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The Impact of Artisanal Small-Scale Mining on Sustainable Livelihoods: A Case Study of Mining Communities in the Tarkwa-Nsuaem Municipality of Ghana

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Abstract

The purpose of this study is to assess the impact of artisanal small-scale mining on sustainable livelihoods in the Tarkwa-Nsuaem Municipality of Ghana. The study seeks to answer the following questions: (1) what is the impact of artisanal small-scale mining on livelihoods in the Tarkwa-Nsuaem Municipality? (2) What measures could be put in place to ensure the sustainability of livelihoods in the municipality? Case study approach to inquiry was used in the study. The authors used interview guides (structured and unstructured) to collect primary data from a sample of 400 household heads, nineteen institutions, six Artisanal and Small-scale Mining (ASM) firms, six mineral processing companies, and two gold buying agents, and traditional authorities from the Tarkwa-Nsuaem Municipality. The findings of the study indicate among other things that; land has been rendered unproductive due to the inability of the dominant ASM firms to reclaim lands after mining. The workers' exposure to cyanide and mercury makes them vulnerable to all manner of health risks which is a threat to the sustenance of livelihoods. Owing to the unsustainable nature of mining activities, the future indicates not only increases in unemployment, but also environmental degradation and health concerns.

Keywords: Sustainable Livelihood (SL); Sustainable Development (SD); Management; Artisanal Small-Scale Mining (ASM); Ghana.

1. Introduction

Considerable efforts have been made by the mining industry to highlight its commitment to protecting the environment and addressing the needs of affected communities. Many companies in the gold mining sector have also made attempts to engage all stakeholders through dialogue and negotiation backed by formalised agreements with local communities and local and national governments to address areas of concern. Large scale gold mining companies including Goldfields Ghana Limited have indicated their commitments by supporting affected communities to address the social and environmental

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concerns which include but not limited to access to land, concerns on all forms of pollution injurious human health, limited employment opportunities for local people, limited livelihood alternatives and increased social vices associated with their operations (Akabzaa & Darimani, 2001; Akabzaa et al. 2007).

Clearly, the searchlight is on Large Scale Mining (LSM) activities that are formalised and appear to be well-regulated. Consequently, the LSM companies have promised better economic conditions in the mine-host communities. The promises of better economic conditions are however not fulfilled. The communities in which minerals are exploited end up being the least developed areas. The exploration, extraction and processing of mineral resources are observed to be environmentally and socially disruptive activities in the country with few of the populace benefiting while the masses languish in abject poverty (Lu & Lora-Wainwright, 2014). The situation gleamingly downplays the link between mining and development and thus points to the fact that the relation remains contentious. As a result, a lot of agitations have characterised the operations of LSM companies. Typical examples in Ghana are the various demonstrations and petitions against the operations of Adamus Resources Limited by some youth and concerned citizens of Nkroful, Teleku-Bokazo, Anwia and Salman in the Ellembele district in the Western region of Ghana (Amevor, 2008). As argued earlier, the aggrieved persons also decide to reduce their poverty by engaging in the mining activities often through Artisanal Small-Scale Mining (ASM).

LSM companies are perceived to be environmentally destructive and socially disruptive. However, ASM which by law is the preserve of only Ghanaians appears to be more destructive and pose a lot of environmental problems as well as livelihood challenges to local communities. Unlike the LSM, the operations of the ASM are often unregulated. They are therefore without plans to reclaiming the lands after exhaustion of the minerals (Styles et al., 2006) while the human capital is affected through the unsafe methods of mineral exploitations.

Many of the mineral dependent states in Sub-Sahara Africa (SSA) are threatened by mass and intractable poverty and social deprivation. This is evident in contemporary research which identifies a strong negative correlation between the level of mineral dependence and its Human Development Index ranking (Feeney, 2002). Thus, the more the states rely on exporting minerals, the worse their standard of living is likely to be due to the inequality in the distribution of the wealth coupled with the sector's adverse environmental ramifications. The apparent negative correlation between mining and development is explained by the natural resource curse hypothesis. The framework posits that natural endowments tends to be a curse as the expected impact on the livelihoods of the people on whose lands resources are situated are constantly kept in perpetual poverty (Forson et al., 2015; Forson et al., 2017; Forson et al., 2016; Obeng-Odoom, 2012). The impact of mining on local communities has therefore been an area of growing concern and attention, and one that mining companies, Non-Governmental Organisation (NGOs) and governments are grappling with. As a result of the concerns expressed by the communities, civil society organisations and other stakeholders have been entreated to evolve programmes and projects to mitigate its effects. Thus corporate social responsibility (CSR) has become a priority concern in the mining industry. Examples of CSR initiatives being carried out by mining companies include the implementation of Local Economic Development (LED) projects, construction of community infrastructure such as community centres, schools and local employment and enhanced alternative livelihoods (Akabzaa et al. 2007). Other measures undertaken includes stakeholder liaison exercises to prevent confrontations with host communities (Cottrell & Rankin, 2000). Note should be taken that studies (see Horsley et al.,

2015; Singh & Hiremath, 2010) that sought to study livelihoods but adopted aggregative analysis ignored key issues such as variability in household composition and thus came out with unclear conclusion. Other strand of researchers sought to correct this by employing disaggregated analysis to understand livelihood variability in relation to geographical areas, household composition and communities (see Fang et al., 2014; Rahman & Akter, 2014). Despite the progress in the extant literature, it is conspicuously clear insufficient attention was paid to sustainable livelihoods of different household groups coexisting in the same communities.

