

## Exploring Best Practices for Environmental Sustainability: A case of Zambia's Ministry of Green Economy and Environment and Zambia Environmental Management Agency

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### Abstract

This study examined the environmental sustainability practices of two key institutions in Zambia—the Ministry of Green Economy and Environment (MGEE) and the Zambia Environmental Management Agency (ZEMA)—with the aim of assessing current approaches, challenges, and opportunities for strengthening sustainability management. Guided by a mixed-methods sequential explanatory design, the research first collected and analyzed quantitative data from 42 respondents using SPSS, followed by qualitative data from three key informants, which were analyzed through thematic analysis to provide a deeper explanation of the quantitative findings. The quantitative results revealed that 97.1% of MGEE respondents and 87.5% of ZEMA respondents confirmed that their organizations have sustainability policies, with near-universal adoption of sustainability practices across both institutions. However, a significant disparity emerged in environmental management systems certification, with 91.2% of MGEE respondents confirming externally certified frameworks compared to only 50.0% at ZEMA. Thematic focus areas differed markedly, with ZEMA concentrating on climate education (50%) and waste management (50%), while MGEE focused predominantly on climate education (85%). Financial constraints emerged as the dominant challenge, affecting 59% of MGEE and 63% of ZEMA respondents, followed by operational efficiency limitations affecting 35-38% of respondents. Qualitative findings further clarified implementation gaps, highlighting inadequate financial resources, low staffing levels, insufficient monitoring equipment, and outdated policy frameworks dating from 1997 and 2009 as major barriers to effective sustainability implementation. The study concludes that while Zambia has made significant progress through policy reforms and institutional structures that promote environmental sustainability, operational challenges continue to limit full implementation. The study recommends accelerating policy modernization, enhancing staff involvement in sustainability planning, strengthening financial and technical capacity, developing strategic public-private partnerships, expanding community engagement programs, and leveraging external pressure strategically to advance sustainability commitments.

**Keywords:** Environmental Sustainability Policies, Institutional Challenges, Sustainability Practices

### 1. Introduction

The world has entered a new period of environmental sustainability focus because urban areas keep expanding while climate change creates increasing pressure on Sub-Saharan Africa's natural ecosystems. The Ministry of Green Economy and Environment (MGEE) together with the Zambia Environmental Management Agency (ZEMA) now focus on eco-friendly urban development because of the new development strategy in Zambia. The practice of environmental sustainability protects natural resources which need to remain available for future generations while it supports economic growth and social development (Morelli, 2011). The environmental problems of Zambia have grown worse since the first years of the 2000s because cities started to grow while people needed more energy than the government and environmental systems could handle (World Bank, 2022).

The proportion of Zambians living in cities grew from 40.5% during 2010 to about 46.7% by 2023 with Lusaka becoming the top area for this urban expansion (World Bank, 2023). Lusaka has surpassed 3.3 million residents while its population expands by more than 4% each year to become Southern Africa's fastest expanding city (UN-Habitat, 2022). The quick development of this area has created major problems for waste disposal systems and land management systems and environmental protection bodies which now face increased difficulties in maintaining sustainable development.

Industrial and urban pollution further worsen the existing environmental threats which exist in the area. The World Health Organization recommends  $5 \mu\text{g}/\text{m}^3$  as the safe limit for PM<sub>2.5</sub> but Lusaka's air quality monitoring shows average levels between 35 and 45  $\mu\text{g}/\text{m}^3$  which endangers public health for many years (World Health Organization, 2023). Research shows that more than 30% of Lusaka's peri-urban shallow groundwater sources contain nitrates and coliform bacteria because residents do not properly manage their waste and sanitation systems (Chileshe et al., 2022).

The Government of Zambia established new institutional structures and policies during the mid-2010s to solve emerging environmental problems through sustainable development planning. The Ministry of Green Economy and Environment (MGEE) started operations in 2021 to lead Zambia's efforts for green economic growth and climate change mitigation. The Ministry of Green Economy and Environment (MGEE) operates as the main organization which unites national climate policy development with renewable energy promotion and sustainable land use management through the National Green Growth Strategy (2022–2030) (GRZ, 2022). The organization uses its main strategy to distribute renewable energy systems and clean cooking equipment through government and donor programs which have delivered 150,000 improved cookstoves to urban and peri-urban families between 2018 and 2023 (World Bank, 2023).

