012). On the contrary, the aim of identifying environmental costs is to unravel hidden costs or improperly allocated ones due to traditional methods, evaluate them, and distinctly report them as being different from the other types of costs, and such costs are losses determined by the deterioration or the inefficient use of raw materials and materials, of utilities (water, energy, natural resources), by the diminished use of non-regenerating resources, by the decrease of the costs required by normative documents (costs determined by the publishing of planning data, taxes, employees training expenditures, to mention but few) (Vasile & Man, 2012). If organizations could understand the pressure coming from the environmental stakeholders to be environmentally friendly and to pursue environmental sustainability as a motivation that is legislative or market-based motivations (Gray & Walters, 1993) to protect the environment (legislative and implementation of best codes practice) and a source of additional revenue streams and cost-saving opportunities for an organization (Coltman, 1994; Bennett *et al.*, 2002; Schaltegger and Burritt, 2006; Doody, 2010; Godschalk, 2010; Lee, 2011) then business organizations in the mining, manufacturing and firms whose activities affect the environment would embarrass the implementation of activities that lead to green climate. Theoretical evidence within the management accounting literature reveals that companies are oriented toward adapting designs that are consistent with strategic directions and priorities, such as sustainability initiatives (Asiaei *et al.*, 2021). The exception in the operationalization of EMA is that most organizations do not take into

account the costs incurred nor the benefits that may come along with being an actor in minimizing environmental degradation (Vasile & Man, 2012).

The prime concern of ISO 14001 is the handling of environmental management systems. Business organizations that are to be effective in the management and handling of environmental issues should understand the details of ISO 14001, as it is designed to introduce environmental improvement in the entire organization's operations and enable organizations to incorporate environmental issues into the corporate decision-making process (Ismail *et al.,* 2014). There are benefits to be derived by business organizations that are ISO 14001 certified organizations, such as improvement in environmental performance (Ann & Wahid, 2006), minimization of waste, conservation of energy and water, and enhancement of corporate image (Bansal and Bogner, 2002), reduction in environmental risks and incidents, and compliance of legislation (Cassells, Lewis and Findlater, 2011).

Corporate environmentalism is of both theoretical and practical importance, and understanding its determinants and consequences has been the subject of considerable research in the past two decades (Asiaei *et al.*, 2021). Business organizations should not only rely on their intangible assets such as know-how, networks, procedures, and information systems but should endeavour to develop public natural resources through their actions, such as environmental protection (Lopez-Gamero *et al.*, 2011; Massaro *et al.*, 2018; Asiaei *et al.*, 2021) and be in tandem in recognitions with tangible or intangible assets as the alignment between environmental resources and appropriate use of management accounting systems facilitates the management of green resources as well as supports the achievement of strategic objectives by mitigating risks and uncertainties, which in turn results in enhancing sustainability performance (Asiaei *et al.*, 2021; Wijethilake, 2017).

6. An Evaluation of the Importance and Effectiveness of the Environmental Management Accounting Systems in Sierra Mineral Holdings Limited (SMHL)

The benchmarking analysis explains the qualities and competencies that sound environmental management accounting systems should have. It was easy to measure the performance of a mining company as its main objective is to maximize profit. To determine how important and effective the environmental management accounting principles are, the study assessed the areas that Sierra Mineral Holdings Limited (SMHL) is compliant with and where they are not compliant, and we made an evaluation of the compliance level by attaching scores that totalled to one for each category given in Table 1.

The evaluation was made using the criteria in Table 1, such as Topography, Geology, Air, Noise, Surface Water, Visual Resources, Accidental Release of Sludge from TSF, Wildlife Protected Areas and Cultural Properties, Borrow Pits and Quarry Sites, and Flora and Fauna. The analysis in Table 1 indicated an above-average rating of 70.50 percent, an equivalent of 253.8 degrees. However, a vital indicator of Wildlife Protected

Areas and Cultural Properties rating is very low at 1 percent, and Topography and Noise rated at 60 percent respectively. This is a clear indication that the environmental community in which Sierra Mineral Holdings Limited does its mining activities is prone to disaster and environmental degradation in the long run. Wildlife Protected Areas and Cultural Properties are far below an acceptable rating that may render the mining activities of Sierra Mineral Holdings Limited a misery to endanger species and be extinct in the near future; this singular act of Sierra Mineral Holdings Limited should render their mining activities invalid. The continuity in the operations of Sierra Mineral Holdings Limited will depend on the mapped-out strategies on how the Wildlife Protected Areas and Cultural Properties indicator would be managed and enhanced; in addition, improvement on the performance indicators of Topography and Noise as the overall rating for the two indicators is weak.

