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Research paper

Analyzing the effect of Akoben programme on the environmental performance of mining in Ghana: A case study of a gold mining company

Serwaa Akoto Bawua^{a, *}, Richmond Owusu^b^a University of Ghana, School of Public Health, Department of Biological, Environmental and Occupational Health, P. O. Box LG 25, Legon, Accra, Ghana^b University of Ghana, School of Public Health, Department of Health Policy, Planning and Management, P. O. Box LG 25, Legon, Accra, Ghana

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ABSTRACT

This study assessed the impact of Ghana's Environmental Protection Agency (EPA) Akoben programme, a rating and disclosure tool which seeks to promote better environmental performance in the mining and manufacturing industries in Ghana. Using a case study approach, the Akoben audit report card for a mining company was analyzed over a three-year period (2009–2011) based on 7-criteria – legal requirements, hazardous on-site waste management, toxic emissions management, environmental monitoring and reporting, best practice environmental management, complaint management, and corporate social responsibility. Key stakeholders' perceptions of the programme's suitability were solicited from the Ghana Chamber of Mines, EPA, and the mining company. Findings revealed that overall environmental performance over the three-year period under review was poor (2009 – 56.6%; 2010 – 65.6%; 2011 – 59.1%) with none of the years meeting the expected minimum limit, with the exception of legal requirements and corporate social responsibilities; the company failed in all other criteria. Specifically, both toxic and non-toxic waste emission discharges were major concerns as toxic parameters, such as for Arsenic, pH and Cyanide, were exceeded. Environmental monitoring and reporting was also a problem for the company. Stakeholders identified inadequate publicity, an absence of legal backing, and a lack of incentives for outstanding performances as the main weaknesses of the programme. Despite this, the stakeholders acknowledge the fact that the Akoben programme has improved the environmental performance of the mining companies because it puts their operations in check, although more can yet be achieved with regards environmental sustainability with this programme, if adequate measures including legal backing are put in place to ensure its continuity.

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1. Introduction

Mining activities could be beneficial to the economic growth of countries if managed properly. However, there is always a trade-off between economic growth and environmental sustainability, as pollution of the environment becomes commonplace because of the excessive exploitation of natural resources (Awan, 2013). This adverse impact of mining activities means human health could be at risk. In effect, governments make serious attempts to improve the environmental performance of mining and manufacturing companies to mitigate environmental pollution.

Over the years, different policy measures have been implemented in many countries to ensure environmental sustainability through the regulation of mining and manufacturing activities. Corporate environmental management (CEM) and corporate environmental information disclosure (CEID) have been important tools (Rabhi, 2011; Zeng, Xu, Dong, & Tam, 2010) to that effect, with CEM being more of a command and control, market-based instrument. A more recent and popular mechanism among developing countries is the environmental performance rating and disclosure (EPRD) (Rabhi, 2011). These tools have become necessary because previous traditional methods have not seen enough environmental performance compliance in developing countries (Haufler, 2010). Yet, there has been some success with EPRD programmes in some developing countries such as China, Indonesia, India, Vietnam, and Philippines, as some studies have reported (Blackman, Afsah, &

* Corresponding author.

E-mail addresses: abiward2010@gmail.com (S.A. Bawua), ensimeyie@gmail.com (R. Owusu).

Ratunanda, 2004; Clarkson, Li, Richardson, & Vasvari, 2008; Powers, Blackman, Lyon, & Narain, 2008).

Ghana is one of the leading producers of gold for the world market (USA Gold, 2014), a country which was once called the Gold Coast because of its abundance of this precious mineral. Thus, to propel economic growth, extraction of gold has been extensive in the country, as has its accompanying side effect of environmental pollution. In response, the Environmental Protection Agency (EPA), the statutory body that is responsible for protecting the environment, has instituted several measures including EPRD to control environmental pollution while improving environmental performance. Previously, environmental regulations in Ghana, while instituted in a strategic legal framework (Environmental Assessment Regulation, 1999), used command and control instruments (Darko-Mensah & Okereke, 2013), a “carrot and stick” approach, legal action and enforcement through monitoring (Sekyi, 2011). Yet, these approaches have generally been described as ineffective, expensive, and time-consuming (Afsah, Laplante, & Wheeler, 1996; Kathuria, 2009; Sekyi, 2011). In Ghana, a lack of political will to prioritize the environment coupled with poor monitoring and enforcement may be critical factors for the instruments' ineffectiveness (Domfeh, 2003).

The Akoben programme is the most recent programme to be implemented by the EPA and seeks to improve the environmental performance of the mining and manufacturing industries through a rating and public disclosure system. The Akoben programme was implemented in 2008 and, as in other EPRD programmes in some developing countries, the time is ripe for empirical evidence on the effect of the programme on environmental performance. Against this background, this study analyzed the impact of the Akoben programme, as an environmental auditing tool, on the environmental performance of a mining company in Ghana.

Akoban is a special audit programme used to assess the environmental performance of mining and manufacturing companies in Ghana through a rating and disclosure system. This was officially introduced by the EPA, part of the government of Ghana. Akoben represents one of the traditional Adinkra symbols and stands for vigilance and wariness, which is a set of behaviours that is relevant to the issues of environmental conservation (Sekyi, 2011). Furthermore, Akoben also signifies alertness and readiness to serve a good cause. Akoben has strong Ghanaian roots and its ratings methodology is tailored to reflect Ghana's environmental values (Allotey et al., 2011). It is for this reason that the Akoben audit encompasses both the physical and human environment in its rating methodology (Sekyi, 2011).

