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Research paper

Sustainable development in Ghana's gold mines: Clarifying the stakeholder's perspective

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ABSTRACT

Using semi-structured interviews and focus group discussions (FGDs), this study examined critical stakeholder's perceptions, experiences and competence in assuring the sustainable management of Ghana's major gold mines. The investigation was inspired by a synthesis of the United Nation's Sustainable Development Goals (SDGs) adopted by the global community in September 2015; it places human resource capacity at the center of a sustainability struggle between local and international businesses. The findings of this study encompass two opposing but interesting perspectives. On the one hand, the study showed that sustainable development is understood differently by stakeholders within the gold mining sector in Ghana, which is why gold mining companies employ different approaches in their pursuit of sustainability objectives. On the other hand, the study revealed that, as mining activities are similar across different mining companies, common understanding and operation of sustainable development in the country's gold mines is a more practical approach to sustaining mining operations. This study further revealed that to facilitate the effective implementation of sustainable development within Ghana's gold mines and to ensure its alignment with SDGs, a regulatory framework is required and this should be developed based on the input of stakeholders.

1. Introduction

Gold mining has been critical to the socio-economic development of many developing countries, particularly those in Africa and South America. Between 1493 and 1600, Ghana was the world leading producer of gold, contributing about 36% of the global output (see Bebbington, Abdulai, Bebbington, Hinfelaar, & Sanborn, 2018; Tuokuu, Gruber, Idemudia, & Kayira, 2018). For many researchers, the gold mining sector in Ghana is an exciting area to study because the country has been mining gold for over a thousand years (Hilson, 2002a). For the past three decades, gold mining has contributed significantly to Ghana's socio-economic development through revenue generation, employment creation, and an increase in foreign direct investment [FDI] (Tuokuu et al., 2018). However, gold mining also has exacerbated incidences of environmental degradation, including the pollution of rivers and lakes which serve as sources of drinking water for many communities (Akabzaa, 2009; Akabzaa & Darimani, 2001; Hilson, 2002b; Tuokuu et al., 2018). Also, some lands have been taken from indigenous people by the Government of Ghana and awarded as concessions to multinational mining companies, with little or no compensation to the original land-owners, leaving them impoverished (Akabzaa & Darimani, 2001).

The impact of gold mining on the environment in developing countries is well researched and documented (see Hilson, 2002b). In Ghana, different stakeholders have acknowledged that mining activities over the years have had debilitating effects on the environment. Over the years, the Government of Ghana, through its environmental policies, has put in place measures to help protect the environment and its citizens (Environmental Protection Agency, 2002). However, unlike the nation's land, forestry, and wildlife sectors, which have interpretations on how sustainable development should be practiced, the Mineral and Mining Law of 2006 (Act 703), as amended in 2010 and 2015, has no provisions for the implementation of sustainable development, which could imply that sustainable development is not a priority in Ghana's mining sector (Ayee, Soreide, Shukla, & Le, 2011). Thus, the law has failed to introduce sustainable development as a binding policy for mining companies. The absence of sustainable development focus in the mining laws is echoed in most of the country's environmental policies including: the Environmental Protection Agency Act of 1994 (Act 490) and the Environmental Assessment Regulations of 1999 (LI 1652).

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Mining companies are generally expected to make profits while, at the same time, provide for the social and developmental needs of their host communities and protect the environment as well (Amponsah-Tawiah & Tuokuu, 2017). Bebbington et al. (2018), from a political settlement perspective, analyze the evolution of mining over different timeframes in Ghana, from pre-colonial times up until today, and how mining activities affect the livelihoods of people at both national and sub-national levels. The authors argue that:

> Although there is an overall elite consensus among politicians that mining rents be centralized, the lack of a long-term development vision for the mining industry has enabled ruling elites to skew public spending towards short-term objectives of political survival, rather than long-term investments that are required to structurally transform the economy and promote more inclusive forms of development (p. 193).

This paper examines how critical stakeholders (e.g., government regulators, mining company officials, and host community members) perceive, experience, and practice sustainable development within the gold mining industry in Ghana. Therefore, the central question guiding this study is: to what extent is the concept of sustainable development understood and embraced in the gold mining industry in Ghana?

Following this introduction there is a review of the literature on sustainable development in the context of mining. This is followed by brief analysis of the conceptual framework guiding the study. The methodology used to collect and analyze the data is then presented. The results and discussion sections follow thereafter. This paper concludes with the limitations of the study and implications for future research.