According to Amevor (2008) surface mining is slowly taking the steam out of agriculture but the negative effects of the former on the latter are conspicuously missing from the discussions on the rising cost of food prices. He explains that multinational mining companies like Golden Star Resources, AngloGold Ashanti, Goldfields Ghana Limited, Newmont Ghana Gold Limited and Chirano Gold Mines hold large tracts of agricultural lands as mining concessions. Consequently, major areas of agricultural production are gradually becoming areas of net food deficit as a result of the operations of surface mining companies. Amevor (2008) supports his arguments with several examples of communities in Ghana which have become net-importers of food due to mining. Kojokrom, a farming community which was evacuated by the mining operations of the Bogoso Gold Limited now Golden Star Resources has been resettled near Bogoso. Their livelihoods have been affected because of limited land area for farming (Baah-Ennumh et al., 2020).

Mineral deposits are exhaustible; therefore, mining has a life span. Agriculture on the other hand, is an economic activity which has been the mainstay for majority of people in Ghana including the Tarkwa-Nsuaem municipality. The sector employs about 70 percent of the labour force in the Tarkwa- Nsuaem Municipality. It is estimated that about 60 percent of the landmass of the Wassa West district (from which the Tarkwa-Nsuaem Municipality was created) is under mining concession, including people's farms and villages, as well as forest reserves. This together with forest reserves constitutes about 90 percent of the total landmass of the district. The implication of this is that only 10 percent of the land is available for other socio-economic activities. This and many more fuels the claim that people in mining communities have suffered a lot of abuses of power, environmental contamination, and destruction of farms or are pushed off their land for inadequate compensation or forced to accept inadequate resettlement packages (Amevor, 2008; Obeng-Odoom, 2012; Wang et al., 2016).

This has had direct impact on domestic lives and social networks in the municipality. Consequently, most of the ASM operators hold the view that the large tract of land acquired by Large Scale Mining (LSM) companies is an encroachment on their sources of livelihood and that the only livelihood option left for them is ASM particularly the ecologically unfriendly, unsustainable and illegal "galamsey".

ASM is considered to be inadequately regulated, with respect to health, safety standards and environmental rehabilitation requirements. Even though small scale mining is legal and operators are expected to register to meet the legal requirements before commencing their operations, this is not the case in the Tarkwa-Nsuaem municipality to some extent. According to the Municipal Office of the Minerals Commission, ASM takes place extensively in one Urban Council and five Area Councils in the municipality but only 15 of them were licensed as of 2010. It is difficult to know their exact number because most of them are operating illegally. Unlike the LSM companies which operates legally and can easily be monitored by the environmental protection agency (EPA) and other related state agencies; the ASMs, particularly the "galamsey" operators cannot be controlled or monitored

easily. Their activities have had wider environmental and social consequences that poses as threats to livelihoods in the mining communities. Additionally, the ASM do not make any attempts to create alternative livelihoods in the mining communities as required by the Minerals Commission in Ghana (Temeng & Abew, 2009). Currently, a lot of Chinese investors have joined the ASM sector and have introduced various techniques and equipments. The Chinese contractors are consulted for the capital equipment needed for the mineral exploration owing to the limited capacity of the local ASM to procure their own machinery. Various forms of partnerships have thus emerged and all these have direct implications for sustainable livelihoods in the municipality (see Awoonor & Forson, 2020; Forson et al., 2020; Forson, 2020; Peng et al., 2020).

It has increasing been a paradox that mining communities who continuously live in the midst of plenty are perceived to be a symbol of poverty and misery (Amevor, 2008; Obeng-Odoom, 2012; Oyejide & Adewuyi, 2011). The ideal situation should have seen a massive improvement in the socioeconomic conditions of the indigenes in mining communities sustained over time. Future generations should have sustainable livelihoods and should be able to attribute the development of their communities to their mineral endowments. They should not rather encounter livelihood insecurities for the fact that their communities are endowed with mineral resources. This can only be achieved through good planning on the exploitation of mineral resources such as gold. It is for these reasons that the Minerals Commission in Ghana has made it obligatory for mining companies in the catchment areas to assist their host communities in Alternative Livelihood Projects (ALPs). This study was therefore carried out to identify ways of sustaining livelihoods in the mining host communities in the Tarkwa-Nsuaem Municipality.

Therefore, the purpose of this study is to assess the impact of artisanal small-scale mining on sustainable livelihoods in the Tarkwa-Nsuaem Municipality of Ghana. The study seeks to explore among others answers to the following questions: (1) what is the impact of artisanal small-scale mining on livelihoods in the Tarkwa-Nsuaem Municipality? (2) What measures could be put in place to ensure the sustainability of livelihoods in the municipality?

2. Conceptual Framework

2.1 Sustainable Development

The term sustainable development (SD) over the years has evolved from a myopic perspective to a broad concept that builds on the dynamism and manifestation of human lives and activities. The definition of the concept has shifted from economic to other conditions in recent times such as; increasing national self-determination predicated on the notion that development is something a country does for itself and reducing external dependency. Feminist theories of development, democratisation, good governance and respect for human rights have also become the fulcrum as features of political development limited by the generic sense of development. More fashionable now are notions of environmentally sustainable development (Forson et al., 2017; Mclean & McMillan, 2003).

The World Commission on Environment and Development (WCED), otherwise known as the Brundtland Commission explains SD as social and economic development that are intergenerational. Sustainability should integrates the three core principles of social, economic and environmental concerns, and oriented to the long-term, and hence, able to last (Brundtland Commission, 1987). It also describes the extent to which projects can lead to

continuous growth and expansion in the economy accompanied by effective resource utilisation and employment generation (Harris, 2000).