Thus, using a scheme of colours – Gold, Green, Blue, Orange and Red; which represent excellent, very good, good, unsatisfactory and poor, respectively, the ratings are reported to the media annually to enhance participation. Analysis of over one hundred performance indicators from qualitative, quantitative and visual data form the basis of the Akoben rating (Sekyi, 2011).

A Gold rating which is excellent means that performance met the regulatory requirements, indicating that a company applies the best international practices in environmental management, whilst adhering to its corporate social responsibility (CSR) policies (Allotey et al., 2011). On the other hand, companies without a valid permit/certificate are given a Red rating. In addition, an operation which has emissions and effluents exceeding environmental quality standards with regards to toxic discharge into the environment or poor on-site hazardous waste management practices receives a Red rating which is the worst of all the ratings. A Green rating which is very good means that a company applies the best practices, is responsive to public complaints in addition to being fully compliant with environmental requirements, but falls short on CSR implementation (Allotey et al., 2011). Blue and Orange ratings represent

good and unsatisfactory, respectively; a Blue rating means that a company meets mandatory environmental requirements and the reclamation bond criteria. A mining site is rated Orange, however, upon failure to meet environmental regulatory issues such as emissions, ambient quality, and incomplete fulfilment of the reclamation bond criteria (Allotey et al., 2011).

1.1. Akoben rating rules

Fig. 1 is a flowchart of the Akoben rating rules of the seven criteria. The rating rules specify the exact numerical cut off points for each category of the five-colour code (Darko-Mensah & Okereke, 2013). The software system has been designed to ensure zero tolerance for non-compliance with legal and hazardous waste management. Thus, even if a company is rated 99% compliant with both legal and hazardous waste management requirements, the system would still rate the company Red (EPA Ghana AKOBEN, 2010).

A company's environmental performance is said to have improved if they moved from a Red to Blue rating. This is done by being compliant with the three basic criteria: Legal requirement, Hazardous on-site Waste Management and Toxic Emission discharge. In addition, an improvement in the environmental performance of companies is achieved when they move from an Orange to Blue rating. Their compliance rate must exceed or be equal to 75% for the following criteria: Non-Toxic and Noise pollutants, Environmental Monitoring and Reporting rate, and Best Management practices. Finally, a Gold-rated company is one that has met all existing criteria (green colour rating) and in addition responds to public complaints and implements the company's CSR policies (EPA Ghana AKOBEN, 2010). Moreover, the final rating awarded to an industry is based on the industry's worst performance.

2. Materials and methods

The study used quantitative and qualitative approaches. In this mixed method, the quantitative data extracted from the Akoben audit cards of the mining company for the years 2009, 2010, and 2011 was subjected to statistical analysis using Microsoft Excel (2007). Basic descriptive statistics was used to analyse the data while outputs of the results from the analysis were presented graphically using column graphs. In the qualitative approach, semi-structured questionnaires were administered to respondents. For further insight, in-depth interviews were conducted with key informants who were purposively recruited from the EPA head office in Accra, the Ghana Chamber of Mines and the Gold mining company that was used as a case study.

A total of 15 respondents were sampled including four members of the Akoben team from the regulatory officials (EPA), two officials from the Chamber of Mines and the remaining nine were from the mining company. Thus, to adequately address the research objectives, the study solicited the perceptions of the key stakeholders on the impact of the Akoben programme on the environmental performance of companies, the appropriateness of the rating criteria/rules as an environmental rating tool, and the fairness of the disclosure process. The tape-recorded interviews were transcribed and subjected to content analysis as themes were developed.

The quantitative analysis used the main EPA Akoben audit criteria rules in evaluating the environmental performances of mining and manufacturing industries. The 7-criteria include: (1) Legal Requirement, (2) Hazardous and Toxic Waste Management, (3) Compliance with Environmental Quality Standards-Toxics, (4) Environmental Monitoring and Reporting, (5) Best Practices Environmental Management, (6) Complaints Management and

