

**THE IMPACT OF GOLDEN STAR WASSA LIMITED (GSWL) OPERATIONS ON ITS  
CATCHMENT COMMUNITIES**

**By**

**KNUST**

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**Declaration**

I, Dennis Owusu Boateng, the author of this project, hereby declare that except for the references to other people’s work, which I have duly acknowledged, the work presented here was actually carried out by me. I also declare that this work has never been submitted partially or wholly to any institution for award of a degree.

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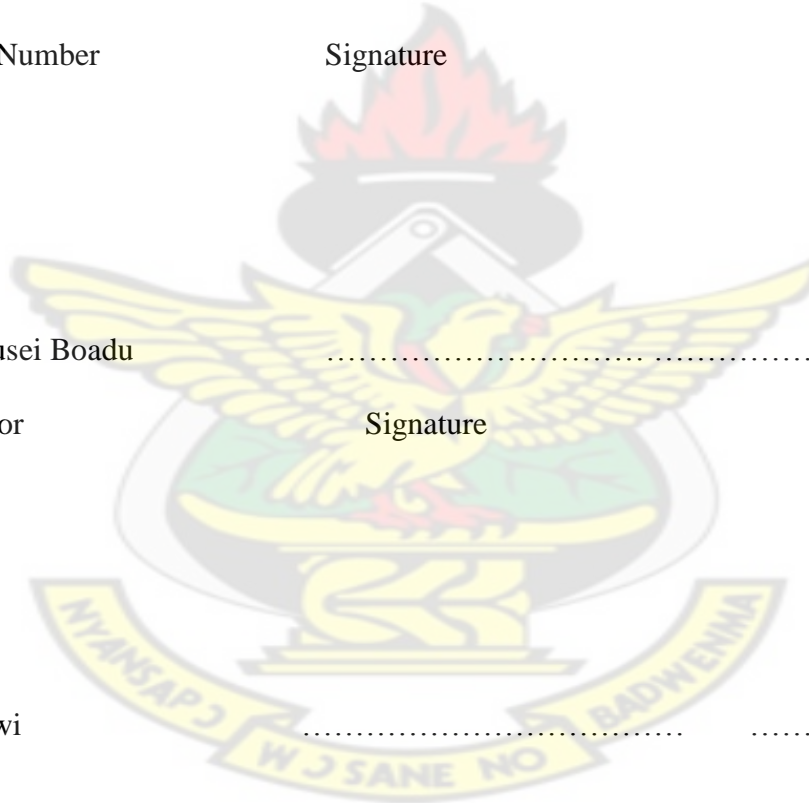
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## ABSTRACT

The study was designed to investigate the impacts of mining on its catchment communities with specific reference to Golden Star (Wassa) Limited operational area. The study covers part of the Mpohor Wassa East District and Tarkwa Nsuaem Municipal Assembly (Akyempim, Benso, Subriso, Ningo and Mpohor which forms the main operational area of GSWL). The descriptive survey was used for the study with a sample size of 40 people. The data collection instrument was questionnaire. Data collected was processed using the Statistical Product for Service Solutions (SPSS). Findings of the assessment indicate that, most GSWL communities have benefited in diverse ways from the company. It was established that, GSWL has a community relation's policy which shows the company's commitment in meeting its corporate social responsibilities. Specific benefits identified during the study include the construction and regular maintenance of access roads, employment for the youth within the area, provision of scholarship for brilliant but needy students, established and implemented alternative livelihood programmes and the provision of skills/vocational training. In addition, social corporate responsibility of the company is evident in the construction of school blocks, clinics and social/community centers. Unlike other mining companies, GSWL has recorded comparatively few community clashes and demonstrations, as a result of being swift in addressing almost all emerging community related issues. It was concluded that GSWL has established and maintained a good relationship with local communities in the mine operational area. It has undoubtedly improved the living standard of the people through the provision of some basic necessities of life as indicated above.

Notwithstanding however, it is recommended that livelihood programmes must be focused on those with readily available markets. Youth training programmes must also be tailored towards specialized skills to be able to address the employment needs of the youth more adequately.