ZEMA operates as the main environmental authority which enforces the Environmental Management Act No. 12 of 2011 through its approval process for industrial and construction and infrastructure development projects. ZEMA evaluated over 1,100 EIA applications throughout the country from 2018 to 2022 with most applications coming from Lusaka because of its fast-growing real estate and industrial sectors (ZEMA, 2023). The enforcement system operates at a limited level because Zambia maintains under 150 environmental inspectors who struggle to perform their duties for regular site monitoring and compliance verification in both unregulated industrial areas and suburban locations (Chikoti et al., 2022).

The established policies and regulations have not solved the existing problems which affect institutional operations. The national budget of Zambia dedicates less than two percent of its funds to environmental defense and climate programs which restricts the operational abilities of both MGEE and ZEMA (AfDB, 2023). The public shows weak understanding of environmental rules because only 38% of Lusaka residents know about national environmental legislation according to awareness surveys (Kabwe & Mizinga, 2023).

The organizations MGEE and ZEMA have adopted multi-stakeholder approaches through their collaborative work to solve these existing challenges. The National Green Growth Strategy (2022–2030) introduced fiscal incentives, including tax exemptions for renewable energy equipment and green technology investments, aimed at encouraging private sector participation in sustainability initiatives (GRZ, 2022). The Lusaka City Council along with private waste companies work with ZEMA to improve waste management through their collaboration which boosted recycling rates from less than 5% in 2018 to about 18% by 2023 in particular town areas (Lusaka City Council, 2023).

Lusaka faces growing environmental problems because its fast urban expansion leads to forest destruction and waste contamination while its institutions fail to handle these issues properly. The sustainability goals of Zambia depend on MGEE together with ZEMA to achieve their objectives through their power to enforce regulations and their development of green growth initiatives and their ability to unite different stakeholders. The constant difference between policy goals and actual results shows that organizations need to improve their operational systems and boost their budget resources and public participation methods. Research about MGEE and ZEMA regulatory methods and policies will show how sustainable urban management and environmental protection systems operate in Zambia.

## 1.2 Statement of the Problem

Environmental sustainability has become a critical priority worldwide as nations strive to balance economic growth with the protection of natural resources. Rapid urbanization, industrialization, and population growth increasingly threaten ecological systems, particularly in developing countries where governance and enforcement capacities are limited. Lusaka, Zambia's capital city, illustrates this challenge vividly. The city produces between 1,200 and 1,500 tonnes of solid waste daily, yet only 40–45 percent is collected through formal systems, leaving the majority to accumulate in informal dumps, contaminating land and water bodies (Lusaka City Council, 2023). More than 60 percent of Lusaka's residents live in informal settlements, which lack adequate waste management infrastructure, sanitation services, and environmental monitoring mechanisms (UN-Habitat, 2022). Air quality has also deteriorated sharply; particulate matter (PM<sub>2.5</sub>) concentrations range from 35 to 45 micrograms per cubic meter, significantly exceeding the World Health Organization's recommended safety threshold of 5 micrograms per cubic meter (WHO, 2023). These levels pose severe public health risks, including respiratory diseases, cardiovascular issues, and increased mortality.

To mitigate these challenges, the Ministry of Green Economy and Environment (MGEE) and the Zambia Environmental Management Agency (ZEMA) have instituted multiple environmental management strategies. These include the Environmental Impact Assessment (EIA) system, regulatory oversight, public awareness campaigns, and alignment with international frameworks such as the Paris Agreement and the United Nations Sustainable Development Goals (SDG 11) on sustainable cities. The National Green Growth Strategy (2022–2030) provides a policy framework aimed at integrating sustainability into urban planning and economic development. Between 2018 and 2022, ZEMA processed over 1,100 EIA

applications, signaling institutional engagement with environmental regulation.

Despite these measures, significant gaps persist between policy and practice. Enforcement capacity remains weak, with fewer than 150 environmental inspectors nationwide, making it impossible to monitor and regulate environmental compliance effectively (ZEMA, 2023; Chikoti et al., 2022). Public awareness is low; less than 40 percent of Lusaka's residents understand environmental laws and regulations, undermining community participation in sustainability initiatives (AfDB, 2023; Kabwe & Mizinga, 2023). Financial allocations to environmental and climate programmes remain insufficient, receiving less than two percent of the national budget, which limits the capacity for infrastructure development, monitoring, and education. This study, therefore, seeks to explore strategies for enhancing sustainable urban management.

environmental hazards were reduced. This study would also enhance quality of life by ensuring proper management of issues such as waste. Access to sustainable resources, such as clean water, would be improved.