1.1. Sustainable development and mining

Sustainable development is a slippery concept and has been the subject of many debates and contestations in literature. It has attracted enormous attention and prominence for over three decades. Admittedly, it means different things to different people depending on one's discipline and background (Essah & Andrews, 2016; Onn & Woodley, 2014; Sorensen, 2012). The different interpretations of the concept could, at times, be said to be confusing (Hopwood, Mellor, & O'Brien, 2005). However, for the purpose of this paper, we will adopt Sachs definition of sustainable development as economic development that is environmentally friendly and socially inclusive (Sachs, 2015). This definition embraces all pillars of sustainable development (i.e., economic, social, and environmental dimensions) to fully maximize the social and economic benefits of mining to host communities (ICMM, 2018).

According to the International Council on Mining and Metals (hereafter, ICMM), sustainable development in the mining sector is when investments are "financially profitable, technically appropriate, environmentally sound, and socially responsible" (cited in Munyanduki, 2017, p. 330). For Benson and Kirsch (2010), sustainable mining is a "corporate oxymoron" and a "set of strategies used by corporations to manage or neutralize critique" (p. 45). Some scholars (Onn & Woodley, 2014; Sorensen, 2012) have argued that because minerals are non-renewable, sustainable development should not even be a subject for discussion. Like Benson and Kirsch (2010), these scholars (Onn & Woodley, 2014; Sorensen, 2012) wonder whether sustainable development in the mining sector is possible or is merely an oxymoron or a definite mistake.

"The Brundtland Report provides a solid foundation for sustainable development but fails to explain how to implement it," (Hilson, 2000). Generally, this lack of clarity of the concept of sustainable development and how it should be implemented has led many to wonder, "what is to be sustained, by whom, for whom, and what is the most desirable means of achieving this goal?" (Agyeman, 2007, p. 193). Bebbington and Bebbington (2018) agree with Agyeman's claim, reasoning that any discussion of mining and sustainable development is more or less likely to focus on the questions of what is likely to be sustained and how host mining communities, for example, negotiate the trade-offs. Consequently, a number of sustainable development frameworks and models have been developed by academics and policymakers for use by governments and industries (Hilson, 2000). For instance, the Global Mining Institute (GMI) was established in 1992 to provide cross-cutting industry research and leadership to mining companies across the globe (Essah & Andrews, 2016; Hilson, 2001). Also, the ICMM and Mining, Minerals and Sustainable Development Project (MMS-DP) were formed in 2001 and 2002, respectively, with the mandate to assess the effectiveness of sustainable development in the mining sector through the Global Reporting Initiative (GRI). The GRI applies the use of economic, environmental, and social indicators to assess the sustainable development performance of mining companies (Essah & Andrews, 2016). Nonetheless, all these institutional and organizational initiatives are voluntary which means mining companies are not obliged to subscribe to them or follow their rules.

The Earth Summit in 1992 in Rio popularized the concept of sustainable development, but the environmental, social, and economic dimensions became more entrenched in 2002 during the World Summit on Sustainable Development (SD) in Johannesburg (Agyeman, 2007; Kates, Parris, & Leiserowitz, 2005). It was at this summit that there was a call to develop collective responsibility to promote sustainable development at local, national, and global levels (Kates, Parris, & Leiserowitz, 2005). A report by the World Economy and Social Survey (2013) claims that some countries in the Global South are leading the way in the formulation and implementation of effective policies toward the achievement of sustainable development. According to the report, developing countries have designed models, taken initiatives and are more committed to achieving the goals of sustainable development than their counterparts in the developed world. The report further cites Bolivia and Ecuador as examples of countries which have added "rights of nature" to their constitutions to protect and preserve the environment and natural resources for the future generations through the application of traditional ecological knowledge. This is contrary to the view that environmental protection is not a first priority in developing countries because "the poor are too poor to green" (Sulemana, McCann, & James, 2016).

Consequently, sustainable development is a practical necessity and requires global and collective actions to ensure that economic and business activities are carried out in an inclusive and progressive society, and a well-protected environment (Sachs & Reid, 2006; World Economic and Social Survey, 2013). According to Onn and Woodley (2014), the first step to achieving sustainable development in the mining sector is for each mining company to establish a sustainability agenda. For the ICMM, sustainable development in the mining and metals sector would only become a reality if mining is done based on principles, that is by promoting ethical and responsible business practices (ICMM, 2018).