Table 1. The extent of the application of the code of best practice at Sierra mineral holdings (SMHL).

No.	Criteria	Compliant (Yes)	Compliant (No)	Total	Comments
	Topography	0.6	0.4	1	Reclaimed mined-out areas. Reclaim stockpile areas. Use designated roots in wet seasons.
	Geology	0.8	0.2	1	Separation of super soil from subsoil during removal. Proper grading and reshaping of the disturbed.
	Air	0.7	0.3	1	Dust Suppression in the Dry season, Provision of masks to employees in dusty areas, and Reduced speed limits.
	Air	0.6	0.04		Future facilities with high noise impacts should be located well away from noise-sensitive areas.
	Surface Water	0.85	0.15	1	Waste oil, fuel, and other lubricants should be stored in strong containments.
	Visual Resources	0.75	0.25	1	Impoundment dams should be rehabilitated to meet international standards.
	Accidental Release of Sludge from TSF	0.90	0.01	1	Rehabilitation, development, and implementation of the Tailings Management Plan coupled with a regular inspection program.
	Wildlife Protected Areas and Cultural Properties	0.01	0.90	1	Not Frequently Used.
	Borrow Pits and Quarry Sites	0.85	0.15	1	The pits should be closed up immediately after use Quarry sites must be included in mine closure and reclamation plans

Source: Developed by the researchers from TEDA report November 2021.

Key to Table Analysis

A checklist was used to score The Extent of the Application of the Code of Best Practice at Sierra Mineral Holdings (SMHL) as indicated below: 100% = Complete adherence to the criterion of the Code of Best Practice. 70% - 90% = Incomplete adherence to the

criterion of the Code of Best Practice, though the performance rating is at an acceptable level. 60% - 50% = Weak Adherence to the criterion of the Code of Best Practice criterion. 40% - 50% = Unacceptable Adherence to the criterion of the Code of Best Practice criterion. 0 = Non-Adherence to Adherence to the criterion of the Code of Best Practice criterion.

Table 1 indicates the summarized scores analyses and reflects the extent of the Application of the Code of Best Practice at Sierra Mineral Holdings and further interpreted in the graph. Figure 1 indicates a high rating of 70.50%, equivalent to 253.8 degrees, but does not guarantee the environmental safety in the community; as a vital indicator of Wildlife Protected Areas and Cultural Proper-ties rating is very low at 1 percent, and in addition Topography and Noise rated at 60 percent respectively.

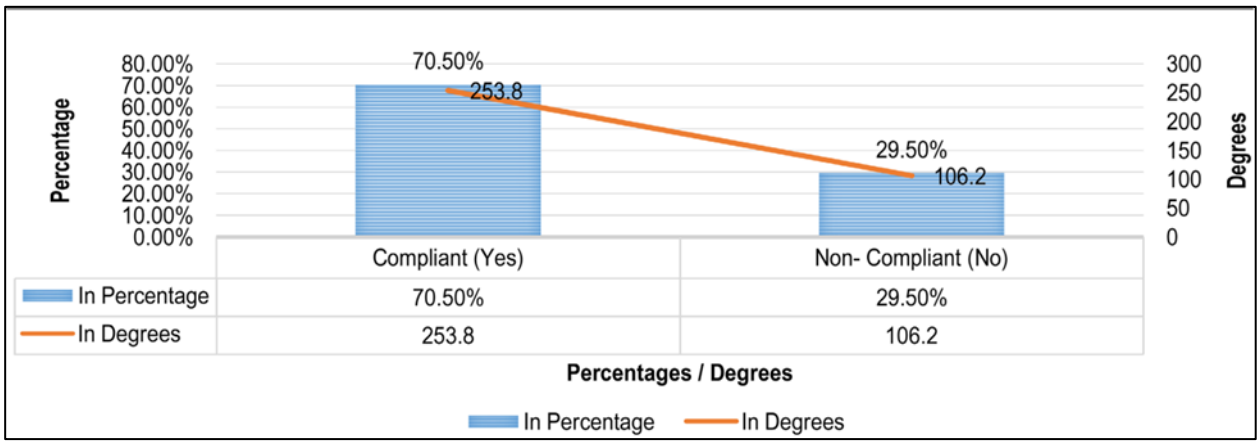


Figure 1: The extent of the application of the code of best practice at Sierra mineral holdings (SMHL)