## DEDICATION

This work is dedicated to my wife, Doris Boateng Yawson (Mrs.), my children; Abena Boatemaa Sekyere and Nana Yaw Dagan Sekyere

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## ACKNOWLEDGEMENT

Praise is to God Almighty for his plentiful grace and mercy for seeing me through this course.

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Special thanks go for the District and Municipal Chief Executives and Coordinating Directors of the Mpohor Wassa East District and Tarkwa Nsuaem Municipal Assemblies, The Western Regional Inspector of Mines and the Environmental Protection Agency's office – Tarkwa.

To management and staff of GSWL, here is my heartfelt appreciation; especially to you, Charlotte Fafa Tay, Zacharia Issah, Francis Sefa and Oscar Dawohoso, I say thank you.

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# CHAPTER ONE

## INTRODUCTION

### 1.0 Background to the Study

Mining operations in Ghana dates back to the pre-colonial era in historical towns like Tarkwa, Prestea, Obuasi and Konongo just to mention but a few. Some studies believe that mining has over the years contributed immensely towards Gross Domestic Product (GDP) and socio-economic development of Ghana in terms of provision of employment (direct and indirect) and social infrastructure. However, some studies also report that the negative effects of mining such as water, air and noise pollution and general deprivation of fertile lands for agriculture purposes leave the people much poorer in relative terms than they were before. The overall effect of mining is therefore negative (Antwi-Boasiako, 2003). Surface mining is used when deposits of commercially useful minerals or rock are found near the surface. The mines are typically enlarged until either the mineral deposit is exhausted, or the cost of removing larger volumes of overburden makes further mining uneconomic. The main types of surface mining in gold production are strip mining and open-pit mining. Open-pit mining is the type of surface mining that has been used by most mining companies in Ghana including Golden Star Wassa Limited (GSWL). This form of mining provides faster and cheaper means of extracting gold than underground mining and at the same time, mining workers face lesser risk of dying from toxic fumes which makes it safer. However, surface mining has a greater impact on the environment due to the destruction of surface landscapes, and as such greatly affects the lives of mining communities in terms of socio-economic wellbeing and their health.

## 1.1 Problem Statement

World Bank Group (2011) points that mining companies provide their communities with direct and indirect employment, skills training, health and educational amenities, improved social and economic infrastructure, and support to small and medium business enterprises. However, there is another school of thought that mining operations have adverse effects on the local population in affecting their traditional means of livelihood, influx of newcomers to the area, which put pressure on existing but inadequate social amenities, rising cases of social vices (e.g. teenage pregnancy), and causing environmental problems ranging from waste rock and tailing disposal, land disturbance, air, water and noise pollution and ground vibration as a result of blasting. They therefore argue that problems that are associated with mining activities far outweigh the benefits.

A careful observation of GSWL activities at the catchment areas in terms of social responsibilities reveals that most catchment communities have socio-economically been improved although there are other confronting challenges which are yet to be met. For example, in attempt to improve educational standards in its catchment area, GSWL has supported about one hundred (100) senior high school students in the Akyempim, Benso and Mpohor (HBB) operational areas for the past three years. GSWL has also constructed basic school blocks at Old Subri, Akyempim, and Ningo and has supported about fifty (50) teachers with monthly allowance package during the same period. In attempt to ensure smooth transportation of people, goods and services, GSWL regularly maintains major roads like Akyempim-Ateiku road, Benso-Manso road and Mpohor Cold Store bypass road. It is significant to note however that the expectations of a sizeable number of the youth in terms of acquiring skills and improvement in income levels have still not been met in full. For example, out of about five hundred (500) youth

who applied for training under the Golden Star Skill Training and Employable Programme (GSSTEP) in 2011, only about sixty had the opportunity to acquire training in one field or the other. Again, under the Sustainable Livelihood Programme piloted in 2010 and 2011 respectively at Akyempim and Ningo/Subriso recorded just about 20% success.