1.2. Conceptual framework

This paper adopts the Sustainable Development Goals (SDGs) as its conceptual framework to analyze how the concept of sustainable development is understood and embraced in Ghana's corporate gold mining sector. The global community in September 2015 adopted "Transforming Our World: The 2030 Agenda for sustainable development" with 17 Sustainable Development Goals (SDGs), to promote the well-being of humanity and protect the Earth for future generations (Rasul, 2016). Before the goals were adopted, the UN member countries met to deliberate on why there was the need to develop a new set of development goals to succeed the Millennium Development Goals (MDGs) and, after lengthy negotiations and engagements, the SDGs were conceptualized (Hak, Janouskova, & Moldan, 2016). Indeed, as

Fig. 1. Sustainable development goals (SDGs).
Source: (MDG Monitor, 2015).

a trailblazer in Africa regarding the promotion of peace, development, and the environment, Ghana was nominated by the UN to be part of a seventy-member country Open Working Group (OWG) established in 2013 with the mandate of designing the SDGs (National Development Planning Commission, 2015).

The SDGs, represented in Fig. 1 below, has 169 targets and 230 indicators (Hak et al., 2016; Editorial, 2018). The goals are "limited in number, aspirational, and easy to communicate, addressing all three dimensions of sustainable development" (National Development Planning Commission, 2015, p. 3). According to the UN, the goals are all interconnected and, with the full support of all 190 member countries, they are achievable (Allen, Metternicht, & Wiedmann, 2017; Editorial, 2018; Rasul, 2016). They are integrated because all the goals are equally important and transformative because, together with the Paris Agreement, they are meant to fight poverty, combat climate change, and build societies that are peaceful on a healthy planet (Allen et al., 2017; Editorial, 2018; Hak et al., 2016).

As reiterated in the Editorial (2018) of the Journal of Sustainable Development, "The establishment of the SDGs can, therefore, be recognized as one of the most significant global efforts made to advance wellbeing while recognizing the planet's ecological limits" (p. 118). The Atlas Mapping Mining provides an interconnectivity between mining and the SDGS via its best practices' model from exploration through to production and, of course, mine closure (see Atlas, 2016). Also, the Atlas envisages that the mining industry has the potential to contribute to all 17 SDGs as it raises awareness of opportunities and challenges that the SDGs pose for the mining industry and its stakeholders and facilitates multi-stakeholder dialogue on how to address these challenges and achieve the SDGs.

The mining sector historically is responsible for some of the very problems the SDGs are trying to address including environmental degradation, social inequality, conflicts, gender-based violence, and corruption, among others (Atlas, 2016). To fully attain the aims and objectives of the SDGs, Hak et al. (2016) recommend the operationalization of the SDG targets because "Only proper conceptualization and operationalization of the targets will transform them from vague and mostly theoretical concepts to tools, which are clearly understandable in terms of empirical observations, measurable or describable by appropriate indicators".

In Ghana, the National Development Planning Commission [NDPC] is charged with the responsibility of ensuring that the country is well positioned to achieve all 17 goals by 2030. Some of the activities the NDPC have been commissioned to undertake include: public engagements to solicit views and opinions from the citizenry, incorporating SDGs into national development plans, and monitoring and evaluation. The Commission together with other partner organizations, such as Ghana Statistical Service, and various planning groups have set up a framework of action to achieve the goals set (National Development Planning Commission, 2015).

In spite of the ambitious and comprehensive nature of the SDGs, some member countries argue that there are too many goals and they are unattainable (Hak et al., 2016). Hak et al. (2016) have identified some inherent weaknesses with the SDG framework including: "poor alignment of targets and goals with existing international agreements and political processes; lack of effective implementation; conflicts between goals and targets, and non-quantified targets" (p. 567).

2. Study area and methodology

2.1. Study area

The study was conducted in four communities in Ghana namely; Tarkwa, Iduapriem, and Bogoso in the Western Region and Ayanfuri in the Central Region. These communities were selected because of their rich mining histories. They also have similar socioeconomic and environmental characteristics. One common feature is that both large-scale and small-scale gold mining companies operate in these communities. This has resulted in socio-economic and environmental problems including resettlement issues, leading to clashes between the mining companies and host communities (Akabzaa & Darimani, 2001). Fig. 2 shows a map of the study communities.