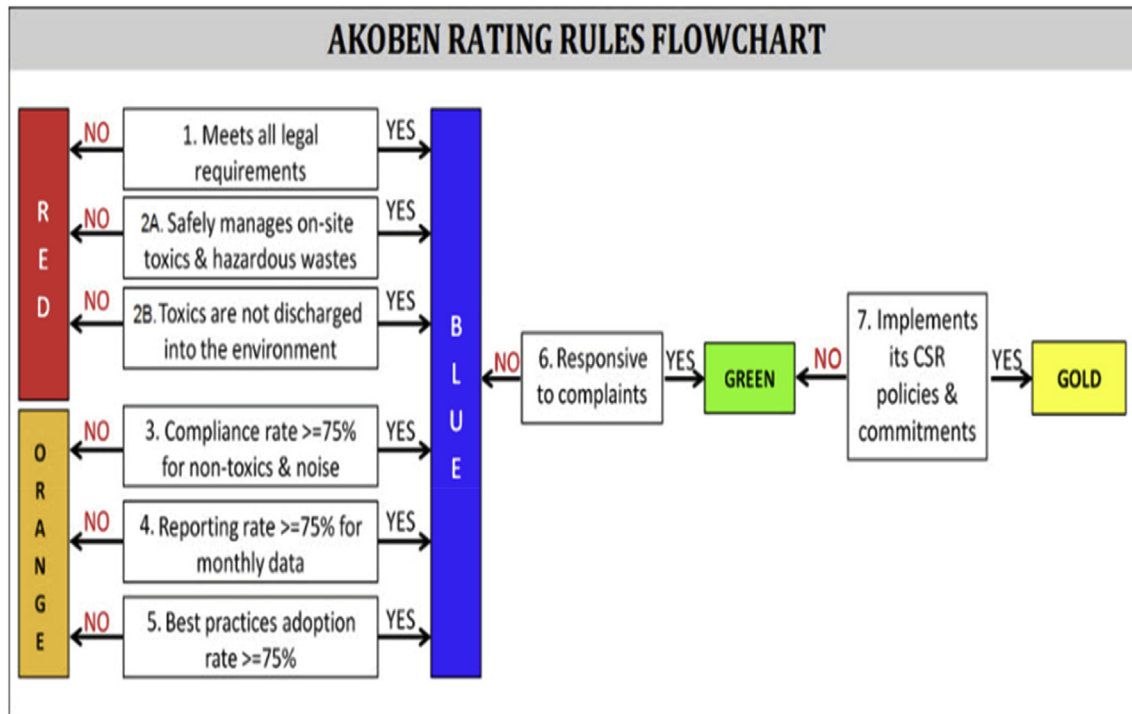


Fig. 1. Flowchart of Akoben rating rules.

Source: Environmental Protection Agency, Ghana (2010).

Community Relation, and (7) Corporate Social Responsibilities (CSR).

3. Results and discussion

All seven (7) criteria of the Akoben audit: Legal requirements, Hazardous Waste On-site Management, Compliance with Toxic Emission, Compliance with non-toxic & Noise Pollution, Environmental Monitoring and Reporting, Best Environmental Management, Complaints Management and Community Relation and the CSR of the company were assessed for a period of three (3) years (2009–2011). The rating and score of each of the seven (7) criteria of the Akoben audit were compared with the Akoben audit criteria limits as shown in Fig. 1 to draw a conclusion.

3.1. Legal requirement criteria compliance

The scores and ratings in the legal requirement criterion were found to have met the expected Blue rating and the 100% score limit. This is presented in Fig. 2 for the three years.

The company had no documented or implied issues with legal requirement compliance throughout the years under review, since the company complied with the Environmental Assessment Regulation LI 1652. This also implies that the company submits its Environmental Management Plan annually, which gives details of the company's operations to Ghana's EPA. It is unsurprising that the company complied with this criterion throughout the three-year period because it is a necessary condition for the renewal of their environmental permit. The aim of the submission of these documents is to ensure that the activities of the mine are carried out in an environmentally sustainable manner.

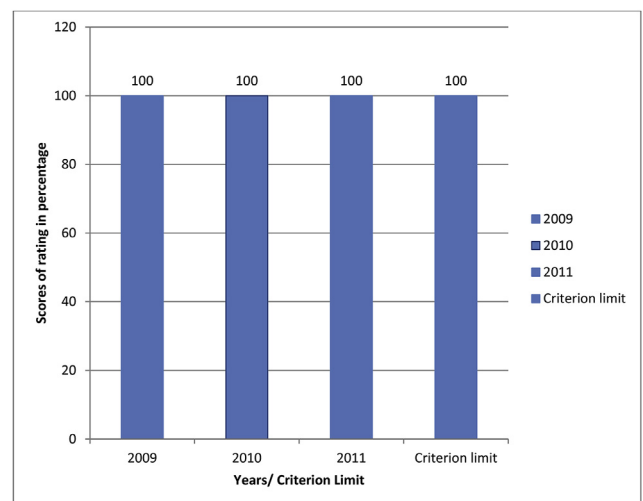


Fig. 2. Annual Legal Requirement Criterion Ratings and Scores for the three years.

3.2. Hazardous on-site waste management criteria compliance

The assessment of compliance with criteria for hazardous on-site waste management shows that the rating and score of the 2009 Akoben audit did not meet the expected Blue colour rating and the 100% score limit. However, hazardous on-site waste management improved and met the Blue rating and the 100% score limit in 2010 and 2011.

The company had a Red rating and scored 33% in 2009 (see Fig. 3) due to unacceptable hazardous waste storage cases. There were instances of tailing spills and process water discharge from a pump station that entered the stream of a fringe community and the failure of the company to identify and manage the risks and

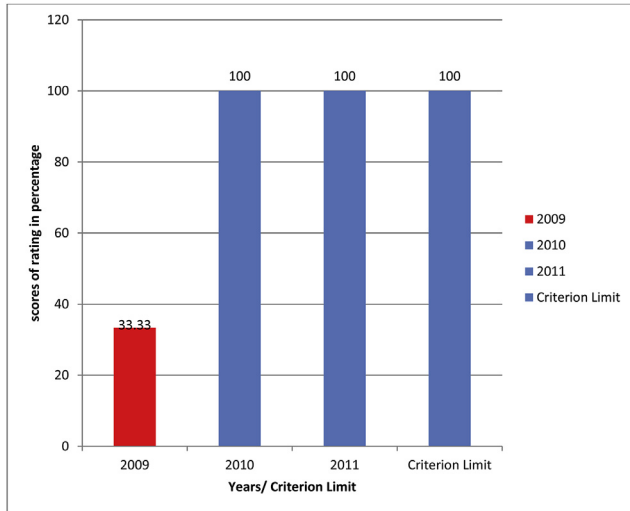


Fig. 3. Annual hazardous waste on-site management criterion ratings and scores for the three years.

impact of tailing spillage.

