

Assessing Sustainable Development in the Mining Industry in Ghana: A Question of Corporate Perspective

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Abstract

The main objective of this paper is to examine sustainable development in the corporate mining context, and provide some guidelines for mining companies seeking to operate more sustainably. There is now a burgeoning literature that examines sustainable development in the context of minerals and mining, most of which is concerned with sustainability at global and national scales. What is often challenging to ascertain, however, from these numerous perspectives on sustainable mineral extraction, minerals and metals recycling, environmental management, and social performance, is how sustainable development applies to mining companies themselves, and what steps a mine must take in order to improve the sustainability of operations. Since mining processes have the potential to impact a diverse group of environmental entities, and are of interest to a wide range of stakeholder groups, there is ample opportunity for the industry to operate more sustainably. Specifically, with improved planning, implementation of sound environmental management tools and cleaner technologies, extended social responsibility to stakeholder groups, the formation of sustainability partnerships, and improved training, a mine can improve performance in both the environmental and socioeconomic arenas, and thus contribute enormously to sustainable development at the mine level.

Key words: Sustainable development; Sustainability; Mining; Mines

1. Introduction

The main issues surrounding sustainable development in the mining industry is a drawn-out one, which has long gained considerable attention from a wide range of parties. The Brundtland Commission, in its landmark report *Our Common Future*, defined sustainable development as “meeting the needs of the present without compromising the ability for future generations to meet their own needs” (WCED, 1987). This definition, however, fails to outline an effective sustainability framework for any industry to follow. The Brundtland Report emphasizes that no single blueprint for sustainability exists and that the ways in which countries achieve sustainable development will vary among the different economic and political systems around the world (NRC, 1995), prompting a number of academics, industrialists and government employees to provide personal viewpoints on the applicability of sustainable development to mining. Consequently, the body of literature on this subject now contains a wide-range of interpretations, and increasingly it is becoming unclear as at how exactly mines can contribute to sustainable development.

Although many have defined and applied the concept differently (see Fig 1), sustainable development, generally, is the combination of enhanced socioeconomic growth and development, and improved environmental protection and pollution prevention, it first received global endorsement as a management and developmental strategy at the highly popularized United Nations Conference on Environment and Development (UNCED), commonly known as the “Earth Summit”, in Rio 1992, where 116 heads of state or government, 8000 delegates from 172 countries, and 3000 accredited individuals from nongovernmental organizations (Pezzoli, 1997) gathered to discuss practical strategies for tackling pressing global problems. Sustainable development has since become a key focus of planning, environmental protection, and remediation efforts worldwide, and several academics and industrialists, in an attempt to operationalize the concept, have developed a number of policy frameworks, indicator sets, and management guidelines for use by governments and businesses

2. Questioning sustainable development in the corporate mining context

As already indicated, the literature has failed to outline precisely how a mine can contribute to sustainable development. Theories pertaining to sustainable mineral extraction are not directly relevant to the sustainability agenda for an operating mine since management invests knowing that it is a temporary project that will function only as long as it is economically viable to extract and process mineral from ore. Of the authors that have provided some perspective on mine sustainability, few have integrated both key industrial environmental and socioeconomic issues into analysis, or explained what measures a mine must take to put sustainable development into practice. We maintain that sustainable development in the corporate mining context requires a commitment in continuous environmental and socioeconomic improvement, from mineral exploration, through operation, to closure. Both the environmental and socioeconomic sustainability agenda for mines are examined in this section of the paper.

2.1 Environmental agenda for mines

Minimizing adverse environmental impacts is an important goal for all industries keen on contributing to sustainable development. Every industry, in addition to generic environmental complications, faces industry-specific challenges and requires careful planning, tactical investment, and strategic management to overcome. In the case of mining, the environmental problems resulting from operations are well known (see Table 1), particularly because the mining industry attracts considerable public attention with its ongoing need to obtain planning permission to take land out of other uses and to extract minerals (Richards, 1996) as well with its nuisance effects, such as noise, dust and traffic. To contribute to sustainable development, a mine must minimize environmental impacts throughout its lifecycle, from exploration, through extraction and refining, to reclamation. This is best accomplished through effective environmental management.