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## 2. Literature Review

### 2.1 Theoretical Framework

This study employed Diffusion of Innovation theory. This theory examines how new ideas, practices, or technologies spread within a social system. In the case of eco-friendly practices, MGEE and ZEMA may serve as innovators or early adopters, driving the adoption of environmentally sustainable practices through policies, regulations, and stakeholder engagement within Lusaka's urban development (Rogers, 2003; Bikhchandani et al., 1992). The diffusion of innovation theory aids in describing the rate at which organizations adopt a new concept of environmental sustainability. As a result, the theory aids the study's understanding of how trends emerge, as well as MGEE and ZEMA's assessment of the likelihood of success or failure for their environmental sustainability policies and strategies.

### 2.2 Strategies and approaches toward environmental sustainability

Environmental sustainability is the recognition of linkages between humans to the ecosystems for life-supporting services. In return, it expresses the human's impacts on ecosystems. The concept of sustainability is increasingly disgraced as a useful practice for the conservation of natural resources, biodiversity, and other life-supporting systems. Environmental sustainability is a system of interconnections of living organisms to the ecosystems that they inhabit and depend on air, water, soil, and other environmental resources (Bennett, 2024).

It is also closely linked to the socioeconomic condition of living beings. Because it is difficult to have a sustainable society without a sustainable productive environment that provides the base for resources. Similarly, a sustainable economic system is also dependent on the sustainable flow of energy, material, and environmental resources. Hence, a sustainable environment can stand alone as a sustainable system and is not dependent on social or economic systems. (Wolfram et al., 2021)

Companies, organizations, and government agencies worldwide play a critical role in achieving sustainable development (Annunziata et al., 2018). Sustainability is a multidimensional concept characterized by economic, environmental, and social development (Braccini and Margherita, 2019). Addressing environmental degradation requires manufacturers' senior management to take on greater responsibility and pressure to implement more sustainable operations (Smith & Doe, 2023). Environmental Sustainability is a preservation concept including biodiversity, social needs, capacity for regeneration, and renewable and non-renewable resources. In other words, environmental sustainability could be a confluence of services and resources (present and future generations) without affecting the health of the existing ecosystems (Khan et al., 2021). Corporate sustainability has been acknowledged as an essential element of organizational strategy, and organizations must disclose corporate management, financial performance, and contributions to sustainable development (Albertini, 2019; Ashrafi et al., 2019).

Sustainability disclosure conveys the vision and strategies of organization to its stakeholders (Amran et al., 2014). According to the stakeholder theory, stakeholders determine the existence of a company, and hence an organization has responsibilities to its stakeholders (Vitolla et al., 2019). Moreover, sustainability disclosure consists of three dimensions such as economic, social, and environmental (Mahmood et al., 2018). All parties worldwide, including governments, companies, investors, and consumers, pay more attention to environmental sustainability issues (Gregory-Smith et al., 2017).

The public is very concerned about knowing that the company is genuinely committed to protecting the environment from climate change, pollution, and other environmental influences arising from the company's activities. Hence, from the view of the legitimacy theory, this makes companies increasingly interested in legitimizing themselves by disclosing improvements to their environmental activities and practices (Ogunode, 2022). By disclosing environmental activities and their impacts on all parties, companies build a positive image and use it as a marketing tool to enhance their public image and goodwill (Kucharska & Kowalczyk, (2023).

### 2.3 Environmental Sustainability, Lusaka Zambia

In the national green growth strategy 2024 to 2030, it was addressed by the government of the republic of Zambia to transition the country to a green economy. Nevertheless, Zambia's transition to a green growth economy has been underway for several years. In Lusaka, Zambia's capital city, efforts toward environmental sustainability have been spearheaded by both government institutions and community-driven initiatives. The Ministry of Green Economy and

Environment (MGEE) and the Zambia Environmental Management Agency (ZEMA) have played pivotal roles in regulating industrial emissions, promoting afforestation, and implementing waste management strategies. A study by Mwale and Phiri (2022) found that MGEE has introduced policies aimed at reducing carbon footprints, while ZEMA has enforced environmental compliance regulations for businesses and industries. Additionally, Lusaka has seen the rise of community-based sustainability initiatives, including grassroots organizations and local NGOs conducting tree planting campaigns, waste recycling programs, and public awareness campaigns (Chileshe et al., 2023). These approaches emphasize a mix of regulatory frameworks and participatory environmental stewardship.