6.2 Achievements in Environmental Management Accounting at Sierra Mineral Holdings Limited (Vimetco Sl Limited)

The achievements of Sierra Mineral Holdings Limited in Environmental Management Accounting are analyzed in Table 2. The achievements of Sierra Mineral Holdings Limited in Environmental Management Accounting were mentioned against the following targets: Policies, Plans & Procedures, Targets, Environmental Management Systems, Monitoring & Documenting Performance, Health & Safety indicators, Resource Management, Environmental Performance Indicators, Emission Controls & Reduction, Environmental Expenditures, and Incidents & Remediation. The company scored very good grades in most of the targets used to evaluate the company's performance in Environmental Management Accounting, with an overall grade of 80%, an equivalent of 288 degrees. However, it performed poorly on Environmental Management Accounting Systems and Emission Controls and Reduction. The poor performance of the company in these two fundamental targets shows the clear breakdown in the handling of EMA as the company does not have a well-coordinated environmental system in place, and the control systems to reduce emissions to a tolerable level and the emissions reduction have not been properly handled by the company; these breakdowns in the EMA requires the immediate attention of the board of directors and management to put strategies in place

that would reduce emission to a tolerable level and implementation to be effected by management and government been the regulatory body perform the monitoring to ensure the implementation is done at an acceptable standard. The company does not have a well-coordinated environmental system in place and the control systems to reduce emissions to a tolerable level will cause serious environmental degradation and will have a negative effect on human lives in the community.

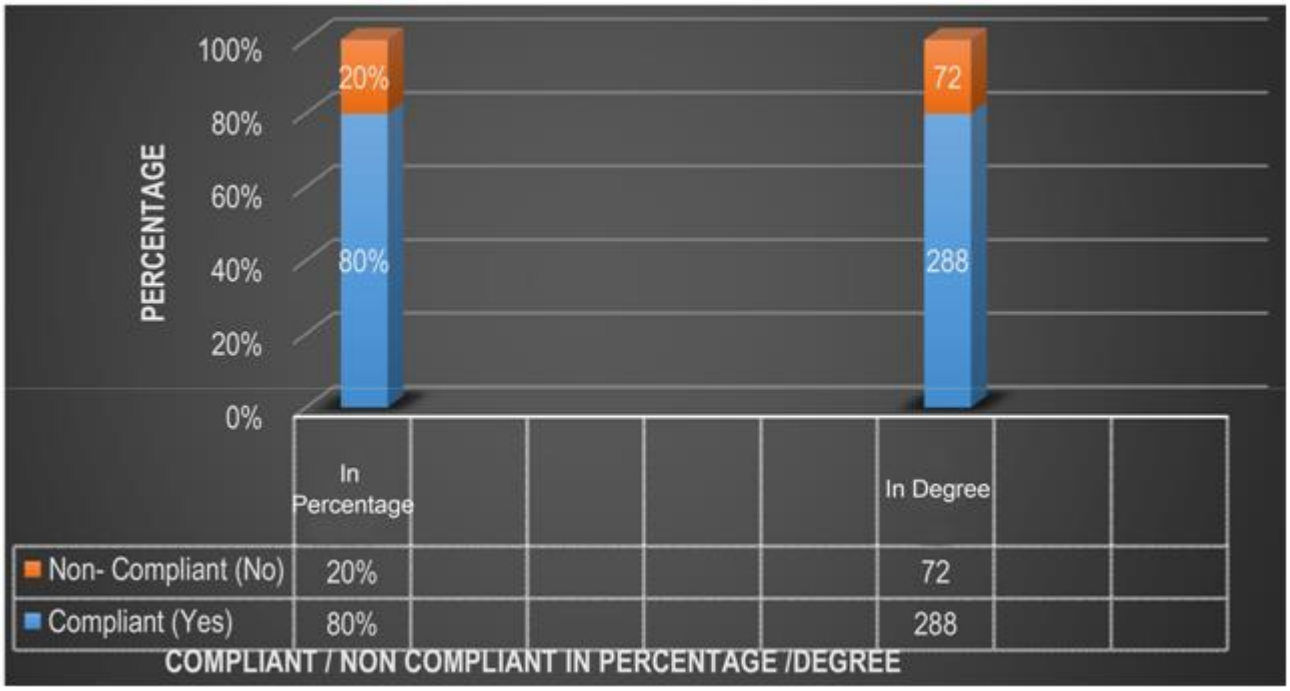
Table 2. Achievements in environmental management accounting at Sierra Mineral Holdings Limited (Vimetco SL) Limited.