2.2. Methodology

This study employed the use of qualitative research design to explore how the concept of sustainable development is understood and infused in the corporate gold mining industry in Ghana from the perspectives of critical stakeholders. This has become necessary because

> The inherent consistency between the logic of win–win and the appreciation that business, government or civil society alone cannot solve today's complex social and environmental problems, allowing for the promotion of partnership formation and stakeholder engagement as a useful strategy for business to meet its social responsibility (Idemudia, 2007, p. 1).

Consequently, qualitative research design was employed to achieve the objective of this study. As indicated by Creswell (1994), qualitative research design is "an enquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants and conducted in a natural setting" (p. 2). Specifically, semi-structured interview questions and focus group discussions were employed as the primary data collection tools. Environmental managers of four large-scale gold mining companies operating in the four study communities were interviewed. Additionally, officials from the Minerals Commission of Ghana, the Environmental Protection Agency (EPA), and local assemblies were interviewed. Finally, Chiefs and opinion leaders (local or community authorities) were interviewed (see Table 1 for the list of interviewees). In all, 20 critical stakeholders within Ghana's gold mining sector were interviewed. These participants were purposively selected based on their knowledge of sustainable development and mining.

To fully represent the views of community members, two focus group discussions (FGDs), involving women and youth groups, were conducted in each of the four study communities. Each group consisted of five members from diverse backgrounds, who were familiar with mining activities in the communities. In all, a total of 40 participants took part in the FGDs. These groups of critical stakeholders were selected with the support of key informants (i.e., chiefs and local assemblymen) in the study communities.

The data collection process consisted of two phases involving 60 participants in total (20 interviews and 40 FGDs). The first phase of data collection took place between June and August 2017 while the second phase of data collection took place between January and March

Fig. 2. Map showing study communities.
Source: (Authors' own map)

Table 1
List of interviewees.

No. of interviewees	Key stakeholders
1	Environmental Protection Agency (EPA)
2	Minerals Commission
2	NGOs
2	Chiefs
1	Ghana Chamber of Mines
1	Forestry Commission
1	Water Resources Commission
4	Mining Companies
4	Local Assemblies
1	Academic
1	Business Advisory Center
20	Total

2018. Furthermore, the study had the approval of Antioch's Institutional Review Board (IRB). With permission from participants from both interviews and focus group discussion sessions, audio-visual recorders were used to record the conversations. These were transcribed verbatim and the transcripts were then read repeatedly together with the audio-visual tapes to ensure the reliability and validity of the data. Also, the data was coded and put into relevant categories and the themes that emerged were then analyzed. Direct quotations were used, where appropriate, to support the themes. Pseudonyms were also used throughout the study to protect the confidentiality of the participants.

3. Results

The purpose of this study was to examine the pursuit of the UN's Sustainable Development Goals (SDGs) as a function of human capital (or stakeholder) management in Ghana's gold mines. The data gathered largely included views, perceptions, and experiences of notable stakeholders through interviews and FGDs. It consists of information volunteered by 36 males and 24 females of which there were 28 youth (between the ages of 18 and 45) and 32 older interviewees (above 45 years). Analysis of the data gathered followed a two-step process. First, the audio files and their accompanying transcripts were respectively listened to and read several times and two broad themes emerged. These were "General Stakeholder Perspectives" and "Specific Stakeholder Perspectives". While the former presents both differences and commonalities in views expressed by all stakeholder groups captured, the latter details specific viewpoints on each stakeholder group. Secondly, the segment on Specific Stakeholder Perspectives was further categorized into three sub-themes, namely regulation of mining activities, corporate mining in practice, and host community engagement and experiences. The aim of this further segmented analysis was to help establish whether or not the three stakeholder groups were engaged in any form of professional collaboration and how such efforts enhanced or lowered mining standards in Ghana. It was also to help determine how theory and practice interacted in Ghanaian gold mines. We believe the outcome of this analysis was critical, not only in providing answers to the research question posed, but also, as shown in the discussion segment of this paper, in helping to illuminate both empirical conversations and policy discussions on sustainability in the corporate mining sector in Ghana.

The study revealed that, in general, stakeholder conceptualization of sustainable development (SD) is different from it in practice. Views on sustainable development seemed to converge based on a need for common practice among mining companies. However, ongoing mining practices suggest that sustainable development is understood and practiced differently by different mining companies. The remainder of this section presents details of these and other findings.