### 3 Research Methodology

The research approach employed in this study is a mixed-methods approach, which combines both qualitative and quantitative forms of inquiry. The subject of this study was investigated using an explanatory sequential design. An explanatory sequential design according to Daka, (2020) consists of first the collection and analysis of quantitative data, which provides a broad overview of the research problem and then collecting qualitative data to help explain or elaborate on the quantitative results.

For the study in particular explanatory sequential design was employed in the study to provide a comprehensive analysis of sustainability approaches, help to explain the effectiveness of MGEE and ZEMA's strategies. The quantitative phase measured the multiple independent variables and show statistical relationships between the challenges faced, and strategies employed and the qualitative phase provided deeper insights for explaining factors impacting sustainability efforts and recommending effective practices.

The population consisted of employees of MGEE and ZEMA based in Lusaka within specific departments relevant to Environmental Sustainability. There were 74 participants in total in this study, who were selected conveniently. There were 6 key informants (managers and directors from the selected departments), with a minimum of 2 years' experience in the field to further ensure that the data gathered came from informed and reliable perspectives, and 68 respondents (employees within selected departments). It was anticipated that the study sample would provide rich information regarding the topic of this study.

The sampling technique that was used in the study was purposive sampling for the key informants these include managers and directors, to ensure that the study obtains insights from experts and decision makers. Stratified random sampling was utilized for the general employees from the selected departments.

Since this study employed an explanatory sequential design, quantitative data were first collected from the identified 68 respondents and qualitative data were collected afterwards. Primary data were collected using a self-administered questionnaire with closed-ended questions and an interview guide containing open-ended questions. Secondary data were obtained from relevant sources of information on different publications and reports on environmental sustainability in order to answer the research questions.

Descriptive statistics was used in this study to organize the data in such a way that it gives meaning and facilitate insight (Qualtrics, 2021). Numerical descriptive measures provided precise, objectively determined values that can easily be interpreted and compared (Northwest Education, 2021). In this study, some of the data was collected from questionnaires and was analyzed through the use of the statistical package for social sciences. Qualitative data collection is usually dependent on interpretation. This study used the thematic analysis approach. Thematic analysis was used to analyze, classify, and present themes (patterns) that related to the data. It illustrated the data in great detail and dealt with diverse subjects via interpretations (Qaissi, 2024). In the case of thematic analysis, processed data were displayed and classified according to their similarities and differences (Qaissi, 2024).

### 4 Presentation of Findings

The study gathered 42 finished questionnaires from the total 68 participants who were originally targeted. The qualitative part of the study includes three main interviews with key informants whom researchers successfully interviewed (n=3).

#### 4.1 Sustainability Policies

The results in Table 1 shows that both organizations have established strong sustainability policies which they actively use for operational management. The MGEE survey results indicate that 97.1% of respondents confirmed their organization maintains an environmental sustainability policy while 87.5% of ZEMA respondents said the same. The research shows that both institutions have achieved 100% adoption of sustainability practices because all participants from each institution followed their sustainability principles.

Table 1: Policy and Practice Approaches by Institution (% Adopted)

Approach	MGEE (% Adopted)	ZEMA (% Adopted)
Environmental Sustainability Policy	97.1%	87.5%
Adoption of Sustainability Practices	~100%	~100%
EMS Certification	91.2%	50.0%
Staff Development in Sustainability	~100%	~100%

Source: Field data, 2026

The research discovered various differences which appeared during the Environmental Management System (EMS) certification process. The MGEE survey revealed that 91.2% of respondents confirmed their organization maintained externally certified EMS frameworks but only 50.0% of ZEMA participants shared this view. The two organizations show different levels of adoption for formalized environmental management standards which international bodies recognize. Staff development in sustainability was reported as a widely adopted approach across both institutions, with near-universal agreement among respondents. The organization invests heavily in staff training programs because they want their workers to develop essential sustainability expertise which helps them achieve their environmental goals. The research findings show that MGEE and ZEMA use policy development and internal operations and employee training as their main sustainability strategies. MGEE has demonstrated greater involvement in official certification systems than ZEMA.