## **1.2 Objectives of the study**

Generally, the main objective of this study is to provide an overview of the impacts that GSWL operations have on the lives of the people living in its catchment communities.

## **1.3 Research Objectives**

Specifically, the study seeks to meet the following specific objectives;

1. To investigate the operational activities of GSWL.
2. To identify the sources of livelihood of the communities in the GSWL catchment areas.
3. To assess the impact of GSWL mining operations on the livelihood of catchment areas.
4. To suggest ways of enhancing the living standards of these mining communities.

## **1.4 Research Questions**

This study is based upon the following research questions:

1. What is the impact of GSWL's operations on the livelihoods of catchment communities and the environment?
2. What benefits have accrued to the people/communities in GSWL's catchment area?
3. To what extent has GSWL impacted on the livelihood of the people in its catchment area?
4. In what ways, can the living standard of the people in GSWL catchment area be enhanced?

## **1.5 Significance of the study**

The study is important to assess the actual contributions of GSWL to its catchment communities and the extent to which the living standards of the people have been improved. It is believed that this will give a clear indication to policy makers and legislators both at the centralized and decentralized levels to be able to make informed decisions not only to consolidate gains but minimize losses if not eradicating them completely. The study will also give the regulatory bodies like the Mineral Resource Commissions and the Environmental Protection Agency, the bases to review their mining procedures and guidelines to ensure environmental sustainability for both present and future generations. The government, chiefs, civil society organizations and other interest groups would thus be informed on the real or opportunity cost of mining through an objective cost-benefit analysis of mining operations.

## **1.6 Delimitations**

The study is delimited to the operational area of GSWL. GSWL operations cut across boundaries of three districts of Mpohor Wassu East (Akyempim and Mpohor), Tarkwa Nsuaem Municipal (Benso) and the Ahanta West (Prestea and Awonakrom) districts. This study however limits its scope to only instructors of the Mpohor Wassu East district and Tarkwa Nsuaem Municipal Assemblies.

## **1.7 Organization of the study**

The study is organized into five chapters including chapter one. Chapter two provides a review of related literature on the impacts of mining on catchment communities and the environment. Chapter three discusses the methodology employed for the study while chapter four deals with

empirical results and discussions of the findings of the research conducted. Chapter five covers a summary of findings, conclusion of the study, and appropriate recommendations.

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## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### 2.0 Introduction

Surface mining is used when deposits of commercially useful minerals or rock are found near the surface; that is, where the overburden (surface material covering the valuable deposit) is relatively thin or the material of interest is structurally unsuitable for tunneling. The mines are typically enlarged until either the mineral deposit is exhausted, or the cost of removing larger volumes of overburden makes further mining uneconomic. The main types of surface mining in gold production are strip mining (the practice of mining a layer of mineral by first removing a lengthy strip of overlying soil and rock) and open-pit mining (the technique of extracting rock or minerals from the earth by their deduction from an open pit or borrows). Open-pit mining is the type of surface mining that has been used by most mining companies in Ghana. This form of mining provides a faster and cheaper means of extracting gold than underground mining. At the same time, mine workers faces a lesser risk of dying from toxic fumes, which makes it safer. However, surface mining has a greater impact on the environment due to the destruction of surface landscapes, and as such greatly affects the lives of mining communities in terms of health and socio-economic wellbeing. This chapter will therefore seek to reviewing literature on the impacts of surface mining in these aforementioned areas and also discusses sustainable mining development. The literature will serve as a basis for analyzing findings from the field survey.

## 2.1 Mining and Opportunities

The discovery, extraction and processing of mineral resources is widely regarded as one of the most environmentally and socially disruptive activities undertaken by business (Peck & Sinding, 2003). Indeed, as Warhurst (2001) notes, many of the environmental disasters or human rights incidents that have contributed to the growing public concern about the actions of companies over the last 40 years have taken place in the extractive industries: the mining sector, therefore, is a key topic in debates about social and environmental responsibility (Cowell *et al.*, 1999). On the other hand, it is believed that mining operations present a lot of benefits for communities where such mining takes place and the country at large.