NO.	Target	Achievements Yes (1)	No (0)	Total	Objectives
	Policies, Plans, and Procedures	1		1	To create structured environmental management policies, plans, and procedures
	Targets	1		1	To set targets that are Specific, measurable, Attainable, Realistic, and time-bound.
	Environmental Management Systems	0		0	To have a well-coordinated environment system in place
	Monitoring & Documenting Performance	1		1	To ensure that there is adequate monitoring and documentation of performance
	Health & Safety indicators	1		1	To give guidance on all health and safety matters
	Resource Management	1		1	To ensure that resources are fully utilized and well-managed
	Environmental Performance Indicators	1		1	To ensure that both financial and non-environmental performance indicators are used
	Emission Controls and Reduction	0		0	To control and reduce emissions to a tolerable level
	Environmental Expenditures	1		1	To properly classify environmental expenditures
10	Incidents & Remediation	1		1	The aim of this is to put in place adequate preventive and corrective measures

Key to Table Analysis

A checklist was used to score the achievements in Environmental Management Accounting at Sierra Mineral Holdings Limited as indicated below: 1 = Complete adherence to the criterion of EMA. 2 = Incomplete adherence to the EMA criterion though the performance rating is at an acceptable level. 3 = Weak Adherence to the EMA criterion. 0 = Non-Adherence to EMA criterion and no information provided. on human lives in the mining environments/communities of Sierra Mineral Holdings Limited.

Figure 2 shows the summary of the overall achievement of Sierra Mineral Holdings Limited in the handling of Environmental Management Accounting practice/systems and reflects an impressive achievement of EMA at an overall rating of 80% and the equivalent of 288 degrees however, the company does not have a well-coordinated environmental system in place and the control systems to reduce emissions to a tolerable level will cause serious environmental degradation and will have a negative effect on human lives in the community and may truncate economic growth if resource which the government may have used for an instant in agriculture is used in the future on the health system strengthening as a result of environmental degradation that impacted negatively



Source: Developed by researchers

7. **Impact on Stakeholders**

A stakeholder is defined as "*any group or individual who can affect or is affected by the achievement of an organization's objectives*" (Freeman, 2015). Organizational capabilities that foster cooperation and environmental learning are critical to stakeholder engagement (Roome and Wijen, 2005; Clarke and Roome 1999). Sierra Mineral Holdings has both internal and external stakeholders, and its impact from mining activities on them is as follows:

7.1 Government

The government serves as the sole regulator for Sierra Mineral Holdings Limited and all other firms within the extractive industries. The government's interest is to ensure that Sierra Mineral Holdings is compliant with the relevant laws and regulations and for them

to meet their statutory obligations. The board of directors, through the senior management, ensures that adequate provisions are provided by ensuring that Sierra Mineral Holdings Limited is fully compliant with all the relevant laws and regulations by producing various yearly reports to the regulator and meeting obligations that give permits or rights to mining. The operations of the company may have a negative effect on the government in the near future if the company does not put in place a well-coordinated environmental system and the control systems to reduce emissions to a tolerable level will cause serious environmental degradation and will have a negative effect on human lives in the community and may truncate economic growth; as the resources which the government may have used for an instant in agriculture are used in the future on the health system strengthening as a result of environmental degradation that impacted negatively on human lives in the mining environments/communities of Sierra Mineral Holdings Limited. In addition, the company management of Topography and Noise and Wildlife Protected Areas and Cultural Properties is far below an acceptable rating, which may render the mining activities of Sierra Mineral Holdings Limited a misery to endanger species and be extinct in the near future and pose a threat to human lives; this singular act of Sierra Mineral Holdings Limited should render their mining activities invalid by the government except the management of the company should ensure that all compliance requirements and obligations by the government are fully met and strategies put in place and implemented to mitigate the negative impact on living lives in the environment.