According to Burian, SD is a “process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations” (Burian, 2006). "Sustainability" is the capacity to maintain a desired level of output or service for an extended period. It is the ultimate test of development efforts. It requires not only that a particular project achieves its objectives during the project life but also that the benefits it generates continue beyond the time of the provider's involvement and continue despite technological changes. At the macro level, sustainability is defined more broadly to encompass the course of actions or inactions undertaken by policy makers which does not in any way decrease the inter-temporal welfare of its citizens over time (see Aidt, 2010; Forson & Janrattanagul, 2014; Forson et al., 2018; Forson et al., 2017; Forson et al., 2016; Forson, 2016b; Forson et al., 2013; Peng et al., 2020).

From the above, SD is explained as a process that meets the social, political and economic needs of society in a way that the needs of the future generation will not be compromised upon. The measurement of the sustainability of an intervention transcends its life implying that the intervention should continue to yield gains even after its life. The evolution of SD as a policy concept over the years is therefore explored in the next sub-section.

Evolution of Sustainable Development as a Policy Concept

The concept of SD even though used extensively since the mid 1980's, is not a new idea. The concept, contrary to popular perception, did not start with the publication of the report by WCED. In the mid 1980's, well before the publication of the report, the concept of SD had been made known initially through the seminal contribution of the United Nations Environment Programme (UNEP) and later on by the activities of the World Bank (Figuères et al. 2003). Even though there were quite a number of similar concepts of SD before the WCED'S report was published in 1987, WCED report started the process of making SD an important issue on the world stage.

The Commission presented and defined the phrase sustainable development (Brundtland Commission, 1987) as "development that requires meeting the major needs of and extending it to all the opportunity to satisfy their aspirations for a better life." However, "living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability" (Brundtland Commission, 1987). Explaining further, SD as a development concept hinges on two pillars; economic development and the consumptive use of natural resources in ways that are sustainable. Thus our consumption should come with the awareness that endowments are finite, and it is our responsibility to preserve the human future on this planet into limitless future (Davis, 2000). The relevance of SD can therefore not be underestimated. The subsequent sub-section therefore explores the relevance of SD.

Relevance of Sustainable Development

The Agenda 21 - Principle 1, of the 1992 Earth Summit, puts human needs as the key concern of SD. The principle further elucidates humans are entitled to a healthy and productive life which should be in harmony with nature. Thus, it is important to ensure nature is sustained to meet the needs of people. Sustainability is important in order to guarantee

equity between current populations and future generations. Sustainable development also improves the wellbeing of beneficiaries by providing facilities which can be maintained. This helps eliminate the problem of reverting to unhealthy sources, especially in the case of water and sanitation.

Sustainable development can however not be fully attained without ensuring sustainability. The two concepts or issues go together. Since SD has at its centre the needs of posterity, there is also the need to ensure sustainability of facilities to make sure that they provide their intended benefits to serve current needs and even kept well to serve future needs as well. Efforts aimed at ensuring SD in Ghana is therefore discussed in the subsequent subsection.

Sustainable Development in Ghana

Emerging efforts to institutionalize the process of National Sustainable Development Strategies (NSDS) as a development management mechanism have been driven by developments in the international arena, including the Brundtland Report, Agenda 21, and the World Summit on SD (WSSD). The primary focus of NSDS is basically to moderate between the three key principles of SD: economic, social and environmental management (Organisation for Economic Co-operation and Development, 2006). Ghana has been involved in several strategy policy processes in an attempt to achieve poverty reduction and SD as a result of the emphasis placed on SD by the Brundtland Report of 1987.

Ghana's pursuit of SD has been shaped or informed by its decentralization policy. Increasing community or local participation marks a conspicuous shift to the approach of development programming. The approach since the introduction of the 1988 decentralisation policy marked a redefinition of the relative roles and government structures at all level (Vordzorgbe, 2005). Decentralization promotes participation at the grassroots level. It gives people the opportunity to take part in decisions that affect their lives. This enables them to take control of affairs and manage them in ways which ensure SD.

Sustainable development strategy outlines eight principles that demonstrates the broad thematic areas of focus. These principles are applicable to the Ghanaian context. These principles embodies set of societal and human values that NSDS should aspire to. It is envisaged realising these core objectives would invariably ensure movement towards a SD trajectory in Ghana. In Ghana, SD principles includes meeting basic needs, developing a better quality of life for posterity and nurturing a conducive enabling milieu. Other key principles extends to managing resource endowments sustainably, targeting effective participation among others as well as pursuing internationally responsive development (Vordzorgbe, 2005). These proposed principles will holistically promote social, economic and environmental developments which constitute SD.

Sustainable Livelihoods

For the past years, the study of rural wellbeing has employed and focused on the concept of livelihood as a conduit to understand and evolve interventions for poverty (Scoones, 1998, 2009). This line of research, which has come to be known as "Sustainable Livelihood Approach" or (SLA) emphasizes on rural people's embedded and holistic view of their lives and environment (Chambers & Conway, 1992; Conway, 2011; Lu & Lora-Wainwright, 2014). Thus the term livelihood not only refers to people, their capabilities and means of living but also the ownership and articulation of information that are vital for the

effective utilisation of the assets people use to obtain a living. According to a framework proposed by Horsley et al. (2015), people occupy the centre of livelihood discussion in relation to how assets are being used. These assets which are both tangibles and intangibles are indispensable for their survival (Krantz, 2001). It also includes entitlements which determine their access to these assets.