## 2.2 Positive Impacts

According to Antwi-Boasiako (2003), on the national level, fiscal income generated through taxes collected from mining operations forms a substantial part of the government's revenue which can be used to implement a lot of poverty reduction interventions strategies. According to a report from the World Bank on "mining and development", Tax receipts from a single mining company can amount to 30% to 50% of a country's fiscal income (Anderson, 1991). Antwi-Boasiako (2003) notes that in Ghana taxes from the mining sector accounts for between 35% and 45% of revenue generated by government. According to Anderson, (1991) studies have shown that the contributions of privately owned mining companies to national development are much encouraging than state-owned mining operations. On the regional and local level, any large-scale mining operation has the potential to significantly and positively

affect economic opportunities for the poor (Anderson, 1991). Turner (1998) notes that in the region where the mining operation is located, it can provide:

Substantial additional employment opportunities—with higher income generation potential than most, if not all, other employment in the area; and

Investments in basic public infrastructure, goods, and services with universal access, for example, transport, water, and power - this creates opportunities for the local people. According to Barry (1996) aside from a mining operation's direct employment impact, there is substantial potential for developing downstream and lateral economic activity with suppliers and refiners, particularly for small- and medium-sized enterprises, in turn generating employment opportunities for non-miners surrounding area. According to him employment generated indirectly by a mining operation amounts to a range of between 2 to 25 times the number of direct employees, in certain cases even more than that. (World Bank, 2001) gives as examples Yanacocha in Peru, and Ok Ted in Papua New Guinea, from where studies have shown that every dollar spent by a mine on operations could generate an average of 2.8 dollars in the local economy, in terms of induced economic activities. Antwi-Boasiako (2003) notes that the contribution of mining to private sector investment is well documented. According to him, a successful mining operation can serve as a catalyst for further inflow of private-sector investment in a country or region if it takes place within a supportive policy context characterized by reliable regulatory frameworks. The World Bank (2001) notes for instance that coal mining which has helped countries with significant coal resources such as China, India, and South Africa to access cheap energy, thereby fueling these countries' economic growth and creating further opportunities for those not involved in the mining sector. According to Akabzaa and Darimani (2001) the most publicized benefits of the increased mining sector investments

resulting from Ghana's economic reforms include the following: - Mining being the leading earner of foreign exchange- Providing substantial government revenue- Providing capital and social infrastructure to the public- Generating direct and indirect employment- Developing communities in mining areas. However, according to Akabzaa and Darimani (2001) while in gross terms, mining is the leading foreign exchange earner; its net foreign exchange contribution to the national economy has been minimal. Generous incentives and tax breaks given to investors and the fact that mining companies retain on the average about 75% of their export earnings in off-shore accounts for various purposes helps explain the sector's minimal contribution to net foreign exchange receipts. Antwi-Boasiako (2003) also observes that most of the companies in Ghana do not pay corporate income taxes due to the virtual tax holiday enjoyed by these companies as a result of the generous capital allowances. Another issue with surface mining is that it has relatively limited capacity to generate employment (Akabzaa & Darimani, 2001).

According to them, it is so because surface mining operations are capital-intensive with relatively low labor requirements. Antwi-Boasiako (2003) also adds that the revenue generating potential of mining may not always be used as efficiently as possible, particularly in the context of governance and corruption issues and where state ownership of the mining operation is involved.

### **2.3 Negative Impacts**

According to Mensah (1998) the poor are at some risk of not participating in the economic opportunities of mining while at the same time bearing many of the costs as well as risks that result from the introduction of a mine in an undeveloped area. He notes that a large-scale mining operation requires major capital investment in infrastructure, technology, services,

and employment. However, the ability of the poor to participate in this investment is limited by their education and work skills. Antwi-Boasiako (2003) adds that what is even worse; their income sustaining opportunities and livelihood might be reduced due to the presence of a mine. This can happen in several ways (Mensah, 1998):

(a) the mine might use natural resources such as land and water on which in particular the poor may depend by limiting opportunities to generate incomes from agriculture, fishing, or hunting;

(b) the mining operation might use regional infrastructure services to the extent that the poor will entirely lose access, either due to the services' increased prices or due to simple capacity limits.