#### 4.2 Strategies Practices

Table 2 summarizes the strategic approaches employed by MGEE and ZEMA to promote environmental sustainability. Collaborative partnerships were identified as a dominant approach, with approximately 95% adoption in MGEE and 100% adoption in ZEMA. This indicates strong reliance on multi-stakeholder collaboration involving government agencies, communities, and other partners.

Table 2. Sustainability Strategy Practices by Institution (% Adoption)

Source: Field data, 2026

Behaviour change interventions were also widely adopted, with ZEMA reporting slightly stronger emphasis than MGEE. Strategies focusing on reducing resource consumption, managing waste effectively, and adopting eco-technologies were reported by over 95% of respondents in both institutions, underscoring the importance of operational sustainability strategies.

Education and awareness programs were among the most strongly adopted strategies, with approximately 97% adoption in MGEE and 100% in ZEMA. Respondents also reported high perceived effectiveness of sustainability strategies, particularly within ZEMA, suggesting confidence in current strategic approaches. Taken together, the findings indicate that collaboration, education, and behaviour change constitute the primary strategic approaches to environmental sustainability within MGEE and ZEMA, with ZEMA consistently reporting slightly higher levels of adoption and perceived effectiveness.

Thematic analysis then followed. The analysis revealed main themes which demonstrated common experiences and perceptions and suggested solutions from all participants. Participants recommended the following: updating environmental policies and regulations, strengthening enforcement mechanisms and incorporating environmental issues into economic development strategies. In addition, interviewees strongly supported: increased funding for awareness campaigns, promoting sustainable consumption and encouraging practices such as reduce–reuse–recycle. One participant said, “More financial resources should be allocated to awareness programmes.” Multiple interviewees emphasized the need to: prioritize renewable energy, promote green technologies and encourage sustainable production and procurement. Participants viewed Public - Private Partnership as essential. One participant added, “Public-private partnerships should mobilize private sector resources and expertise to support sustainability.” Interviewees recommended actions to ensure MGEE and ZEMA have adequate capacity: increasing staffing levels, providing adequate monitoring equipment and allocating sufficient funding. Another participant echoed that, “We need increased staffing and proper monitoring equipment to implement programs effectively.”

#### 4.3 Discussion of Findings

The mixed-methods approach enables the integration of quantitative insights about what works with qualitative understanding of how interventions should be designed and implemented. The findings reveal a comprehensive set of strategies spanning policy modernization, capacity strengthening, partnership development, technological advancement, and community engagement.

The research clearly establishes that policy modernization is a fundamental requirement for enhancing environmental sustainability. Both the quantitative and qualitative findings converge on the need to update and strengthen the policy frameworks within which MGEE and ZEMA operate. The qualitative data specifically identified the National Policy on Environment (2009) and Environmental Impact Assessment Regulations (1997) as outdated and currently under review, indicating institutional recognition of this need.

The research findings demonstrate that education and awareness strategies are among the most strongly adopted approaches, with approximately 97% adoption in MGEE and 100% in ZEMA. Respondents also reported high perceived effectiveness of these strategies, particularly within ZEMA. This strong adoption and perceived effectiveness suggest that education and awareness should continue to be central to sustainability efforts, while potentially being strengthened and expanded.

Behavioral change interventions, which were reported as widely adopted particularly within ZEMA (approximately 100%),

go beyond awareness to actively promote changes in how individuals and organizations interact with the environment. Mvula, Mulenga & Lisomona. (2024) also in their study stated that behavioral change is key to environmental sustainability. These interventions might include incentives for sustainable practices, recognition programs for environmental leaders, demonstration projects that showcase sustainable approaches, and social marketing campaigns that leverage community norms and values.

The finding that behavioral change interventions are more strongly emphasized in ZEMA than MGEE may reflect the agency's direct engagement with regulated entities and communities. Through its enforcement and compliance activities, ZEMA has opportunities to encourage behavioral change among those subject to environmental regulations. MGEE, operating at a more strategic level, may focus more on policy and coordination than direct behavioral interventions.