Sustainable livelihoods are related to effective and meaningful poverty reduction. Essentially, for livelihoods to be considered sustainable, it must be able to meet the needs of both the current and unborn generations. People should therefore have access to the assets for productive activities towards obtaining decent living standards. Sustainable livelihoods are contingent on careful planning in a participatory and all-inclusive manner. In order not to engender exclusivity in sustainable livelihood planning, the poor, who are most vulnerable, should be considered as major stakeholders in the planning process despite the little influence they have over the decision-making process (Acquah et al., 2020; Forson et al., 2016; Forson, Janrattanakul, & Carsamer, 2013).

With these understanding, the efforts aimed at promoting sustainable livelihoods in mine host communities should aim at the creation of social, economic, institutional and environmental conditions for both the current and future generations. Livelihoods that yield short-term gains, no matter their impact on the people and environment are travesty to the concept of sustainable livelihood. With these as the bases, livelihoods in mine host communities should not be solely dependent on the minerals which are finite commodities but must continue to guarantee decent standards of living even after closure of mines. This will forestall the development of ‘ghost towns’ which emerge after the closure of mines.

2.2 Overview of ASM in the Tarkwa-Nsuaem Municipality

The Tarkwa-Nsuaem municipality is one of the areas in Ghana with the highest concentration of ASM operations. The operations take place in or near many communities in the municipality. This situation could be attributed to the fact that the geological formations in the municipality are the mineral laden Tarkwaian and Birimian formations as already discussed in chapter six. According to the municipal office of the Minerals Commission, only 15 small scale operations are licensed while majority of them are unlicensed (galamsey) and operate on the blind side of the law. Even though they are aware of the operations of some of the “galamsey” activities, it is difficult for the Commission to prevent them from operating. This is due to the fact that some of them operate in old or abandoned mines or in remote areas. Although “galamsey” activities have given rise to concerns relating to environmental degradation, social disintegration and health and safety risks in the municipality, it is practically impossible to mount a 24 hour guard in every part of the municipality.

The Municipal Office of the EPA, the Traditional Council and Assembly members interviewed alluded to the fact that they receive regular complaints about pollution of water bodies and other negative environmental practices of the ASM groups. According to the Municipal Officer of the EPA, Tarkwa, the municipal capital is located on the abandoned mines of the defunct SGMCO at Tarkwa which used to operate underground. This abandoned underground mine is made up of an intricate network of inter-connected tunnels. They are accessible through about 64 different entry points called ghettos dotted around the township. Figure 1 shows one of such ghettos at Bakoakhu near Tamso.



Figure 1. Abandoned Mine Pits Serving as Entry and Exit Points for ASM

Note: The ghettos make it possible to enter the mine at one end and resurface at an entirely different point. It is therefore very difficult to monitor or control the activities of the *galamsey* operators in the municipality.

The aggressive nature of ASM activities particularly *galamsey* pose a significant threat to life and property. For instance, the University of Mines and Technology Basic Schools' buildings (see Figure 2) had a lot of cracks due to the underground blasting activities of *galamsey* operators. This has rendered the buildings unsafe. The Morning Star Hotel which is located close to the school and other houses also experienced similar problems. This led to a lot of confrontations between the owners of the properties and the law enforcement agencies. The confrontations were fuelled by their perception that the security agencies are complacent in the ASMs' use of dynamites for mining. Following numerous complaints from residents and property owners, the Municipal Assembly commissioned a committee made up of the Minerals Commission, Environmental Protection Agency, Bureau of National Investigation and the Ghana Police Service to investigate the issues. One of their notable recommendations was to seal all the openings leading to the defunct underground mine. This has not been implemented and there is no indication that it will be implemented anytime soon. All the relevant agencies contacted in the course of the study could not provide any reason for the non-implementation of the recommendations made earlier. Meanwhile ASM activities keep on increasing in the municipality both underground and on surface (Hinton, 2005).



Figure 2. Cracks on the UMAT Nursery School Block

Note: These cracks are incessantly caused by underground blast from *galamsey* operators in the municipality.

3. Methods and Techniques

This is a case study. According to Yin, a case study approach is an empirical inquiry that investigates a contemporary phenomenon in detail bounded by its real-life context especially when there are no clearly well-defined boundaries between phenomenon and context (Yin, 2009). Case study provides the opportunity for an intensive analysis of many specific details that are often overlooked. It is useful for studying a community, group, an episode, a process, an individual, a society or any other units of social life. Yin further posits that one of the key strength of the case study research design is that it can focus on specific and interesting cases and it provides the investigator with more realistic responses. Kumeckpor (2002) on the other hand views a case study design as an approach that critically and systematically examines circumstances and factors that leads to a particular situation, condition or even an event. Premised on these arguments, the case study research design was adopted for this study. The identified characteristics of the research approach would help in understanding comprehensively the dimensions and manifestation of the relationships existing between ASM and sustainable livelihoods in mining areas in Ghana particularly the Tarkwa- Nsuaem Municipality. Alternatively, the case study research design was used to examine the prospects of introducing sustainable sources of livelihood in the Tarkwa-Nsuaem Municipality.

The authors used secondary data and interview questionnaires to collect data from a sample of 400 household heads, nineteen institutions, six Artisanal and Small-scale Mining (ASM) firms, six mineral processing companies, and two gold buying agents, and traditional authorities from the Tarkwa-Nsuaem Municipality. Key informants questionnaire interviews were administered to household heads, and heads of the institutions who served as participants in the study. Descriptive and explorative approaches to case study analysis were used to analyse data.

4. Result and Discussions

Demographic Characteristics

The Tarkwa-Nsuaem Municipality had a total projected population of 107,712 for the year 2009 and a population growth rate of 3 percent. There are more males than females in the municipality with 50.8 percent of the total population being males while 49.2 percent are females. The male dominance in the municipality is attributed to the higher number of male immigrants flocking to the municipality in search of jobs in both ASM and LSM companies.