2.2 Socioeconomic agenda for mines

Principle 1 of the Rio Declaration proclaims that “Human beings are at the centre of concerns for sustainable development” and “are entitled to a healthy and productive life in harmony with nature” (Epps, 1997). Thus, another essential element of sustainable development is extended socioeconomic responsibility, which Warhurst & Mitchell (2000) define as “the internalization of social and environmental effects of operations through proactive pollution prevention and social impacts assessment so that harm is anticipated and avoided and benefits are optimized”. This simply requires industrial operations to address the needs of all stakeholder groups throughout the various stages of operation. There is now a growing expectation for corporations to operate in accordance with community groups that are potentially affected by industrial operations, and to address the needs of stakeholder parties when devising corporate policies. In fact, since the success of so many industries – particularly those of the primary sector – depends so heavily upon the contributions and input from stakeholder parties, and the cooperation of surrounding communities, it makes practical business sense to account for the needs of these groups through appropriate corporate policies.

For a mine, since a number of the cultural aesthetic, and natural resources critical to the well being of society can be adversely impacted by activity, it is crucial that the needs of secondary parties be addressed from the outset. This can be a challenge of monumental proportions, since many external groups perceive mining activities as being heavily environmentally and ecologically damaging, in spite of what effective preventative measures are in place. Further, accommodating the demands of a community can be highly costly and time consuming, requiring that the mining company holds a number of public meetings and consultations, to issue significant amounts of corporate literature, and to hire outside consultation assistance. Some recommended strategies for managing the key socioeconomic issues in the industry include (Epps, 1997):

- Gathering local community perceptions on mine development
- Determining beforehand the likely effects of development on normal evolutionary process within the community (way of life, relationships, behavior, and social resilience)
- Identifying the possible effects of the project on religious or historic elements of the community’s way of life
- Determining the likely participation of local people in the mine project
- Assessing whether there is a need for relocation of the population as result of the mine project
- Determining whether or not there is potential community conflict
- Calculating economic costs of protecting the community’s cultural values
- Identifying beforehand the potential project benefits and negative impacts to the community

A mine can provide a number of economic benefits to a community, including providing employment to residents, making use of local services and contributing funds to regional developmental projects (Dorian & Humphreys, 1994). In terms of employment, it is critical not only for the mine to hire locally, but to help residents seek alternative employment once extraction and mineral processing activities have ceased. This is imperative considering that the livelihood of so many communities depends upon mineral production. For example, as McAllister et al (1990) explain, in Ghana, mining has long been regarded as the backbone of many regional economies, particularly in rural and remote areas, where it often serves as the sole source of income. Particularly required in situations like these is assurance that residents have alternative employment, or at a minimum, the skills required to work in other industries following mine closure. To minimize such problems, mines, while still in operation, can employ the following strategies (adopted from Rocha & Bristow, 1997):

- Implementation of re-skilling programs: the general functional literacy level of mine labourers is improved, and workers are trained in additional industrial areas to ensure that they are marketable in the job market once the mine has closed.
- Establishment of small and medium sized enterprises: to establish small-and medium-sized businesses independent of the mine for the purposes of attracting entrepreneurial operations that will survive after the closure of the mine.
- Development of Education and Training Facilities: since every mine demands people with good technical skills, the establishment of technical colleges thus provides key business opportunities; the mining company can

also provide financial assistance to locals in the form of academic scholarships and bursaries, offer certification programs, or apprentice programs to further enhance skill levels.

The next section of the paper outlines a series of steps that would lead to improved sustainability at mines. Two case studies of AngloGold Ashanti and Anglo Platinum Limited are then presented illustrate how two of Africa's leading mining sustainable development practitioners have operationalize the concept.