The findings show that the Akoben programme has improved the environmental practices of the company with regards hazardous on-site waste management. The company implemented the environmental management practices recommended by the Akoben audit team and consequently in the 2010 and 2011 audit years the company had a Blue rating with a score of 100% (see Fig 3). All hazardous chemicals and reagents used by the company, which include sodium cyanide, sulphuric acid, xanthate and aerophine, were properly stacked, labelled and stored in a shed. Also, the hazardous waste generated was classified into solid (oily laden hydrocarbon materials) and liquid (washing bay effluent and hydrocarbon waste). The areas which generate both liquid and solid hazardous waste on the mine site were managed in line with best practices.

3.3. Compliance with toxic emission criteria

The company received a Red colour ratings from the Akoben audit conducted on the toxic emission criteria as depicted in Fig. 4,

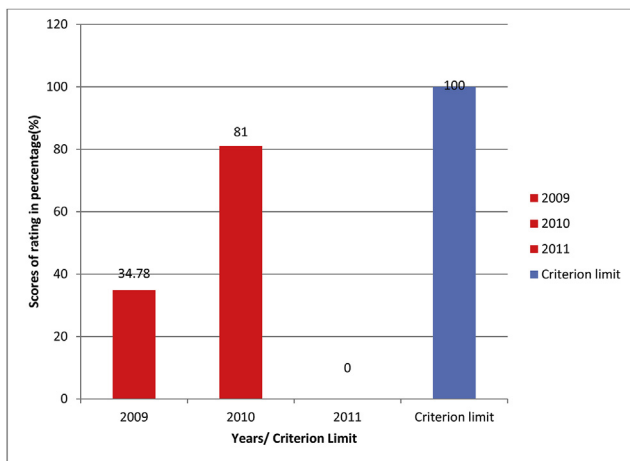


Fig. 4. Annual toxic emission criterion ratings and scores for the three year period.

for the three-year period under review. Throughout the review years from 2009 to 2011, the highest final score was only 81%. None of the toxic emission criteria for the three-year period met the acceptable Blue rating and the 100% score limit. The worst rating was in 2011 which was 0%.

The findings show that the mining company was unable to manage toxic substances emitted and discharged into the environment to the required standard. Toxic emissions often contain hazardous chemicals that are harmful to human health and which industries must not allow into the environment. The company received a red colour rating for the toxic emission criterion because of the violation of environmental quality standard for some toxic parameters in the effluent discharged by the company. The company exceeded its environmental quality standards for arsenic, cyanide and pH in their effluent over the 12-month period.

Also, the 0% score of toxic emission discharge in 2011, (see Fig. 4) could be due to the inconsistency of the environmental quality standards used for water and effluent quality measurements. The standard guidelines used for water and effluent quality in the three years (from 2009 to 2011) were different. In 2009, the EPA effluent guideline was used as the standard for effluent parameters, and in 2010 the company's control points/geological background was used in the assessment, whereas in 2011 international standard guidelines were used for the basis of the effluent measurement and these guidelines had different values for each parameter. Research conducted in Changshu city in China by Zhang (2010) confirmed that the changes in standards greatly influenced the environmental performance results of firms. In addition, Akoben rating rules put more emphasis on some criteria than others based on the negative effect each had on the environment. For instance, the software system has been designed to ensure there is zero tolerance for non-compliance to legal and hazardous waste management. Thus, even if a company complies 99% with both legal and hazardous waste management requirements, the system would still rate the company Red (EPA Ghana AKOBEN, 2010). This explains why a Red colour rating was given to this criterion even in 2010 when a score of 81% was recorded.

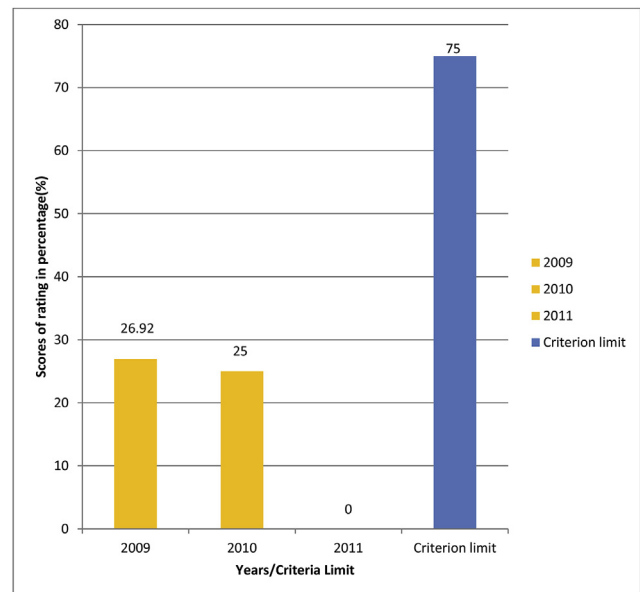


Fig. 5. Annual non-toxic and noise pollution criterion ratings and scores for the three year period.

3.4. Non-toxic and noise pollution criteria compliance for the three-year period

In Fig. 5, the company did not meet the non-toxic and noise pollution criterion Blue rating and its score was 75%. It failed to comply with both standards for conventional air pollutants and non-toxic effluent quality parameters over a 12-month period.