Agriculture is the major economic activity in the municipality. Other economic activities are industry and commerce. About 68 percent of the economically active population are engaged in the agricultural sector whilst the remaining 32 percent are engaged in the area of commerce and industry.

Agricultural activities are mainly on subsistence level. According to the Municipal office of MoFA, the average farm size is 2.5 acres. The main crops cultivated in the Municipality are cassava, plantain, cocoa and oil palm. There are seven commercial banks, five rural banks and about five financial institutions across communities in the Municipality. Standard Chartered Bank, Ghana Commercial Bank, Stanbic Bank, Social Security Bank, and Ecobank are the existing commercial banks. The Social Security and National Insurance Trust, State Insurance Corporation, Gold Coats Securities, Consumer Credit Limited and Metropolitan Insurance Company are the other non-banks institutions available.

The highest income earners in the Municipality are mining workers followed by construction and consultancy firms respectively in the Municipality. According to the Municipal Labor Officer, many mining and mine related industries employ a lot of people in the municipality. Notable among them is Goldfields Ghana Limited which employed 2,488 people in 2011. Some of the mine related or auxiliary companies are; Liebherr, Allterrain Services, BANLAW, Group Five, AEL, G 4 Security and OTR Tyres. Most of these companies employ skilled personnel such as; heavy and light duty mechanics, welders, auto mobile technicians, heavy equipment and machine operators and people with skills in financial administration and management. According to the Traditional Council, majority of the people employed by the LSMs and the mine related or auxiliary companies are not natives of the municipality since most of the natives lack the requisite skills.

People in the agricultural sector are the least income earners in the area, with an average of GH¢2,400 (approximately USD \$600ⁱⁱ) per annum. According to the Municipal Plant Protection Officer, the labour force in the agricultural sector has been decreasing due to the fact that people find ASM more lucrative. Farms and farmlands have also been destroyed by mining activities. Chemicals such as mercury and cyanide used by miners also destroy crops and farmlands. Workers in the mining sector averagely earn above GH¢ 9,600.00 (approximately USD \$2,400) per annum.

ASM Activities and their Short Term Effects on Livelihoods

ASM activities exist as either legal or illegal activities and they affect livelihoods in two different ways. Negative effects include deteriorating the capabilities, assets (including both tangible and intangible resources) and activities required for a means of living; and positively by providing avenues and conditions that facilitate the creation of capabilities, assets (including both tangible and intangible resources) and activities required for a means of living. The short term effects of ASM on livelihoods are normally experienced in the early

seasons of the activities where indigenous and traditional technical abilities are highly prominent with little or no capital investments in the activity. Table 1 summarizes the effects of ASM activities on livelihoods.

Table 1. The Short Term Effects of ASM Activities on Livelihoods

Positive Effects		Negative Effects	
<i>Natural</i>		<i>Natural</i>	
i.	Adoption of effective natural resource management practices	i.	Destruction of forest lands
		ii.	Destruction of soils and plant species
		iii.	Pollution of river bodies and underground water reserve
		iv.	Increase in illegal mining activities
<i>Human</i>		<i>Human</i>	
i.	Development of entrepreneurial skills	i.	Increased incidence of STDs
ii.	Training on sustainable livelihood programmes	ii.	Increased food and water contamination
		iii.	Increased respiratory diseases
		iv.	Destruction of formal educational activities
<i>Social</i>		<i>Social</i>	
i.	Provision of socio-economic infrastructure	i.	Destruction of basic infrastructure such as roads, water supplies, houses, etc.
ii.	Capacity training for Traditional Authorities	ii.	Loss of civil and human rights
iii.	Provision of local governance infrastructure; e.g. Information centres	iii.	Destruction of traditional local governance systems
iv.	Increased networks; CBOs and civil society activities	iv.	Adaptation to new cultural traits and systems
		v.	Increased domestic conflict on ownership of resources
		vi.	Loss of social networks as a result of relocation
<i>Economic</i>		<i>Economic</i>	
i.	Increased access to credits	i.	Landlessness (Loss of farm lands)
ii.	Provision of employment opportunities	ii.	Loss of crops and livestock
iii.	Creation and growth of productive activities (SMEs)	iii.	Unemployment
		iv.	Loss of customers and raw material suppliers

Source: Authors' Construct

From the negative perspective, ASM activities are detrimental to indigenous communities and the ecosystem they are closely linked with. These risks include but are hardly exhaustive to culture, exposure to introduced diseases, loss of territory, traditional livelihoods, and loss of control to outsiders (IIED & WBCSD, 2003).

Mostly ASM and other mining activities have problematic consequences including disruption of traditional and indigenous cultures and economic activities, exposure to sexually transmitted diseases, price hikes for basic commodities, pollution and displacement of conventional livelihoods. They most of the time have consequential effects for ethnic minority communities, including indigenous groups, and for gender relations (Bass & Dalal-Clayton, 2001). How these manifest in the lives of the people depends on how institutional systems, processes and mechanism for promoting effective decision making and development influence the translation of potentials to benefits for the people in mining communities. Local and national development policy frameworks and interventions, the interplay between the public and private sector in service delivery, creation of jobs and expansion of economic potential and traditional mechanisms and systems for local capacity development all influence the short to mid-term effects of ASM on the livelihoods of mining communities.