3. Interrogating sustainable development guidelines for mines

Once mine managers and employees fully conceptualize the merits of operating sustainably, and how sustainable development applies in the corporate mining context, the transition will not be difficult. What management must not do is follow too closely the sustainability guidelines outlined in government mining documents, since many do not clearly specify how mine properties can contribute to sustainable development, or outline the necessary steps for improved mine sustainability. Often, governments have implemented sustainability policies that cover a wide range of mineral and mining activities such as extraction, processing, recycling, and substitution, each of which has a significantly different contribution to sustainable development. Take, for example, Ghana's Environmental Action Plan Volume 2, which, by building upon the Brundtland definition, attempts to define sustainable development in the context of minerals and metals, and address a number of issues relevant to mining such as reclamation, land access, protected area preservation, and aboriginal rights (Shinya, 1998). The Policy, overall, is monumental in that it represents Ghana's first national attempt to advance sustainable development in the mining context, but it fails to provide accurate sustainability guidelines for mining companies, despite one of its six major objectives being "to provide a framework for the development and application of science and technology to enhance the industry's competitiveness and environmental stewardship" (Government of Ghana, 1996). It supports pollution prevention, risk assessment, and life-cycle management, but does not identify which practices mines should adopt

3.1 Improved planning

The needs of the environment, communities, and stakeholders need to be addressed from the outset. Since contributing to sustainable development involves setting goals for continuous improvement, corporate policies must be rewritten to accurately identify a mining company's short and long-term environmental and socioeconomic goals. Revamped corporate policies and improved goal setting is a fundamental starting point for the mining company, because it demonstrates to stakeholders a clear corporate commitment, and helps motivate mine employees to work toward new and improved goals. As Cooney (2000) explains, a sustainable mining policy is the first step to reconciling mining with the sustainable development agenda, as it helps align operations with governmental objectives, create a basis for dialogue, and clarify corporate sustainability objectives. As operations progress, a policy can then be used to ascertain whether performance is consistent with the company's sustainable development goals. The mine could also have in place corporate statements and complementary policies that address more specific areas of mine sustainability. Examples include an occupational health and safety policy, a medical policy, mine reclamation policy, an environmental assessment policy for property transfer, environmental health and safety policy, governmental affairs audits, and a mining affairs policy.

Improved planning for sustainable development also requires a mining operation to develop practical plans for closure, an issue often overlooked from the outset. Environmentally, a mine must plan to ensure that: Adequate water supplies, clean air, and productive land are left available to future operations; A health environment is made available to future miners; Opportunities exist for future land owners; Post abandonment risks are minimized. Further, since mines are typically located in areas where they represent the main economic activity, following abandonment, staff must (Rocha & Bristow, 1997; Warhurst et al, 1999): Support local training/educational institutions; Ensure ongoing training and reskilling of workers; Commit to providing assistance with job search facilities; Account for compensating workers and families to cope with readjustment and temporary unemployment. Addressing each of these environmental and socioeconomic considerations would be considered best practice for mine closure.

3.2 Improved environmental management

Once the important organizational groundwork has been laid, mine management can then focus on implementing tools and technologies that lead to improved efficiency in operations. The first step, however, is improving environmental management practices, which not only helps improve the effectiveness of operations but also enables environmental technologies to be more readily implemented. This is accomplished by adopting a number of environmental management tools, the most important of which include (Garrod & Chadwick, 1996): Environmental reviews; Environmental accounting; Environmental reporting; Environmental audits; Environmental policies; An environmental management system (EMS) and Life-cycle assessments. For example, mine environmental audits and reviews can serve as an effective means for assessing risks (Bunch and Garr, 1990), including health, ecological and ecotoxicological impacts. In another case, an environmental management system (EMS), which is a set of organizational procedures, responsibilities, processes and necessary means to

implement environmental policies (Begley, 1996), can assist a company in identifying opportunities for more effective use of resources, and to better address constraints and risks (Warhurst & Noronha, 2000)

3.3 Addressing the needs of communities and stakeholders

Shifting to the socioeconomic arena of sustainable development, given the wide range of stakeholders that are potentially affected throughout the life of a mine, in combination with the high degree of public awareness of mine impacts, it is becoming increasingly important for mining companies to address the needs of stakeholder groups in policy-making processes. In fact, improved communications is proving integral in enhancing business relations in all industries, and extended corporate responsibility is now a growing expectation within the public domain. By demonstrating a commitment to community residents, shareholders, external stakeholders, and employees, industry – in this case, mining – will experience an increased ease with which to operate. Significant social responsibility can be achieved in the industry if individual mines concentrate on improving communications, community relations, and internal management strategy.