The non-toxic and noise pollution criteria of the Akoben audit conducted within the review period led to an orange rating for the Akoben audits conducted on this criteria for the three years and the scores were only able to reach about 1/3rd of the required score of 75% for 2009, 2010 and were as low as 0% in 2011. Failure to comply with both standards for conventional air pollutants and non-toxic effluent quality parameters over a 12-month period could be due to the inconsistency of the environmental quality standards used for water and effluent quality, as well as inadequate facilities available for the monitoring of this parameter. Although, conventional air pollutants and non-toxic parameters do not have adverse effects on humans, their increase in non-toxic effluent quality parameters, such as total suspended solids (TSS), conductivity, colour and biological oxygen demand (BOD) and, oil and grease have an effect on organisms living in bodies of water. According to Ntengwe (2006), high conductivities result in the reduction of dissolved oxygen in water and fish die due to the sudden decrease of oxygen in rivers.

Also, ambient air quality is affected when conventional air pollutants, such as particulate matter (PM) content, increase. Atmospheric particulate matter (PM) exerts its greatest effects on vegetation and ecosystems and its increase may reduce radiation interception by plant canopies, thereby reducing photosynthesis and precipitation. In addition, fatty organic materials from industries can cause environmental pollution. When large amounts of oil and grease are discharged in to water, they increase the BOD level in the bodies of water and float on the surface causing aesthetically unpleasant conditions (Bedu-Addo & Akanwarewiak, 2012). A high level of BOD will lead to oxygen depletion, which can have severe consequences on fish life in water bodies (Osibanjo, Daso, & Gbadebo, 2011).

3.5. Environmental monitoring and reporting criteria compliance

The researchers also analyzed the environmental monitoring and reporting criteria compliance. Here the frequency with which water, noise and air quality was monitored from three sampling stations, including compliance monitoring, surveillance monitoring and control/reference point monitoring. The result of this monitoring and reporting criteria compliance led to an Orange colour rating for each of the three years under review. Very low scores were recorded throughout the period with the lowest (2%) recorded in 2010. The best score was in 2009 which was followed by a sharp drop in 2010 before it again improved to 20%. This is illustrated in Fig. 6.

Fig. 6 shows the frequency with which water, noise and air quality was monitored from three sampling stations, which included compliance monitoring, surveillance monitoring and control/reference point monitoring (EPA Ghana AKOBEN, 2010). Compliance monitoring points are designated as those locations where the responsibility for maintaining environmental quality lies with companies. In comparison, the environmental quality of surveillance points is not the primary responsibility of companies, but these points are monitored to observe if there are any trends that could be linked to a company's operations. Control/reference points are totally outside the zone of the environmental impacts of companies and these points are monitored in order to understand the background conditions of neighbouring locations and to conduct

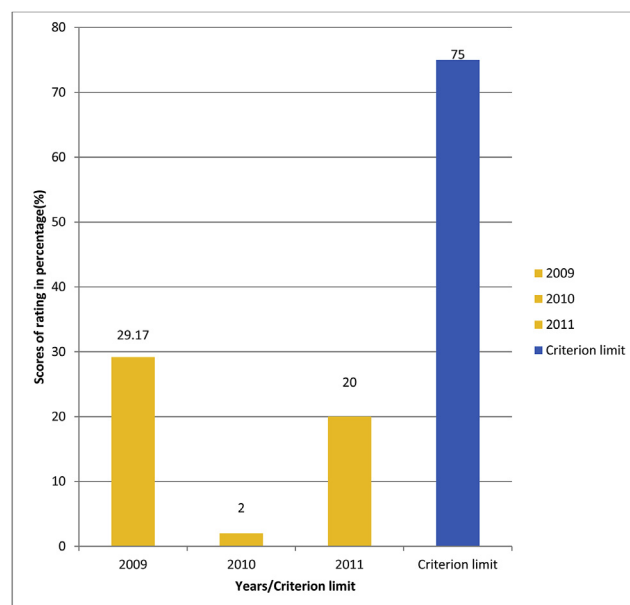


Fig. 6. Annual monitoring and reporting criterion ratings and scores for the three year period.

various comparative analyses (EPA Ghana AKOBEN, 2010). The company did not meet the requirement of the monitoring and reporting limit which has a general score of 75%. It failed to comply with the required frequency of monitoring and reporting of the company's effluent quality as well as water and energy usage to the Ghana EPA every month. This process makes companies accountable for environmental issues to EPA.

As shown in Fig. 6, all were rated Orange, but not red, as Orange is the worst colour rating for this criterion (EPA Ghana AKOBEN, 2010). This rating might be due to the minimal impact that the monitoring and reporting of effluents has on humans and the environment, compared to other criteria. The company's non-compliance under this criterion could be because of inadequate monitoring and reporting rate of water usage, energy usage, effluent quality, air quality and noise. Hence, the frequency of and time for reporting over 12 months were inadequate. This could be

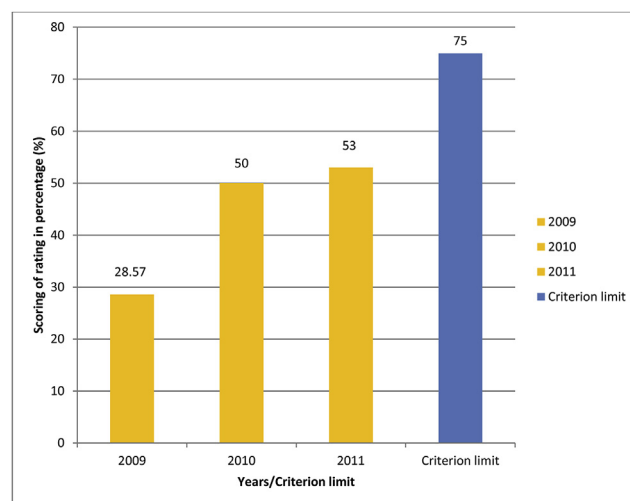


Fig. 7. Annual best practice and environmental management criterion rating score for the three years.

due to the discrepancies in the company's sampling and monitoring location.