ASM Activities and their Long Term Effects on Livelihoods

The framework also identifies two main impacts of ASM activities on communities in the long term as impoverishment and empowerment. The backward linkage in the framework illustrates that these manifestations as much as they originate from the livelihoods choices of people also manifest within the livelihood environment. This means that, impoverishment and empowerment can be assessed by assessing the state of human, social, economic, natural and physical capital of communities in relation to the choices made as indicated in Table 2. The issues of impoverishment originates from the findings that the loss of livelihood assets limits the capabilities of communities for making a living and managing risks– affecting all the livelihood assets or capital that facilitate this process.

This is the stage where the culmination of the short run effects; after resettlement programmes, compensation and relocation interventions have been instituted; and the impacts of mining activities are actually felt. This stage emerges as a result of the utilisation and management of the systems warranting compensation for asset loss, implementation of local and national development policy frameworks and interventions on mining, institutionalization of effective collaboration between public and private actors and the adoption of effective and reliable Community Based Management Systems (CBMS). Yet all these would only have positive consequences depending on the quality of the institutional and organizational frameworks. For instance, it has often been documented that the institutional and organisational conditions providing compensation on asset loss do not in any way correspond to actual loss and sustenance of livelihoods. Downing et al. (2002) explains that no amount of compensation can adequately restore and enhance livelihood standards of communities subjected to forced displacement and expropriation.

Prominent among mining activities in Ghana is the increasing engagement in ASM. As a result, virgin forests have been cleared and ridges have been besieged and mined from top downwards through a series of benches. The degradation of large areas of land by the ASM constitutes a major threat to agriculture in the communities and consequently the economic wellbeing of the people in those communities. The increasing illegal ASM and the fast growing destruction of the vegetation illustrate the weakness of the institutional systems for controlling ASM.

However the reverse is true if the capacity of institutions to deal with ASM is enhanced. Thus institutional and organizational conditions for translating potential to benefits in a way are imperative for managing and reducing risks and/or promoting livelihood enhancement. On the other hand, ASM activities in the long run results in consequential positive impacts and this has been captured as “Empowerment” in the framework. Empowerment means that people or communities do not diminish but rather improve their livelihoods and enhance their cultures.

Table 2. The Long Term Effect of Mining on Livelihoods

Empowerment	Impoverishment
<i>Natural</i>	<i>Natural</i>
<ul style="list-style-type: none"> • Re-forestation • Reclamation of closed mines 	<ul style="list-style-type: none"> • Dead fauna and flora • Polluted water bodies
<i>Human</i>	<i>Human</i>
<ul style="list-style-type: none"> • Increased accessibility to basic services • Improved health status 	<ul style="list-style-type: none"> • Poor access to social services • Poor health status
<i>Social</i>	<i>Social</i>
<ul style="list-style-type: none"> • Reduction in vulnerability • Reduction in exclusion • Increased advocacy • Increased investment from royalties • Improved demand for local investment by mining companies 	<ul style="list-style-type: none"> • Increased vulnerability • Increased exclusion • Insecurity • Loss of community identity
<i>Economic</i>	<i>Economic</i>
<ul style="list-style-type: none"> • Improved income levels • Increased production and productivity • Satisfaction of basic needs 	<ul style="list-style-type: none"> • Low income levels for indigenous economic activities dependent on land • Low production • High cost of living

Source: Authors Construct

Livelihood Outcomes and Level of Well-being

All these consequences would result in inducing impoverishment and enhancing empowerment defined in terms of poverty and sustainability and therefore suggests whether livelihood choices and actions have been effective, responsive and sustainable. This would therefore be evident in the reduction or escalation of poverty which can be observed in the dimensions of society from the social, economic, natural, and physical perspective as depicted in the backward linkages. These may include increase in income levels, increased production, improved food security and health status, reduced vulnerability, more sustainable use of natural resources and enhanced capacity to manage risks and shocks or the negative state of these variables or measurements. Similarly at this level, institutional and organizational issues play critical roles in the management of ASM activities after critical livelihood choices have been made. Most evident at this stage are issues relating to policy outcomes, findings from poverty and livelihood assessment and the review of policy reforms for ensuring sustainability (Akabzaa & Darimani, 2001). Community institutional structures and organization are transformed in ways that may support or hinder livelihood activities of the people. This will affect the level of well-being.

Environmental Impact of Mining Activities in the Tarkwa -Nsuaem Municipality

ASM activities in the Municipality have negatively affected the natural environment. For instance, they have contributed to the degradation of the natural environment and the destruction of the ecosystem (Amevor, 2008). The open cast method which is practised extensively and intensively has had devastating effects on the environment. Through mining activities, hills have been graded down, vegetation covers of soils have been removed and deep pits have been created. Large tracks of land have been extensively degraded by the activities of large-scale mining companies, licensed small scale companies and illegal operations in most communities. Trees are extensively cut down and used as props in mine pits; they are also used as fuel wood to dry the ore and to build shelter on most of the ASM

sites. The use of fuel wood and growth of settlements have also contributed to the environmental degradation experienced in the municipality.

Pollution of water bodies is also a major problem associated with mining activities in the municipality. Seepage of heavy metals into underground water is a potential hazard from mining to the natural environment. Some community water sources such as streams and rivers have been polluted. A typical example of such rivers is River Bediabewo at both Efuanta and Bakoakohu near Tarkwa. Figure 3 shows the extent of siltation and pollution of the Bediabewo River. This has resulted in various public health hazards in the Municipality. For instance, according to the Municipal Health Statistician, diarrhoea was the fifth most common outpatient disease (OPD) in the municipality in 2008 and 2009. It was also the third most common cause of death in 2009. Dust pollution has led to the prevalence of diseases such as tuberculosis and skin irritation. For instance, acute respiratory infections were the second most common OPD disease in 2008 and 2009. Skin diseases and ulcers were the fourth most common OPD disease for the same period.