3.1. General stakeholder perspectives

Stakeholders who participated in the study included regulatory bodies (RB), mining companies (MC), and a cross-section of host community members (COM). Before findings on these specific stakeholder groups are presented, it is important to reflect on threads that were

found to be common to all three stakeholder groups. A major observation from the results of this research was that the aims of the UN's three-legged framework for sustainable development (SD) were generally not shared by the stakeholder groups interviewed. Only a small number of stakeholders made submissions that aligned with the UN's conceptualization of SD as an economic, social, and environmental protection measure; the majority of them, however, believed SD involved one or a combination of any two of these three legs of sustainable development. For instance, of the six interviewees for the regulatory stakeholder group, only two members were able to identify SD as a three-dimensional concept. The remaining four officials of different regulatory agencies provided evidence to the effect that SD is either one or two legged. It was observed that this second set of interviewees failed to meet the specifications of the UN's framework largely because they tended to explain the concept from the perspective of their respective organizations. Thus, regulators in such areas as water resources, forestry, etc. were inclined to assign SD an environmental focus because these resources are primarily regarded as part of the environment. Interestingly, half of the interviewees from the four mining companies properly identified SD. While this is an improvement compared with the regulatory stakeholder group, it is still unacceptable that half of the miners, the lead implementers of the SD policy on mining, failed to properly conceptualize SD. Additionally, only five out of the fifty community members interviewed (10 one-on-one interviews and 8 focus group discussions) identified the three constituents of SD. Therefore, when adding the three stakeholder groups together, it can be said that as many as 51 of the 60 interviewees failed to explain SD according to the UN standard. Another general observation was the disconnect between SD theory and its practice, which can rightfully be derived from its prevalent mis-conceptualization. Details of these observations are presented in the sub-sections that follow.

3.2. Specific stakeholder perspectives

Based on the general stakeholders' inability to properly define the sustainable development space, as framed by the UN and within which all mining activities ought to take place, it is important to present specific accounts by the different stakeholder groups and the findings for each stakeholder group. This will help establish further the inconsistencies between them and also help determine stakeholder groups with sustainable development conceptualization that are consistent with the SDGs and those that are not. It will also help to provide a basis for the common understanding and practice of sustainable development.

3.2.1. The regulator viewpoint

Regulating mining activities is a major step towards the attainment of the SDGs. This is because regulators ensure that mining operations are not only standardized, but also sustainable. It means that regulatory bodies must be conversant with standard requirements of mining operations as well as those of sustainability. However, regulators of mining operations in Ghana seem divided with regards to understanding and enforcing sustainable mining provisions. On the one hand, some regulators were very explicit in explaining sustainable development and how to embed it in mining activities. This category of stakeholders demonstrated a good understanding of sustainable development and how to realize it. For example, as RB 6 repeatedly questioned:

> When it comes to the economic leg, are they [mining companies] cheating us in terms of royalty payments? Is the level of royalties at par with international benchmarks? Is Tanzania charging the same? Is South Africa, is Mexico, is Chile charging the same or what is the rate going for? Even in the sub-region, Mali, Burkina Faso, Ivory Coast, are we competitive or ours is too high?

The regulator believed that finding sincere answers to these questions constitutes a strategic effort to address the economic aspects of sustainable development. Similarly, on the environmental leg, the regulator stressed a need to enforce existing laws to help address issues affecting this leg. The interviewee cited the Minerals and Mining (General) Regulations LI 2182, for example, which seeks to guide the construction of tailing dams in ways that do not result in broken walls and subsequent spillage of cyanide into the environment. According to the regulator, the focus of SDGs 13 and 15 is environmental sustainability which can only be assured by responsible human activities. As the informant puts it:

> When we talk about sustainable development goals, goal 13 and goal 15 talk more about the environment. Goal 13 talks about climate change, depletion of the ozone layer. So, if human activities such as mining degrade the forest reserves, we would be increasing the carbon dioxide stock in the atmosphere. It means [that] we are depleting the ozone layer. Number 2, sustainable development goal 15 talks about the degradation of the land, forest, and other natural resources.

On the social front, the interviewee wondered why there cannot be a law, of the type that their outfit is currently working on, to compel companies to deliver on their corporate social responsibilities. Undoubtedly, it is important to recognize the regulator's knowledge, experience, and perceptions of sustainable mining in Ghana, particularly as they relate to the attainment of the SDGs. It is also imperative to note the regulator's observation that human resource capability and its commitment to SDGs is at the center of the ongoing sustainable mining discourse. As regulators have argued, if gold mining in Ghana is destroying the environment, if it is not creating alternative livelihoods, and if it does not provide social security for host community members, then it is simply because the human capital or stakeholders of these gold mines are neglecting their corporate mining responsibilities. As a result of a defective human resource management strategy, "degradation has already occurred. So, what we are doing now is that other areas that have been depleted by way of galamsey (illegal mining) are to be reclaimed and replanted" [RB 4].