3.6. Best practice environmental management criterion compliance for the three-year period

Fig. 7 shows the results of the Best Practice Environmental Management criterion of the Akoben audit conducted in 2009, 2010 and 2011. The company received an Orange rating conducted on this criteria over the three-year period and the scores for 2009, 2010 and 2011 were 28.57%, 50% and 53% respectively. These ratings and scores were all below the expected Blue colour rating and the 75% score limit even though it showed a trend of improvement.

The best environmental management practices of the Akoben audit for mining involves measures put in place in the management of the companies' pit and waste dumps, types of soil used to backfill mined out pits, types of grasses used to rehabilitate the land as well as proper measures implemented to prevent tailing spillage (EPA Ghana AKOBEN, 2010). As can be seen in Fig. 7, the gold mine failed to comply with this criterion. The company had 24 waste rock dumps, which were at different stages of rehabilitation. These waste rock dumps have slopes that are not battered between 20°–30° and had lift heights greater than 20 m, which was provided in the design and needed to be implemented during construction. In addition, most of the waste rock dumps were constructed with no public safety and post reclamation end-use consideration. The company is now committed to rehabilitating 13 waste rock dumps within the next 3 years (Environmental Protection Agency, 2010).

Additionally, the company did not use High Density Polyethylene (HDPE); a pipe material which is recommended by Ghana EPA for industrial use. It serves as a medium for discharges to prevent spillages entering the environment because of its toughness and flexible nature, which enables it to withstand deep fill heights and extended loads. In managing reforested areas, agriculture lands, plantation and forest resources the company failed to create favourable conditions for the return of fauna and the company had not undertaken any meaningful rehabilitation of disturbed areas as agricultural land hence no food crops were harvested and analyzed. Similarly, the combined topsoil and subsoil cover on waste dumps and backfilled pits was not of the recommended level of 0.5 m thickness (Environmental Protection Agency, 2010). The failure to comply with this best management criterion was a result of the company directly discharging tailings into the environment, collapsing waste rock piles, destroying wildlife habitats and contaminating agricultural lands. These non-compliances would not allow the company to enjoy the benefits of best management practice, such as less resistance from key stakeholders, avoidance of harmful environmental and social impacts, and lower financial liabilities (Environment Australia, 2002).

3.7. Complaints management and community relation criteria compliance

Public complaints serve as an important source of feedback on the effectiveness and impact of government policies. The Akoben rating methodology places considerable importance on environmental complaints received from the public, and views this as a channel for equalising the situation of asymmetric information between companies and regulators. The Akoben audit conducted on the Complaint Management and Community Relations criterion for 2010 had a score of 67% which means it did not meet the expected Green rating and the 100% score limit. However, the criteria ratings and scores for both 2009 and 2011 were 100% (see Fig. 8).

Community complaint management was inadequate in 2010,

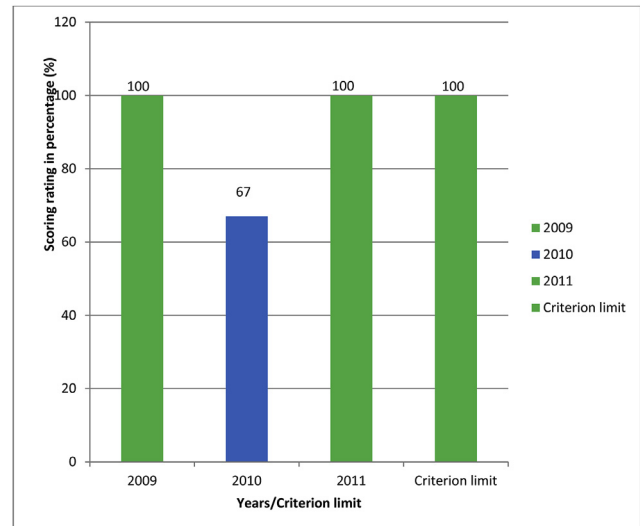


Fig. 8. Annual complaint management and community relations criterion ratings and scores for the three years.

because the company submitted only monthly returns for 5 out of the 12 months and out of a total of 157 community complaints received, only 105 of the complaints were resolved. Since the Akoben rating methodology recognises that environmental complaints are not always environmentally valid, frivolous complaints were discarded and genuine complaints were registered (Allotey et al., 2011).

From the analysis, it can be seen that the company took steps to implement recommendations from the Akoben audit and in 2011 it had a Green rating and a score of 100% as shown in Fig. 8. The impact of the audit under this criterion was positive and this could be largely attributed to measures put in place and the willingness of the company to solve public complaints. The company has a department that solely deals with community welfare, i.e. the Community & Social Development Department. It provided a complaint log book that keeps records of all complaints in order for them to be addressed. Also, the company regularly and accurately reported on all the received, resolved and unresolved complaints to the EPA over the 12-month period in 2011.