Figure 3. Siltation and Pollution of River Bediabewo near Tarkwa

Note: Some community water sources such as streams and rivers have been grievously polluted. This has resulted in various public health hazards such as diarrhea. It should be noted that Diarrhea was the fifth most common outpatient disease (OPD) in the municipality and the third most common cause of death in the municipality in 2009.

Another area of the destruction of the natural environment is the creation of numerous uncovered pits in mining communities in the municipality. The Wassa Fiase Traditional Council is concerned about the pits that are left uncovered after mining. They are of the view that both large and small scale mining companies are guilty of this offence. The Traditional Council (TC) is of the view that it is the government's responsibility to ensure that these pits are covered before new concessions are given. The money deposited at the Chamber of Mines to be used to cover pits left behind by mining companies should be used for such a purpose in the area.

According to the Municipal EPA Officer, there are many uncovered pits dotted all over the mining communities of the municipality. Some of these pits are partially covered by vegetation and this is dangerous to both human beings and animals. Environmental

degradation is compounded by the activities of the ASMs particularly the unlicensed ones which operate at subsistence level to survive on daily basis and do not care about the long term effects of their activities on the environment. Even though both the municipal offices of the Minerals Commission and EPA carry out monitoring activities and also carry out educational programmes, they lack the capacity to effectively check the activities of the ASMs especially those in remote and inaccessible areas. The EPA for instance has only two permanent staff, a small office space and no laboratory.

Economic Activities Generated by the Small Scale Mining Companies

Apart from food vending, other economic activities have been generated by the activities of the small scale mining companies. For instance, at the Nana Yefri concession, due to the distance from the site to the nearest largest community, a taxi station has been created a few metres away from the site. A drinking spot is also located close to the taxi station. This is in spite of the fact that the management said drinking and smoking were not allowed at the site. It was discovered that some of the workers do what is known as ‘drink/smoke and carry’.

Additionally, due to extensive clearing of the forest or vegetation, charcoal burning is also actively done close to the site as indicated in Figure 4. According to the Municipal offices of the Ghana Private Road Transport Union (GPRTU) and the Metro Mass Transport, ASM activities have also facilitated their work. Many people move to the municipality in search of job and also some move from one place to the other either within the municipality or to other parts of the region and country regularly. Again, most of the equipment and other goods and services used by the ASM miners are brought into the municipality by traders from Kumasi, Accra and Takoradi. Most of these goods are transported through the GPRTU vehicles and Metro Mass Transport Service and this has helped to keep these transport businesses which employ a lot of people in business. For instance four Metro Mass buses leave Tarkwa each morning before 7.00 a.m. and the same number leave Kumasi for Tarkwa in a day. GPRTU vehicles also ply the same route 24 hours a day and most of their passengers are mainly traders. It was also observed that various group of traders do a lot of business at the various companies. For example, clothing, drugs and domestic items such as radio, sound systems, cooking utensils and other items are also hawked at the sites. Various shops have also been set up to sell items that are mainly used by the workers such as rubber pans, rubber sandals, flash lights, sacks and other items used by the ASM workers in nearby communities.



Figure 4. Charcoal Burning Activities Near Nana Yefri Mining Concession

Contribution of Mining to the Development of the Communities in the Municipality

The analyses of the nature of ASM in the mining communities have revealed that the sector serves as a major source of livelihood to most people especially the youth in the communities. The sector's quick economic returns, a belief shared by both current and former employees, have been an attracting force for migrants from both within and outside the Western Region into the mining communities. The economic potentials have also retained the economically active age-group who otherwise would have migrated out of the communities due to limited employment opportunities. These individual benefits are expected to culminate into community development. The next part of the chapter examines the contribution of the ASM to the development of the mining communities.

Two main observations relating to economic empowerment were made by the study in the Municipality. Mining provides employment and income for respondents and 50.50 percent of the household heads interviewed were employed in the mining sector. This was an increase from the 22.80 percent of respondents who were initially engaged in the activity. Mining therefore is the main source of occupation of households in the host communities and offers the mechanism for human welfare development and conditions for sustainable livelihood development in the Municipality.

Adopting alternative livelihood approaches is critical since the mining sector is not able to employ most of the unemployed youth of the municipality. The approach is associated with the dependency theory and the economic principle of diversification. It was realised that the continuous dependence on one source of livelihood could trigger vulnerability in times of price fluctuations and seasonal imbalances especially for economic activities such as ASM. It becomes more critical as exploration is experimental and with little productivity. Evidence from the study suggests that returns on mining are being invested in other occupations such as artisan, housing, and trading as respondents have come to realise the eccentricity of the occupation they are engaged in.

The study shows that 69.23 percent of the miners had invested in other jobs and this provides evidence of the desire for livelihood diversification which must be supported with

capacity building interventions and systemic efficiency to facilitate a thriving diversified local economy. This is where local economic development interventions come into play.

From the study, it was also evident that income levels had also generally increased per the responses from the inhabitants. Initially, 13.50 percent earned below GH¢ 50.0 a month. Only 1.50 percent of the respondents earned below GH¢ 50.0 at the time of the survey and this was an indication of increasing income levels of respondents. Even though the proportion of respondents who earned between GH¢ 51-100 a month declined, the movement resulted in increases in the proportions of those who earned between GH¢ 151 to above GH¢ 250 per month.

The critical factor which influenced this dichotomy is the kind of occupation that respondents of the municipality were engaged in. Comparing initial and current earnings from income levels, it was realised that farmers constituted the least proportion for all the income levels. It however witnessed increases in proportion in income levels after the introduction of mining activities. For instance, 5.16 percent of those engaged in farming earned GH¢ 51-100 per month as compared to 22.50 percent in the same category. Several differences were observed and this tends to suggest the marked contribution of the mining industry to the income levels of inhabitants in the Tarkwa-Nsuaem Municipality.