7.2 Communities

The Communities want a fair and equitable share from Vimetco SL Limited by meeting their corporate and social responsibilities. The community also wants their safety and would like to have priority for employment at Sierra Mineral Holdings Ltd. The board of directors, through senior management, ensures that since November 2012, the company has been financing community development initiatives within the purview of Sierra Mineral Holdings Foundation and also giving priority to locals in terms of job facilities. The board of directors, through senior management, has also ensured that the Sierra Mineral Agency has reconstructed and resurfaced all roads in the lease area and has continued to invest in the maintenance of local roads. (TEDA: Environmental Consultant, 2012]. However, the environmental degradation caused by the company through the weak handling of topography and Noise and the company not having a well-coordinated environmental system in place and the control systems to reduce emissions to a tolerable level will also cause serious environmental degradation and will have a negative effect on human lives in the community; the safety of the community is at risk. Although 1% of sales revenue is paid to the community development fund and it is controlled by community leaders, it is in no way a near compensation for the abnormities in environmental management.

7.3 Management

The interest of management is to ensure that there is value for money in its service delivery. To achieve this management, have to make timely decisions to ensure efficiency is achieved. The general manager ensures control and direction flow from top to bottom as shown in the organization structure, to give targets as a benchmark and ensure management decisions are approved.

7.4 Employees

The main interest of the employees is to ensure that their condition of service is attractive and there are staff-enhancing facilities. The General Manager provides an exciting work environment where employees are allowed to exhibit their talent and bring new initiative and experience to achieve team objectives. Also, the SMHL encourages employees' interest, passion, commitment, desire to learn, and enthusiasm to face challenges. (TEDA: Environmental Consultant, 2012), Management provides a strong code of conduct and also ensures staff members are fully motivated to work effectively in an enabling environment. However, the environmental degradation caused by the company through the weak handling of topography and Noise and the company not having a well-coordinated environmental system in place and the control systems to reduce emissions to a tolerable level will also cause serious environmental degradation and will have a negative effect on human lives in the community including the employees.

7.5 Banks

The bank wants to provide banking services to Sierra Mineral Holding Ltd because mining companies maintain huge account balances. Their main interest is to make a profit through commissions and interests on deposits. Four commercial banks are used to provide banking services to the Sierra mineral holdings, including the Sierra Leone Commercial Bank. General Managers can safeguard the company's interest by ensuring that their arrangements with the various banks are documented through the signing of a Memorandum of Understating that provides a Going Concern assurance and is regularly revised and their services retained. The general manager should also ensure that the financial statements explain its going concern status which will give the banks assurance for continuity.

7.6 Suppliers

The suppliers want Sierra Mineral Holding Limited to supply them Alum with raw materials for a production activity that can bring out quality production of Aluminum to supply to the global market, and the general manager, in turn, provides supplies to its main supplier In Romania with superior quality that can provide both primary and processed aluminum. The bauxite mines in Sierra Leone, on the other hand, supply all the necessary raw materials for the Romanian operations and the company assures of supplying superior and quality products that can compete with international standards.

8. Suggest Strategies for the Application of Environmental Management Systems in Sierra Mineral Holdings Limited

Environmental Management Accounting (EMA) is a form of accounting that involves the dissemination of environmental information (known as environmental costs), such as quantities of waste produced, radiation levels discharged, carbon emissions released, and the like, to support internal decision-making within a corporation (Wachira and Wang'ombe, 2019; Schaltegger, Hahn, & Burritt, 2000).

We recommend that the company have a mitigation plan in place and map out strategies for the implementation of environmental codes of best practice and the implementation of environmental accounting systems and adapt the theoretical stages in the operationalization of environmental accounting practice or systems. A theoretical review revealed that there are stages an economic entity should follow in order to operationalize an EMA, such as getting the support of top management, defining the limits of the system that is going to be implemented, identifying the significant influences the economic entity exerts upon the environment; determining, according to the case, the already registered forms of impact upon the environment; defining environmental costs; gathering the analysis team; reviewing the existing accounting system; identifying the opportunities of profit or savings (expenditure cuts) which are not considered yet; issuing proposals regarding the modification of the existing accounting system; testing the system of environmental management accounting. In addition, three aspects should be considered to determine the most efficient methods of implementing environmental accounting that should be embedded in the routine activities of an organization; these activities include identifying the significant issues regarding the environment that the economic entity wants to quantify through cost associations (environmental cost objects); identifying relevant data in order to include these objects within costs; defining the systems of collecting those data. (Vasile & Man, 2012).