(c) higher incomes of mine workers can lead to rising local prices for key goods (food, fuel, land/housing) and services—with others in the area not only left behind, but with significantly shrunk real incomes. Antwi-Boasiako (2003) notes that environmental damage resulting from a mining operation, or left behind after mine closure, ranging from water pollution or restrained water quantity to tailings and subsidence, can seriously limit people's current and future income opportunities, in particular when dependent on agriculture, fishery, forestry or hunting. According to World Bank (2001) corruption and macro-economic mismanagement can severely limit the positive impact of mining creating opportunities on the national level. The World Bank (2001) gives an example of countries such as Congo and Zambia which have shown little overall development benefit from the copper production of the past decades, with state ownership and mismanagement characterizing the sector.

## **2.4 Environmental and Health Hazard**

According to Weber-Fahr (2002) surface mining though less dangerous than underground mining, has a greater impact on surface landscapes. Surface mining requires the removal of massive amounts of top soil in order to gain access to the minerals, which can cause erosion, loss of habitat, and dust pollution. It can cause heavy metals to dissolve and seep into both ground and surface water thereby erupting marine habitats and deteriorate drinking water sources. Vast agricultural lands are destroyed through surface mining, affecting food production in the country, and the sources of income for the people affected (Weber-Fahr, 2002). Pavloudakis and Roumpos (2004) note that the most dramatic change which occurs during surface mining is the disturbance and associated change in land configuration and vegetation. According to (Mensah, 1998) abandoned or orphaned mines, resulting from mine closure are often serious causes of concern, as they continue to cause ongoing pollution and potential public danger notes that damages to the environment during a mining operation can lead to further health risks that may be caused by a variety of effects, ranging from water pollution or restrained water quantity to dust, noise, and subsidence. According to Weber-Fahr (2002) a cross-study analysis of environmental damages as a result of mining operation in 51 mining countries across the globe put about 60% of the residents in these communities at risk.

The mechanisms that are considered to have greater potential of causing environmental damage are the following (Pavloudakis and Roumpos, 2004):-Modification of morphology leading to changes in hydrological pattern and loss of wild animal habitat and degradation of landscape value, which in turn leads to a reduction of property value;

- Topsoil removal leading to loss of agricultural land and increased surface run-off leading to loss of incomes and water pollution. According to a study commissioned by the European Union, because of the large area of land disturbed by mining operations and the large quantities of earthen materials exposed at sites, erosion can be a major concern at hard rock mining sites. Consequently, erosion control must be considered from the beginning of operations through completion of reclamation. Erosion may cause significant loading of sediments (and any entrained chemical pollutants) to nearby water bodies, especially during severe storm events and high snow melt periods. Sediment-laden surface runoff typically originates as sheet flow and collects in rills, natural channels or gullies, or artificial conveyances. The ultimate deposition of the sediment may occur in surface waters or it may be deposited within the floodplains of a stream valley. Historically, erosion and sedimentation processes have caused the build-up of thick layers of mineral fines and sediment within regional flood plains and the alteration of aquatic habitat and the loss of storage capacity within surface waters. The main factors influencing erosion includes the volume and velocity of runoff from precipitation events ,the rate of precipitation infiltration downward through the soil, the amount of vegetative cover, the slope length or the distance from the point of origin of overland flow to the point where deposition begins, and operational erosion control structures. Major sources of erosion/sediment loading at mining sites can include open pit areas, heap and dump leaches, waste rock and overburden piles, tailings piles and dams, haul roads and access roads, ore stockpiles, vehicle and equipment maintenance areas, exploration areas, and reclamation areas. A further concern is that exposed materials from mining operations (mine workings, wastes, contaminated soils, etc.) may contribute sediments with chemical pollutants, principally heavy metals.