3.8. Community relation and social responsibility criteria compliance

“Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large” (Holme & Watts, 2000). The researchers checked how the organization was performing with regards to this criterion. The community relations and social responsibility (CSR) criteria ratings and scores were Gold and 100% over the three-year period (see Fig. 9) (see Fig. 10).

The company performed well under Corporate Social responsibility (CSR) in the Akoben audit criteria with a score of 100% and a Gold rating. The outstanding performance under this criterion could be due to the implementation of the company's CSR Policy that contributed to sustainable development. It supported local training and the empowerment of communities, e.g. the mine undertook an apprenticeship training programme to impart employable skills to local artisans and polytechnic certificate holders. Moreover, the company implemented malaria control

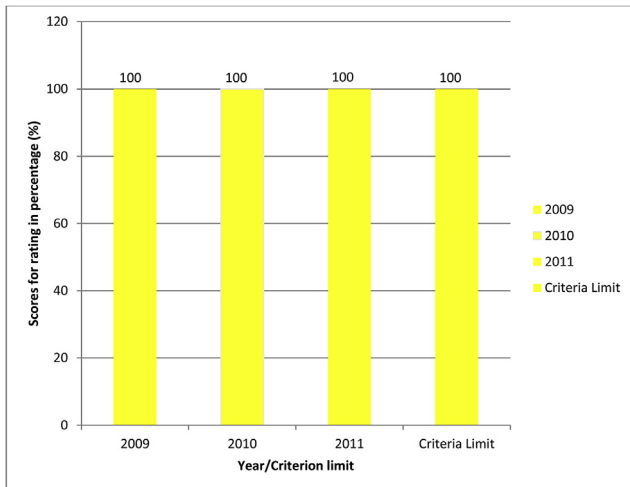


Fig. 9. Annual community relation and social responsibility criterion ratings and scores for the three year period.

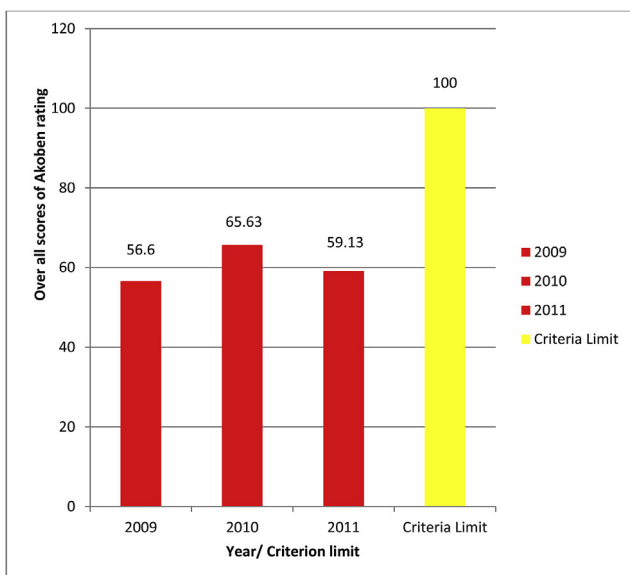


Fig. 10. Overall Akoben audit performance ratings and scores of a gold mining company.

projects within the communities to prevent malaria and built a hospital within the community to improve the health of the inhabitants. It has also resettled communities and paid in full their electricity and water charges. The company's 2010 Akoben audit report card confirmed that there had been consultation with community members before any project began, this is a key requirement of CSR. For example, there were consultative meetings with community leaders before the construction of two vehicle bridges over a river between two villages close to the company.

3.9. Overall Akoben audit performance

The final ratings and scores were all below the expected Gold rating and the 100% score limit. The Akoben audit conducted in 2009 had the lowest score of 56.60% and the one conducted in 2010 had the highest score of 65.63% (see Fig. 10). The decrease from 65.63% in 2010 to 56.60% in 2011 could be attributed to the non-compliance of certain criteria, such as hazardous and toxic waste

emission discharge and non-toxic and noise pollution, in 2011. The system is made in a way so that there is no tolerance for hazardous and toxic waste emission discharge, hence its violation automatically leads to a red rating. Overall, Red ratings were recorded for the three years under review (see Fig. 10).

The following criteria: toxic emission, non-toxic and noise pollution, monitoring, reporting, and best practice environmental management did not meet the Blue rating and the 100% score limit for each year the audit was conducted for the mine site. Similarly, the hazardous waste on-site management and complaint management, and community relation criteria did not meet their respective blue and green colour ratings and the 100% score limit for 2009 and 2010 respectively. These non-compliances confirm that the company has not done enough to meet the commitments they made in their environmental impact assessment (EIA) at planning stage.

3.10. Perceptions of key stakeholders on the environmental performance rating and disclosure (Akoben) programme

The researchers made an in-depth inquiry into the perceptions some key stakeholders have on the Akoben concept, environmental performance rating rules/criteria and disclosure of the Akoben programme. The range of responses obtained from the different stakeholders during interviews on their perceptions are presented below.

3.10.1. Perception of the impact of the Akoben concept

The results indicate there has been improvement in the environmental performance of some mining companies. Some mining companies now pay more attention to environmental issues, following the introduction of the Akoben programme. There has been some improvement since the initial poor environmental performance recorded in the first Akoben audit by all the mining companies, which has seen some mining companies move from a red rating to orange or blue.