Unfortunately, only a third of mining regulators were able to express such informed positions on sustainable corporate mining in Ghana. The majority of them demonstrated incomplete knowledge of the SD framework. As noted earlier, these stakeholder defects are largely rooted in a lack of common understanding and practice of sustainable development among the various regulatory bodies of Ghana's gold mining activities. This was a particularly worrying trend as regulators are often noted for their supervisory role, and without adequate knowledge in what has to be supervised, it is difficult to imagine how supervision was delivered. For example, in the following excerpt, a regulator's attempt to explain the procedure through which mining is practiced. He states:

> If you look at our mining practices, you start the mine with an environmental permit, exploration, then when you delineate all your reserves, you come for the mining lease. If you have the lease, it doesn't mean you have the right to mine, you still have to obtain your environmental permit […] All these come with the sustainability issues, where you address them until you walk away. [RB11]

While this 'sustainable development practice', as explained here, mirrors the three components of SD, the interviewee, in an earlier submission, conceptualized SD as the use of post-mining land for purposes such as tourism, fish farming, and other socio-economic uses:

> We are looking at other uses of the land with respect to the end of mine life and that is where the idea of sustainability comes in. It doesn't mean land should be reversed to its normal stage but it could be put to other uses which can bring in income or can support livelihoods. [RB 10]

It is important to note that pre-mining procedures and post-mining activities do not represent actual sustainable mining in mining practice.

Interestingly, such conflicting submissions in respect of SD theory and practice run through many regulator accounts and it must be queried how control can be exercised over the implementation of a policy that is misunderstood by the controller.

3.2.2. Mining companies and sustainable mining

In general, all four Ghanaian mining companies who participated in the study demonstrated a good understanding of the concept of sustainable development. The mining companies made submissions that can be understood in light of what MC 9 describes as "utilizing resources and facilities that will benefit the current generation and not compromise the future generation." However, with regard to the scope of practice, the companies were as divided as their regulators, with some emphasizing the social, economic, and environmental aspects and others combining two or all three legs of sustainable development. In fact, just half of the mining company representatives interviewed were able to align the SD concept and mining practice. For example, one miner argued that mining companies include sustainable development in their operations by nearly bringing the mined land back to its original state. In the view of the miner, when the land is reclaimed in this way, then the three aspects of sustainable development are guaranteed. As the miner explained:

> If you mine, you have to backfill the pit, you have to put your topsoil back, you have to plant and study the plants to make sure they are doing well and then you can confidently say that, when I came, the area was like this and I have brought it back to this stage, almost like its original state. That is the sustainable development aspect that we do. [MC 9]

This mining company believes that for sustainable mining to occur, mining companies must be responsible environmentally, economically, and socially. As the preceding quote shows, the environmental component is about returning post-mine lands to a point that is similar to its pre-mined state. MC 9 also has in place socio-economic programs such as the "G-STEP" and "G-STOP", which deliver the company's economic and social responsibilities. Although this three-tier approach is generally shared by MC 9 and MC 7, the latter mining company believes that "if we talk of sustainability, we cannot wait till the mine is closed before we start planting. So, we do a concurrent rehabilitation program as and when areas are disturbed, we come in and try to reclaim the land".

This is an interesting development because while MC 9 reclaims after closure, MC7 rehabilitates as it mines. MC 10 practices sustainable development only by making the "environment stable and sustainable" by infusing sustainable development into their mining activities through wildlife conservation; preservation of vegetation, water bodies, trees, forests and plant species; and reduction in its carbon footprint.

Yet, the fourth mining company (MC 8) interviewed indicated that its sustainable development activities are carried out through a department that the company established to deal with its social issues. In this regard, the department offers artisanal training, animal rearing, etc. to host community members in order to sustain them even after the mine's closure. Although this is a good attempt at responding to its corporate social responsibility, MC 8's focus on only the social aspect of sustainable development is rather too limited. Similarly, as presented earlier, MC 10 is also only focused on the environment while the sustainable development practices of MC 7 and MC 9 are three-legged and consistent with the UN's provisions on sustainable development.