Generally, mining has enhanced the living standards of people in the host communities. Comparison between initial and current household financial status indicated marked improvement in financial standings for miners than any other occupation. Similar evidence was identified among farmers with varied observations made for those engaged in trading. For instance, 56.25 percent indicated that they were financially inadequate when previously engaged in farming compared to the 72.03 percent currently engaged in mining. Proportions of miners who indicated that their financial standings was moderate also increased from 73.82 percent to 84.62 percent and those who indicated poor financial status declined from 85.93 percent to 34.29 percent. This demonstrates the effects of mining as a major source of employment and income in the study communities.

Even though traders indicated that their income levels had increased, it is evident that this had not necessarily translated into higher financial standings. The proportion of traders who indicated adequate financial standings declined from 43.75 percent to 16.10 percent while those who indicated poor financial standings increased from 0.74 percent to 54.29 percent. This suggests that higher income levels may not necessarily translate into higher financial standings as issues of cost of living must be taken into account.

The study revealed that on the average, 85.0 percent of respondents indicated the main economic activity taking place in their communities was ASM particularly, “galamsey”. Most respondents (i.e. 74.30) indicated that mining had affected the environment of their communities in various ways while 25.70 percent stated the contrary. The effects of mining were pronounced in area councils where artisanal and small-scale mining especially “galamsey” were predominant. For instance, respondents in Tarkwa, Pepesa, Nsuaem, Benso and Pepesa West where artisanal and small scale mining activities recorded proportions of 95.0 percent, 98.30 percent, 63.90 percent, 73.30 percent and 76.70 percent of respondents affirmed the effects of mining on the communities. Similarly, 53.70 percent of respondents in the Nsuta Area Council indicated that mining has had effect on their environments. This suggests that ASM activities have had dire effects on the communities in these urban/area councils. Respondents indicated several negative effects of

mining activities on the environment in their various communities. The study identified uncovered pits, polluted lands by poisonous chemicals such as mercury and cyanide, polluted water bodies and destroyed farmlands as evidence of the negative effects associated with ASM activities. According to Todaro and Smith (2003), the quality of environment is a vital element in enhancing overall quality of life and future growth. However, persistent poverty is the root of much locally caused environmental degradation. The endowments of communities including its air quality, land and water is a collective heritage for posterity. The indiscriminate destruction of endowments in pursuit of the “GDP is good” phenomenon penalises both present and future generations.

From the study, respondents indicated that they had benefited both positively and negatively from mining. Employment, income and job security were the examples cited by respondents as positive effects of mining to them. However, respondents also indicated negative effects of mining on them. Citing personal experiences, respondents identified that mining had resulted in increased prevalence of diseases, led to destruction of farmlands, pollution of water bodies, and pollution of air through blasting.

Apparently, the respondents indicated that mining companies were not doing much to enhance the benefits and reduce the negative effects. Evidence from the field revealed that 46.98 percent of respondents were of the view that mining companies were helping mostly through sensitisation while 53.02 percent of respondents felt that no effort had been initiated by mining companies. This provides an indication of the levels of satisfaction of people with mining companies in the Municipality and provides for increase in partnership between mining companies, ASMs and members of host communities.

5. Implications for Policy Intervention and Action

Based on the consequential impact of ASM activities, two response measures are imperative. The first builds on the benefits that accrue as a result of ASM activities. This has been identified as “*measures of enhancement*”. The underpinning rationale connotes the interventions to build the capacity of SMEs, to optimise social investment by mining investors as well as promote policy measures that fundamentally aim at sustaining benefits from ASM activities as well as optimising the potentials that are associated with ASM activities while minimizing risks and shocks. It includes reviewing policy and regulations to build the capacity of ASM to be more environmentally friendly and economically efficient.

In the area of impoverishment, it is identified that the negativity associated with ASM activities needs to be eradicated or reduced. To this, policy measures are to aim at providing interventions that would remove issues that reduce the capabilities and assets of making a living and providing mechanisms that facilitate the creation of new capabilities and assets for making a living. Research evidence have shown that the restoration of livelihoods must begin with the identification of all potential impoverishment risks at the outset and then efforts put into mitigating or avoiding them. LSMs can help by developing the capacities of ASMs and subletting part of their operations to them in a way to reduce illegality and promote efficiency. Legalising ASM therefore would encourage the initiation of livelihood programmes to mitigate the negativities of ASM activities through Sustainable Livelihood Programmes.

The critical awareness should therefore be to appreciate the importance of translating interventions to benefits and reduction in impoverishments. In terms of research, all these key issues must be integrated in the definition of variables so as to effectively capture the

dynamics and intricacies of sustainable livelihoods in mining communities. This framework therefore provides an analytical and programming mechanism for promoting SD through the understanding of the impact of ASM activities on the livelihoods of communities. This approach is strong in its comprehensiveness in identifying the short term and long term effects of ASM activities in a multi-sectoral manner warranting interventions to consolidate or enhance livelihood systems and their outcomes from a similar perspective.

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ⁱ A *galamsey* is a local artisanal gold miner in Ghana, West Africa; such workers are known as *orpailleurs* in neighboring francophone nations. Galamseys are people who do gold mining independent of mining companies, digging small working (pits, tunnels and sluices) by hand. Literally the term *galamsey* means to ‘*gather*’ and ‘*sell*’.

ⁱⁱ Approximation based on 2016 exchange rate of \$1 USD = GHC 4.00.