3.4 Formation of sustainability partnerships

Finding cooperative approaches for engaging with the rest of civil society is a key to perpetuating improved sustainable development in industry. This is best accomplished through the formation of partnerships with influential groups and organizations such as academic establishments, churches, research institutions, NGOs, non-profit organizations, governmental bodies, and voluntary associations. Labonne (1999) outlines three major strategies for mine management keen on forming sustainability partnership: Advocating good governance in developing countries with potentially rich mineral endowments by supporting efforts to increase technical assistance in the mineral resources field; Forming partnerships with government and external stakeholders, and taking steps to reduce social exposure; and Creating a socially proactive culture within the industry by reaching out to stakeholders.

3.5 Emphasis on training

Chapter 36 of Agenda 21 contends that training is “one of the most important tools to develop human resources” and to “facilitate the transition to a more sustainable world” (Hale, 1995) for a mine to operate more sustainably, awareness education is needed at all industrial levels, from the decision makers involved directly with governments and other industries, through professionals, to machine users and operators. Mine employees must be provided with information about key corporate environmental and socioeconomic issues, company goals, and the mine development process. Mining companies must take initiatives to educate mine employees. The need for increased educational resources is evident in several mining regions around the world. For example, in a number of small-scale gold mining areas in developing countries, where mercury is still used as a leach reagent in spite of its toxicity, a major information gap exists because miners, particularly those using rudimentary techniques, have not been properly educated on mercury use and its associated environmental and health impacts.

Integrating these and similar coursework at mines would certainly lead to improved environmental and socioeconomic conditions. By following the six guidelines outlined in this section of the paper, mines could significantly improve environmental and socioeconomic performance and in turn improve the sustainability of operations. A number of mining companies worldwide have already achieved sufficient environmental socioeconomic improvement by following guidelines similar to those outlined above. Case studies of two such experiences in Ghana and South Africa are presented in the next and final section of this paper. Both have helped set a precedent for sustainability in the mining industry, and represent an adequate benchmark for mines striving to improve the sustainability of operations.

4. Two case studies in Ghana and South Africa

Sanchez (1998) observed that many major mining companies in the world, in an attempt to improve environmental performance, have integrated into their operations a number of highly effective environmental policies and formal documents, a well-trained staff for environmental matters, periodic environmental audits, improved stakeholder communication tools, provisions for mine decommissioning, and life-cycle assessments and ecobalances. More recently, these companies have become active in promoting corporate socioeconomic responsibility. Thus, there is now consensus building on both environmental and socioeconomic issues. In the discussions to follow, case studies of two of the industry’s leading sustainable development practitioners in Ghana and South Africa are presented to illustrate how sustainable development has been embraced at the corporate level.

4.1 Case study 1: AngloGold Ashanti (Ghana)

Headquartered in Johannesburg, South Africa, AngloGold Ashanti has 20 operations in 10 countries on four continents, as well as several exploration programmes in both the established and new gold producing regions of the world. The group’s operations are divided into the following regions: South Africa Region, Continental Africa Region, Australasia Region, and the Americas Region. AngloGold Ashanti employed 61,242 people, including contractors, in 2011 (2010: 62,046) and produced 4.33Moz of gold (2010: 4.52Moz), generating