3.2.3. Host community experiences

With the level of inconsistency in the understanding and practice of sustainable development by mining companies and in the oversight of the sustainable development responsibility by regulators of mining activities, host community understanding and expectation of SD was also lacking. The unmet community expectations ranged from the creation of alternative livelihood opportunities, social amenities, and environmental protection to the restructuring of mining operations in the country to address these critical aspects of their lives, and incidentally also SD needs. This call by the host community stakeholder group is clearly a gap gaps created by the mining company and regulator groups. If the regulatory and mining company groups fully understood and properly implemented the SD concept, the host community stakeholders would not be adversely affected.

It is also important to note that although some community members had good knowledge of SD management in the mining sector and freely shared their views on SD components, a good number of them, particularly those in the focus groups, expressed their expectations of mining in the area, and it was from such expectations that their understanding of the SD concept and its implementation were derived. In all, a similar trend, as in the first two stakeholder groups, was observed. In other words, SD was conceptualized as a one-, two-, or three-legged framework. Only one out of every ten community members actually correctly conceptualize SD. Of course, the community members can only observe or experience what miners and their regulators do, and it is not surprising that their experiences are consistent with those of the other two stakeholder groups. For example, the majority of community members believed that mining companies were not economically, socially, and environmentally responsible and examples were cited to support their claims. On the environmental leg, for instance, a youth leader regretted that although most mining companies strive to meet some of the needs of host community members, such efforts have often been inadequate. According to the informant:

> There is a place on the Kumasi junction-MC 9 road, with a pit full of water. Someone has even fallen in it before and when we suggested that if they are not using it they should seal it up to avoid such accidents, they told us they had given it to the EPA to work on but up till now, they haven't done anything. (COM14)

The interviewee also noted that, at places such as Atobrakrom, blasts from miners have caused buildings to shake and crack. In the view of this young community member, people living in buildings close to mine sites should either be resettled before such blasts or be properly compensated for any such damages to lives and properties. Since the majority of community members interviewed both one-on-one and in focus groups made submissions that reflect their inability to appropriately conceptualize and infuse SD in mining operations, we can say that host community members, like the regulatory and miners groups, are seriously challenged in their pursuit of the SDGs in the Ghanaian gold fields.

4. Discussion

This paper aimed to explore the perceptions and experiences of sustainable development of key stakeholders in Ghana's gold mining sector. These stakeholders included government, mining companies, employees, and other critical stakeholders in Ghana's gold mining sector. Almost two decades ago (Hilson, 2001), there had already been calls by scholars to investigate how mining firms are defining sustainable development of their mining operations. Specifically, Hilson (2001) sought to investigate how mining companies are interpreting the concept of sustainable development and putting the theory into practice in their operations. Similar studies have been conducted from the perspectives of mining firms and macro-country and global level mining firm performances over the years (Essah & Andrews, 2016; Hilson & Murck, 2000; Kumah, 2006). Very few studies have engaged the issue of sustainable development in gold mining from multi-stakeholder perspectives; and this study is one which attempts to fill this gap in research.

Consistent with McQuilken and Hilson's (2016) report on Artisanal and small-scale gold mining in Ghana, which found that different stakeholders had different perceptions on critical sustainable mining issues like "galamsey", it was also found in this study that different

stakeholders have different opinions and understandings of what sustainability within the gold mining sector should entail. While some stakeholders perceived sustainable development as being either an economic, social, or environmental protection issue, others believed it involved either one or a combination of any two of these three dimensions of sustainable development. This finding aligns with Appiah and Buaben (2012) who found in a gold mining study in Ghana that the respondents in their study had different opinions on the social and environmental challenges they were confronted with by virtue of gold mining activities. The respondents in Appiah and Buaben's (2012) study flagged the prevalence of malaria and tuberculosis; as well as environmental pollution as the major problems confronting them in the mining area.

In this study, it is contended that in agreement with prior studies (John & Narayanamurthy, 2015), the failure of the stakeholder groups to agree on the scope of sustainable development as outlined in the UN sustainable development goals (which are economic, social, and environmental), might account for the implementation of different approaches applied by mining firms towards achieving sustainable development objectives. There is, therefore, the need to push for coherence in the understanding of sustainable development in Ghana's mining sector since it could be argued that improved and coherent sustainable mining practices in Ghana's mining sector could lead to reputation enhancement for mining firms, better relationships with the local community in the mining firm's operational catchment area; and better relationships with governmental agencies, investors and the financial community (IFC, 2014).