9. Conclusion

The analyses in Table 1 focused on the extent to which Sierra Mineral Holdings applied the Code of Best Practice to environmental management practice; the analyses indicated an above-average rating of 70.50 percent, an equivalent of 253.8 degrees. However, a vital indicator of Wildlife Protected Areas and Cultural Properties rating is very low at 1 percent, and Topography and Noise rated at 60 percent respectively. This is a clear indication that the environmental community in which Sierra Mineral Holdings Limited does its mining activities is prone to disaster and environmental degradation in the long run. Wildlife Protected Areas and Cultural Properties are far below an acceptable rating that may render the mining activities of Sierra Mineral Holdings Limited a misery to endanger species and be extinct in the near future; this singular act of Sierra Mineral Holdings Limited should render their mining activities invalid. The continuity in the operations of Sierra Mineral Holdings Limited will depend on the clearly mapped out

strategies on how the Wildlife Protected Areas and Cultural Properties indicator would be managed and enhanced. In addition, improve the performance indicators of Topography and Noise as the overall rating for the two indicators is weak. On the other hand, the analyses in Table 2 focused on the Achievements in Environmental Management Accounting at Sierra Mineral Holdings Limited. The company scored very good grades in most of the targets used to evaluate the company's performance in Environmental Management Accounting, with an overall grade of 80%, an equivalent of 288 degrees. However, it performed poorly on Environmental Management Accounting Systems and Emission Controls and Reduction. The poor performance of the company in these two fundamental targets shows the clear breakdown in the handling of EMA as the company does not have a well-coordinated environment system in place, and the control systems to reduce emissions to a tolerable level have not been handled properly by the company; these breakdowns in the EMA requires the immediate attention of the board of directors and implementation to be effected by management and government been the regulatory body perform the monitoring to ensure the implementation is done at an acceptable standard. The company does not have a well-coordinated environmental system in place, and the control systems to reduce emissions to a tolerable level will cause serious environmental degradation. They will have a negative effect on human lives in the community.

The government, being the regulatory body, should require the mining company to have a mitigation plan with mapped-out strategies that would be implemented to minimize the misery of endangered species becoming extinct in the near future. Topography and the government should closely monitor Noise performance indicators. The poor performance of the company not having a well-coordinated environmental system in place and the control systems to reduce emissions to a tolerable level should also be monitored by the government as these factors have the potential to cause serious environmental degradation. They will have a negative effect on human lives in the community and may truncate future economic growth if resource which the government may have used, for instance, in agriculture is used in the future on the health system strengthening as a result of environmental degradation that impacted negatively on human lives in the mining environments/communities of Sierra Mineral Holdings Limited.

The management of Sierra Mineral Holdings Limited should prepare a mitigation plan with clearly mapped-out strategies with deliverable timelines on the Wildlife Protected Areas and Cultural Properties, Topography and Noise indicators to improve the application of the Code of Best Practice and application of Environmental Management Accounting to an acceptable norm.

Future research focuses their research on the impact of Sierra Mineral Holdings Limited activities on human lives, Wildlife Protected Areas, and Cultural Properties. Research relating to Management Accounting (MA) has been quite considerable and cuts across different industries and different countries (Pedroso and Gomes, 2020; Ahmad and Zabri, 2015). In a nutshell, the EMA provides benefits such as providing information that

contributes to the achievement of cleaner production and value chain management, helps strategic decision-making decisions at different levels of the organization that depend on environmental performance indicators that are physical and financial and this information can be provided by maintaining a resilient environmental practice of environmental systems; and EMA can be a common approach to provide data derived from financial and cost accounting for key purposes, including increased material efficiency, reduced level of hazardous emissions to the environment, and decreased environmental protection costs (Thabit & Ibraheem, 2019). The achievement of these benefits requires commitment on the part of senior management, and the core values of environmental management should be inculcated into the employees of the business organization and should be the responsibility of senior management and be monitored by management and environmental stakeholders (Muhammad & Iqbal, 2019; Tzempelikos, 2015).

Conflict of Interest Statement

This research is free from conflict of interest and has no anticipated ethical issues.

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