Multiple interviewees emphasized the need to prioritize renewable energy, promote green technologies, and encourage sustainable production and procurement. This is in line with the study done by Iqbal, Hassan, Akhtar & Khan (2018) who proposed green technology as a sustainable way to go. These recommendations reflect recognition that technological advancement can both reduce environmental impacts and enhance institutional capacity for environmental management. Solar energy, for example, can reduce reliance on charcoal and other biomass fuels that contribute to deforestation and indoor air pollution. Cleaner production technologies can minimize waste and emissions from industrial processes. Digital technologies can improve environmental monitoring, data management, and reporting efficiency.

The promotion of green technologies should extend beyond government operations to encompass the broader economy. This might include incentives for businesses to adopt cleaner technologies, technical assistance for technology upgrading, procurement preferences for environmentally friendly products, and research and development support for local green technology innovation. By creating demand for green technologies and supporting their development and adoption, government can accelerate the transition to a more sustainable economy.

Public-private partnerships (PPPs) emerged from the qualitative findings as an essential mechanism for mobilizing resources and expertise to support sustainability. Participants viewed PPPs as particularly important given the financial constraints facing government institutions. One interviewee explained, "Public-private partnerships should mobilize private sector resources and expertise to support sustainability."

Specific opportunities for PPPs in Lusaka's environmental sustainability context include waste management, where private companies can complement municipal collection services and develop recycling capacity; renewable energy, where private investment can expand access to clean cooking and electricity; sustainable agriculture, where agribusinesses can promote environmentally friendly farming practices; and environmental monitoring, where technology companies can provide sensing and data management capabilities.

Effective PPPs require careful design to ensure alignment with public interests and environmental goals. Mwale and Phiri (2022) also added that clear contractual arrangements, performance standards, monitoring mechanisms, and accountability provisions are essential. Partnerships should be structured to share risks and rewards appropriately, with adequate safeguards to prevent private interests from overriding environmental objectives. Building institutional capacity to manage PPPs is therefore an important prerequisite for successful partnership development.

The research findings consistently emphasized the importance of community engagement in environmental sustainability. The quantitative data showed that education and awareness programs, which engage communities, are among the most strongly adopted strategies. The qualitative recommendations called for strengthening community engagement and awareness programs as part of the solution to sustainability challenges.

Community engagement is particularly important in Lusaka's context, where over 60% of residents live in informal settlements that may lack formal waste management services and environmental monitoring. This is in line with the study done by Chileshe and others who noted that engaging these communities in identifying environmental priorities, designing appropriate interventions, and implementing solutions can build ownership and ensure that programs are responsive to local needs and circumstances (Chileshe, Banda & Tembo, 2023).

The qualitative recommendation to promote reduce-reuse-recycle practices through awareness programs reflects recognition that community behavior is fundamental to environmental outcomes. This was also highlighted in the study by O'Brien, Selboe & Hayward (2023) who found that waste management, in particular, depends on how households and businesses dispose of materials, segregate recyclables, and minimize waste generation. Changing these behaviors requires sustained engagement that builds understanding, provides convenient alternatives, and creates social norms that support sustainable practices.

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## 5 Conclusions and Recommendations

The research successfully identified evidence-based practices spanning policy modernization, capacity strengthening, partnership development, technological advancement, and community engagement. The study concludes that both MGEE and ZEMA have established strong foundational policies and demonstrate commitment to environmental sustainability through high adoption rates, staff development, and collaborative approaches. The research conclusively demonstrates that staff involvement in sustainability planning and implementation is more critical than passive capacity measures such as training programs alone. For Zambia specifically, the findings support ongoing efforts to transition to a green economy as articulated in the National Green Growth Strategy (2022–2030) and the Eighth National Development Plan. By addressing the challenges identified in this research and implementing the recommended practices, MGEE and

ZEMA can enhance their effectiveness in promoting environmental sustainability within Lusaka's urban development and contribute to building a more sustainable future for Zambia.

The study therefore recommends MGEE should develop capacity and programs to address thematic areas currently receiving minimal attention, including energy use, clean cooking, and sustainable agriculture. While recognizing that some of these areas may fall under other ministries, MGEE should strengthen inter-agency coordination to ensure integrated approaches to interconnected environmental challenges. ZEMA should consider whether greater attention to energy and forestry issues would enhance its regulatory effectiveness.

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The authors declare that they are not aware of any competing financial interests or personal relationships that may have influenced the work described in this document.

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### **Ethical considerations**

The article followed all ethical standards appropriate for this kind of research.

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