\$6.6bn in gold income, excluding joint ventures (2010: \$5.3bn). Capital expenditure in 2011 amounted to \$1.5bn (2010: \$1.0bn). As at 31 December 2011, AngloGold Ashanti had an attributable Ore Reserve of 75.6Moz (2010: 71.2Moz) and an attributable Mineral Resource of 230.9Moz (2010: 220.0Moz). The main objective of AngloGold Ashanti's Greenfield exploration team is to make significant, high-value gold discoveries in new and existing regions, while Brownfield exploration focuses on incremental additions to known ore bodies and new discoveries in defined areas around existing operations. Total expensed exploration for 2011 amounted to \$313m of which \$98m was spent on Greenfield exploration, \$87m on Brownfield and \$19m on marine exploration. This includes \$109m spent on prefeasibility studies. The group's exploration programme, which covers Greenfield, Brownfield, and more recently, marine exploration, is conducted either directly or in collaboration with partners.

To address emerging interrelated socioeconomic and environmental issues, the company has developed a management framework and has produced an Environmental Health and Safety (EHS) policy that sets the guidelines for an EHS management system designed to achieve a consistency of approach, motivate continuous EHS improvement, and clearly set out expectations for joint ventures and partnership (Ashanti Goldfields Company, 1998). More importantly, the policy addresses the company's commitment to continuously improve environmental management practices and socioeconomic relations, and outlines a number of methods it is currently using to do so, including (Anglogold Ashanti, 1997):

- Implementing site-specific environmental, health, hygiene, safety and emergency response policies, management programs, and practices, with the aim of continuing improvement.
- Designing, operating, decommissioning and evaluating facilities to ensure compliance with government and company requirements, and to minimize risks to health, safety and the environment
- Training and equipping employees with the skills to achieve an injury-free and health workplace and to fulfill their environmental obligations
- Educating employees on practices to improve the environment, wellness and safety on and off the job
- Requiring contractors to implement practices consistent with company health, safety and environmental policies and procedures
- Encouraging conservation and pollution prevention measures
- Providing information and training for the safe handling, use, transport, and disposal of materials
- Communicating openly and on a timely basis with employees, the public, governments, and other stakeholders on activities involving environment, health and safety
- Researching processes, practices and technologies that will lead to improved environmental, health and safety performance
- Conducting regular environmental, health, hygiene, safety and emergency response audits, and implement action plans called for these audits
- Reporting regularly to the Board of Directors on environment, health, hygiene, safety and emergency preparedness.

The EHS has contributed significantly to the environmental management component of sustainable development at operations, but to address key socioeconomic concerns, Anglogold Ashanti has developed a **Statement on Community Responsibility** consisting of four core principles (Anglogold Ashanti, 2000): Respect the cultures, customs and values of individuals and groups whose livelihoods may be impacted by mining activities; Recognize local communities as stakeholder groups and account for their needs; Participate in the social, economic and institutional development of local communities; and Respect the authority of national and regional governments, and integrate activities with their development objectives.

5. Case study 2: Anglo Platinum Limited

Anglo Platinum Limited is the world's largest primary producer of platinum, accounting for about 38% of the world's annual production. The company, based in South Africa, was previously called 'Anglo American Platinum Corporation Limited'. Anglo Platinum expects to produce approximately, 2.9 million ounces of refined platinum in 2012. Most of the group's operations lie to the northwest and north east of Johannesburg. The majority of the company's operations take place in the Bushveld Complex, a large region that contains a range of mineral commodities including chromium, vanadium, magnetite and platinum group metals. Anglo Platinum Limited is one of the largest mining companies in South Africa. It has interests in a total of 16 operations worldwide, each of which has advanced environmental safeguards in place, and has established positive relations with stakeholder parties. As McAllister et al. (1999) explains, "Anglo Platinum Limited has gone a long way toward defining sustainability at the mine site". In February 1998, the company adopted a sustainability policy in which is stated:

Sustainability means the exploration, design, construction, operation and closure of mines in a manner that respects and responds to the social, environmental and economic needs of present generations and anticipates that of future generations in the communities and countries where we work. We are committed to demonstrating that through this policy we can contribute to long-term improvements in quality of life while acting as stewards

for the environment. (Anglo Platinum Limited, 1998). The South African Government, under the Ministry of Mines has set up a Mine Waste Management Act, generally, under which is also the South African Mining Waste Control Regulation. In this regulation, a person or a company that carries out a class of operation, activity, industry or work is required to hold a permit or approval under the Waste Management Act in respect of that activity. This act manages and includes a broad range of activities, including environmental problem assessment; oversight of facilities that generate air, water and hazardous waste pollution; air and water quality monitoring; clean-up of contaminated sites; and providing education, outreach, and technical assistance to businesses, local government agencies, and interested citizens. Anglo Platinum Limited has also made additional changes that have enhanced the socioeconomic sustainability of its operations, primarily through working in a collaborative manner with governments, the populous and non-governmental organizations. In another example, through sustainable development reporting, the company has improved communications with government bodies and external stakeholder parties on critical environmental and socioeconomic issues. It issued its first regional sustainable development report in 1998 and published another in 1999 based on performance in 1998. Finally, to further sustainable development research in its operations, Anglo Platinum Limited is supporting a research program on Environmental and Social Performance Indicators conducted by the Mining and Environmental Research Network based at the University of Johannesburg (Cooney, 2000).

6. Implications from the case studies

It is clear from their activities that both AngloGold Ashanti and Anglo Platinum Limited have improved the sustainability of mine operations, and in turn have helped set a precedent for sustainable development in the mining industry. Like the Government of South Africa, if the government of Ghana can actively invest heavily in the operations of the mining firms in the country in areas of waste management and disposal, sustainability could be achieved and the country, or the mining industry as a whole, can put sustainable development into practice. Again, by following the sustainability guidelines presented earlier in this paper, and implementing similar strategies to both AngloGold Ashanti and Anglo Platinum Limited, mines can sufficiently improve performance in both the environmental and socioeconomic arenas, and hence contribute significantly to improve sustainability in the mining industry.

7. Conclusion

This paper has attempted to bridge a major gap in the sustainable development and mining literature by clarifying exactly how sustainable development can be applied in the corporate mining context. Since the industry's operations have the potential to impact a wide range of environmental and socioeconomic entities, by committing to improved environmental performance and addressing the needs of stakeholders and community groups from the outset, mines can put the concept of sustainable development into practice. The paper has also offered guidance for mining companies interested in improving the sustainability of their operations. Six recommendations were made – improved planning, improved environmental management, cleaner technology implementation, increased stakeholder involvement, formation of partnerships, and improved training – that if followed, would help any mine improve and sustainability of its industrial practices. Finally, case studies of two mining companies, AngloGold Ashanti and Anglo Platinum Limited, were represented to illustrate further how governments mining companies can operationalize sustainable development. Now that we are in the 21st century, it is becoming increasingly important that mines, for the benefit of ecology, surrounding communities, governments, and its employees, continue to tackle pressing socioeconomic and environmental issues with improved strategy, and help put sustainable development into practice in the industry.

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Notes
 Note 1

- Environmental care “married” to development.
- Improving the quality of human life while living within the carrying capacity of supporting ecosystems.
- Development based on the principle of intergenerational inter-species and inter=group equity.
- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- An environmental “handrail” to guide development.
- A change in consumption pattern towards more benign products and a shift in investment patterns towards augmenting environmental capital.
- A process that seeks to make manifest a higher standard of living for human beings...that recognizes this cannot be achieved at the expense of environmental integrity.

Figure 1: Examples of definitions of sustainable development found in the literature. (Source: Barrow, 1999)

Note 2. Table 1: Examples of common environmental impacts from mining operations

Activity	Common environmental impacts
Water discharge	Acid Mine Drainage Heavy metals overloading
Dewatering	Ecological impacts, Sediment runoff, Effluent contamination, and Impact upon water resources
Smelting	Air pollution, Acidic deposition and Heavy metals contamination
Transportation	Noise pollution, Dust and sediment, Gaseous emissions, Oil and fuel spills, and Soil contamination
Mineral extraction	Erosion, Landform changes, Alteration of water tables Dust , and Vegetation and habitat destruction Aesthetics