It was found, consistent with prior research (Amponsah-Tawiah & Dartey-Baah, 2011; Kessey & Arko, 2013; Mensah, Mahiri, & Mireku, 2015), that there are also some similarities in the activities within the mining sector in Ghana. There were, however, inconsistencies in the practices geared towards the achievement of sustainable development goals. It is argued, therefore, that stakeholders within the mining sector should consider adopting a uniform and convergent understanding of the concept of sustainability in order to achieve consensus on the most pragmatic approaches for facilitating the advancement of sustainability issues within the mining sector in Ghana. It was further found that in order to successfully implement a common concept of sustainability, the opinions and contributions of key stakeholders are necessary for the development of a regulatory framework that will align with UN Sustainable Development Goals. This is consistent with Hilson and Murck's (2000) study of mining firms in Canada. A social license therefore is a key prerequisite for successfully establishing and operating any mining venture (Falck, Spangenberg, & Wittmer, 2015).

With regards to the managerial implications of the study, we propose that mine managers must actively involve all the stakeholders in the mining industry in developing a coherent and unified conceptualization of sustainable development vis-à-vis the UN sustainable development dimensions which are social, economic, and environmental. The economic dimensions of this conceptualization could include the efficient usage of resources and specifically address issues of economic growth and revenue management, corruption, and enhanced local content (IFC, 2014) in Ghana's mining sector. Regarding the social dimension, issues that could be comprehensively addressed could include the provision of jobs for the unemployed in mining areas and address issues of human rights protections, poverty reduction schemes, land use and acquisition, as well as community health and safety and security (IFC, 2014). From the environmental perspective, issues of water conservation, biodiversity, climate change and adaption, pollution and waste management, as well as all steps to reduce carbon footprints and achieve minimal negative effects on the earth's ecosystems (IFC, 2014; Mayyas, Qattawi, Omar, & Shan, 2012; Thun & Müller, 2010) should be considered. This will help garner the support required for the implementation of sustainable development goals by mining firms.

As well as achieving consistency in the practice of sustainable development, mine managers must also ensure that the expectations of various mining communities are met in order to achieve the support of the various communities in their operations. This is because the research findings indicate that host community members reported that community needs, such as the provision of alternative livelihood opportunities and environmental protection issues as well as the restructuring of mining operations, are not being met. Additionally, some members of host communities indicated that although some jobs have been created for the indigenes, those jobs are woefully inadequate.

Twerefou (2009) noted in a report on “Mineral Exploitation, Environmental Sustainability and Sustainable Development in EAC, SADC and ECOWAS Regions” that in relation to mineral exploitation in Africa, the capacity of environmental protection institutions is weak. He argues that the capacity of environmental protection institutions in Africa in terms of requisite technical personnel and finance is often limited and they are usually inadequately resourced to undertake monitoring and evaluation of environmental degradation and to carry out critical verification of environmental reports. A decade on, we argue from a policy standpoint that to the extent that regulators of mining activities such as the Minerals Commission in Ghana play a critical role towards the achievement of the SDGs goals, they must be abreast with standard requirements of mining operations and sustainability and its interpretations. This is because our research findings revealed that, the regulators of mining firms have varied interpretations of the provisions in the mining regulations.

5. Conclusions and implications for future research

It has been established from our study that there is a need for a more uniform understanding of sustainable development in Ghana's mining sector. Stakeholders in Ghana's mining sector should seek to understand the UN Sustainable Development Goals' Framework and begin to employ it in order to develop sustainability competencies in the sector. Mining firms should engage their key stakeholders and assist them in grasping the demands and implications of integrating the UN Sustainable Development Goals into mining practices in Ghana. The mining firms should demonstrate strong leadership and accountability in the area of sustainable development by measuring, monitoring, reviewing, and evaluating their progress towards meeting the Sustainable Development Goals in their mining operations and regularly communicate their progress to the public.

This research has the following limitations. Firstly, the sample only included gold mining companies operating in the Western and Central regions of Ghana. Although the findings of this study provide requisite information on sustainability of mining in Ghana, future studies should focus on other mining areas within Africa in order to widen the scope of the research. A qualitative approach was also employed which is suitable for exploratory studies. Future studies could employ quantitative methods so that findings can be generalized.

Conflicts of interest

None.

Ethical statement

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

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jsm.2019.02.007.

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