- Air emissions (CxHy, COx, SOx, NOx) causing air pollution and life quality degradation and contributing to greenhouse effect. Airborne emissions occur during each stage of the mine cycle, but especially during exploration, development, construction, and operational activities. Mining operations mobilize large amounts of material, and waste piles containing small size particles are easily dispersed by the wind. The largest sources of air pollution in mining operations are; Particulate matter transported by the wind as a result of excavations, blasting, transportation of materials, wind erosion (more frequent in open-pit mining), fugitive dust from tailings facilities, stockpiles, waste dumps, and haul roads. Exhaust emissions from mobile sources (cars, trucks, heavy equipment) raise these particulate levels; and gas emissions from the combustion of fuels in stationary and mobile sources, explosions, and mineral processing. Once pollutants enter the atmosphere, they undergo physical and chemical changes before reaching a receptor (Figure 1). These pollutants can cause serious effects to people's health and to the environment. These air borne emissions from the mine's operation can affect the air quality of a surrounding community. Finer particles (often referred to as PM2.5 or smaller), which have a higher health concern, account for around 5% of mine dust emissions and are mostly generated by vehicle exhausts and combustion processes, similar to urban areas (U.S. Environmental Protection Agency, 2009)

-Disturbances (noise, vibrations, etc.) also cause life quality degradation and reduction of property value. Noise pollution associated with mining may include noise from vehicle engines, loading and unloading of rock into steel dumpers, chutes, power generation, and other sources. Cumulative impacts of shoveling, ripping, drilling, blasting, transport, crushing, grinding, and stock-piling can significantly affect wildlife and nearby residents. Vibrations are associated with many types of equipment used in mining operations, but blasting is considered the major source.



Vibration has affected the stability of infrastructures, buildings, and homes of people living near large-scale open-pit mining operations. According to a study commissioned by the European Union in 2000: “Shocks and vibrations as a result of blasting in connection with mining can lead to noise, dust and collapse of structures in surrounding inhabited areas. The animal life, on which the local population may depend, might also be disturbed” (MINEO Consortium, 2000).

- Discharges from pit protection wells causing drop of water table and increased flow in streams which also cause irrigation problems, floods and degradation of potential water uses. When an open pit intersects the water table, groundwater flows into the open pit. For mining to proceed, mining companies must pump and discharge this water to another location. Pumping and discharging mine water causes a unique set of environmental impacts that are well described in a study commissioned by the European Union: “Mine water is produced when the water table is higher than the underground mine workings or the depth of an open pit surface mine. When this occurs, the water must be pumped out of the mine. Alternatively, water may be pumped from wells surrounding the mine to create a cone of depression in the ground water table, thereby reducing infiltration. When the mine is operational, mine water must be continually removed from the mine to facilitate the removal of the ore. However, once mining operations end, the removal and management of mine water often end, resulting in possible accumulation in rock fractures, shafts, tunnels, and open pits and uncontrolled releases to the environment.

“Ground water drawdown and associated impacts to surface waters and nearby wetlands can be a serious concern in some areas. “Impacts from ground water drawdown may include reduction or elimination of surface water flows; degradation of surface water quality and beneficial uses; degradation of habitat (not only riparian zones, springs, and other wetland habitats, but also upland habitats such as greasewood as ground water levels decline below the deep root zone);

reduced or eliminated production in domestic supply wells; water quality/quantity problems associated with discharge of the pumped ground water back into surface waters downstream from the dewatered area. The impacts could last for many decades. While dewatering is occurring, discharge of the pumped water, after appropriate treatment, can often be used to mitigate adverse effects on surface waters. However, when dewatering ceases, the cones of depression may take many decades to recharge and may continue to reduce surface flows .... Mitigation measures that rely on the use of pumped water to create wetlands may only last as long as dewatering occurs” (MINEO Consortium, 2000).