(...) the companies were beginning to rectify legal documents; waste management practices were being improved; self-regulation had improved; companies were addressing public complaints and increasing attention to corporate social responsibilities; and best environmental management practices have been adopted to improve upon the environmental performance of their operations – (Senior Programme Officer, EPA, Akoben, 2014).

The EPA Akoben team, therefore, encouraged other companies to follow suit and sent a message to those that had increased in their ratings that there was still room for improvement. Also, the Akoben team highlighted that:

(...) the implementation of the Akoben programme has encouraged a lot of mining companies in the renewal of their environmental permit on time (Programme Officer, EPA, Akoben, 2014).

This environmental permit is a legal requirement under Environmental Assessment Regulation, LI 1652, 1999 that states that “no person shall commence an undertaking unless prior to the commencement, the undertaking has been registered by the Agency and an environmental permit has been issued by the Agency in respect of the undertaking” (Environmental Assessment Regulation, 1999).

In general, respondents viewed the Akoben programme as an

important tool for evaluating environmental and social performance. They acknowledged that issues such as environmental complaint management, CSR and waste management can improve with the Akoben programme. This was substantiated by the mining company's Akoben team who claim that, their own operations have improved and have become more environmentally friendly. Thus, the programme ensures continuous compliance with regulatory requirements, pollution prevention, improvement in hazardous waste on-site management and the adoption of best management practices, including the avoidance of tailing spillage. Generally, self-regulation by the mining companies was emphasized as an important tool of this programme.

In effect, the stakeholders observed that there has already been some positive impact on the environmental performance of some mining companies since its introduction. A respondent from the Chamber of Mines said:

Implementation of the programme has made mining companies more concerned about the environment, because all companies were rated red at the first disclosure and some have improved upon the red rating (Senior staff member, Chamber of Mines, 2014).

This view from the Chamber of Mines, a key stakeholder, is critical to the success and sustainability of the Akoben programme itself. In fact, member mining companies may well agree and support the programme based on positive feedback from their mother union. Despite the positive perception about the Akoben programme, the Chamber of Mines bemoaned their lack involvement in the programme's design. Even though a formal presentation on the programme was made to them by the EPA.

3.10.2. Perception of the rating criteria/rules

According to the Akoben team, the software system rated companies' environmental performance based on the seven criteria and has been programmed to ensure zero tolerance for non-compliance to legal breaches and breaches of hazardous on-site waste management. These two criteria are critical and would have significantly negative impact on the environment in the case of non-compliance. The EPA therefore still assigns a red rating to a company even if there was 99% compliance with both legal and hazardous on-site waste management criteria. Furthermore, "the final rating assigned to a company was based on the company's worst performance". The Akoben team members explained that this was done to help companies identify their environmental issues and take mitigation measures to correct them.

On a similar note, it was observed that respondents were satisfied with the rating criteria because it outlined the environmental issues facing industries, which helped companies to identify problem areas. Nonetheless, there was some concern around how the stringent criteria also negatively impacted companies' ratings especially regarding compliance with toxic emission and hazardous waste onsite management. Therefore, some respondents argued that the rating would be very useful if the EPA made room for adjustments by considering historical legacies. Moreover, it could use different rating criteria and environmental quality standards to rate old and new mining companies. The study observed varied levels of satisfaction from respondents about the Akoben rating criteria, with some requesting a review of the criteria because they deemed them too stringent.

3.10.3. Public disclosure of Akoben results

It was found that Akoben followed a two-step procedure for disclosing the results to the public and the media. The first step was internal disclosure where the results of ratings are privately shared

with companies. If there were issues that required further review, the companies would inform the Akoben team in writing. Upon receiving the feedback, the team would review the ratings and re-send the results to the company. Then the final ratings were disclosed to the public on World Environment Day every year. This procedure was commended by some respondents, as it gave them a chance to filter any information that was incorrect or inaccurate. Additionally, the respondents noted it could force compliance in subsequent assessments since its publicity made performance increase natural. A respondent said:

(...) disclosure of companies' results could also improve environmental compliance rate and reduce pollution, since it informs the public how well these industries were performing in terms of the environment and its impact (Senior Programme Officer, EPA Akoben, 2014).

Moreover, respondents emphasized the importance of the public's awareness of what was happening within their environment. They however, cautioned that the public should be educated to enhance their understanding of the Akoben results to avoid any misinterpretation. This is necessary because, it makes all parties appreciate the audit results better. Generally, the audit should therefore be viewed as a tool for correction, improvement, and commendation and not as vindictive as it is currently seen.

4. Conclusions

The study showed that although the overall performance of the mining company did not meet the required standards for each of the three years under review, the company performed very well in the areas of Legal requirements, Hazardous on-site waste management, Community complaint management and CSR. In addition, there is optimism concerning the impact of the Akoben programme on the environmental performance of companies and that it can be beneficial for environmental sustainability in Ghana in the future. Moreover, the emphasis on self-regulation means efficiency can be maximized if it is used appropriately as a complementary tool within a strong legislative framework that can ensure obligatory compliance by stakeholders. This study was done in one mine. Thus, the results may not be applicable to all mines in the interpretation of the Akoben programme as an environmental auditing tool.

Conflicts of interest

None declared.

Ethical statement

Authors state that the research was conducted according to ethical standards.

Funding body

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