- Surface run-off and discharges from surface water collected in pit causes suspended solids in streams and aquatic life disturbance, floods, and degradation of potential water uses

(a) the mine might use natural resources such as land and water on which in particular the poor may depend by limiting opportunities to generate incomes from agriculture, fishing, or hunting;

(b) the mining operation might use regional infrastructure services to the extent that the poor will entirely lose access, either due to the services’ increased prices or due to simple capacity limits.

(c) higher incomes of mine workers can lead to rising local prices for key goods(food, fuel, land/housing) and services—with others in the area not only left behind, but with significantly shrunk real incomes. Antwi-Boasiako (2003) notes that environmental damage resulting from a mining operation, or left behind after mine closure, ranging from water pollution or restrained water quantity to tailings and subsidence, can seriously limit people’s current and future income opportunities, in particular when dependent on agriculture, fishery, forestry or hunting.

According to World Bank (2001) corruption and macro-economic mismanagement can severely limit the positive impact of mining creating opportunities on the national level. The World Bank (2001) gives an example of countries such as Congo and Zambia which have shown little

overall development benefit from the copper production of the past decades, with state ownership and mismanagement characterizing the sector.

Disturbances (noise, vibrations, etc.) also cause life quality degradation and reduction of property value- Radiations which are dangerous to human health- Discharges from pit protection wells causing drop of water table and increased flow in streams which also cause irrigation problems, floods and degradation of potential water uses- Surface run-off and discharges from surface water collected in pit causes suspended solids in streams and aquatic life disturbance, floods, and degradation of potential water uses

- Discharges from waste water treatment plants and water/oil separators cause pollution and contamination of aquatic receivers which also lead to aquatic life disturbance and degradation of potential water uses- Improper management of municipal and special/hazardous waste causes increased concentration of toxic substances in soils/waters and aesthetic problems.

### **2.5 Health Hazards associated with Surface Mining**

EIAs of mining projects often underestimate the potential health risks of mining projects. Hazardous substances and wastes in water, air, and soil can have serious, negative impacts on public health. The World Health Organization (WHO) defines health as a “state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity.” The term ‘hazardous substances’ is broad and includes all substances that can be harmful to people and/or the environment. Because of the quantity, concentration, or physical, chemical or infectious characteristics, hazardous substances may (1) cause or contribute to an increase of mortality or an increase in serious irreversible or incapacitating illness; or (2) pose a substantial

present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (World Health Organization. 1946)..

According to Kitual (2005) individual health risks associated with large-scale mining evolve around work-related injuries and health risks, as well as around an increased exposure to infectious diseases and environmental issues. He notes that the number of injuries and fatalities in mining varies a lot between countries, mostly depending on mining methods and technologies used, and whether minerals are mined in open pits or underground. According to Sumanth (2005) mining regions may have a higher prevalence of certain diseases because mining alters the environment and allows disease causing pathogens and vectors to survive more freely than in other environments. Malaria is endemic in many tropical regions of the world. The warm and wet climate is ideal for mosquitoes, the vector for the disease. However, due to the physical and environmental changes that mining produces, malaria may have an increased prevalence in mining areas in tropical regions. Water pits created by mining activities serve as a reservoir for mosquito breeding.

Sumanth (2005) also notes that in addition to malaria, some skin diseases may also have a higher prevalence in mining areas. In tropical regions with active mining, cyanide and mercury runoff from gold processing into local water bodies often increases the prevalence of skin diseases, as people use such water for daily necessities without treatment. Pollution caused by quarrying and blasting in open-pit mines increases not only the dust particles in the air and the surrounding environment, but also promotes the spread of toxic chemicals. Some of the toxic chemicals that result from blasting include cyanide and sulfur dioxide, which are all very harmful to the body (Akabzaa, 2000). Pavloudakis also adds that in addition, arsenic, which is

used in processing the crushed rock, flows into streams and rivers, the major source of drinking water for local residents.

## **2.6 Socio-economic Consequences**

According to Songsore et al. (1994), the positive economic development that often follows the establishment of a mining operation can also have negative effects on consumption levels of the poor. Higher incomes of mine workers, especially in relatively isolated areas, can lead to rising local prices for key products (food, fuel, transport)—with the poor left behind. Also, mining can use significant amounts of land and water, which can impact the poor who depend on these resources for their livelihood and food security. Akabzaa and Darimani (2001) note that in the context of mine closure, the sudden end of economic opportunities, when not planned for, tends to increase local poverty levels dramatically. He notes that in Namibia for instance, in the late 1990s, foreign mining investors closed their operations and withdrew without notice leaving the Government and the local communities to deal with the mine closure without any preparedness. Anderson (1997) adds that sudden mine closure can also deprive the local population of the most basic social services and of access to public goods, such as clean water, energy, or transport, if the mining company previously had provided these.

According to Songsore et al. (1994), in Ghana, the sudden closure of Dunkwa Goldfields mines in the late 1980s deprived all the communities in the area from electricity supply since this had been previously provided by the mining company. According to Anderson (1997) the often-remote location of mining operations increases the challenges for local economic development in the aftermath of mine closure, with government resources typically hard to free up for these areas. The problematic social and environmental legacies left behind by mining operations, then,

can compromise the economic benefits they once yielded. In a study on the impact of mining in Tarkwa, Ghana, Akabzaa and Darimani (2001) identify two main factors responsible for the high cost of living in Tarkwa. First of all, he notes the disparity in incomes in favor of mining company staff. According to him, the salaries of the Ghanaian staff in the mines are indexed to the US dollar, which raises their income far above their counterparts in the public sector. In addition, the expatriate staff of the mines is paid internationally competitive salaries, which further widens the income disparities in Tarkwa. This group of high-income earners has thus influenced the pricing of goods and services such as housing, food and other amenities (Akabzaa and Darimani, 2001). A study by Downing (2002) also proved that disparities in incomes emerge and the lure of new opportunities creates in-migration. Different groups compete for access to public goods and social services and new tensions in the community abound. According to Downing (2002) new types of poverty are created, with a mixture of “original residents” who have been unable to share in employment opportunities, and “newcomers” who have migrated in with the hope of finding employment, but have been unsuccessful in doing so. Social ills such as alcohol abuse, prostitution and child labor often increase. The second reason Sumanth (2005) gave is that the mining industry has withdrawn a significant percentage of the labor force from agriculture another income-generating activities by taking farmland away and holding out the false promise of employment. The fall in food production in an area that is already densely populated, with high unemployment, accounts for high food prices. UNEP(1997) notes that a major issue that is always investigated during decision-making procedures regarding the development of surface mines is public protest. For numerous groups of interest, including local authorities, chambers, ecological organizations, etc, a mine is a potential threat for the environment, public health and socioeconomic activities that interfere with it. For this reason,

any proposal for further development of mining sites is either rejected or it is accepted after setting a series of terms and conditions (UNEP (1997). According to Downing (2002) in general, the development of a surface mine affects the socioeconomic activities of local communities by the following ways: reduced access to public utilities (e.g. transportation), economic (employment, money inflow to local economy), change of land uses (farmland, grazing, tourism, residential (relocation of villages) and culture (lifestyle, population density, archaeological sites & monuments).

Health and safety Akabzaa (2000) observes that the social organization of every community is guided and directed by certain principles. In a study of the impact of mining at Tarkwa in Ghana, he found out that the concentration of mining operations has had a seriously adverse impact on the social organization and cultural values of the people. According to Akabzaa (2000), concerns have been expressed about inadequate housing, youth unemployment, and family disorganization, school dropout rates, prostitution and drug abuse. Although these problems are not new to the area, they have risen to a level that the population perceives to be threatening and the main cause has been the concentration of mining activities in the area.

According to the Akabzaa (2000), the concentration of mining activities has triggered massive migration of all kinds of people to the area. The population growth rate is above the national average and might even be double it. For example, at the Grasberg mine in Indonesia the local population increased from less than 1000 in 1973 to between 100,000 and 110,000 in 1999. Similarly, the population of the squatter settlements around Porgera in PNG, which opened in 1990, has grown from 4000 to over 18,000.<sup>10</sup> This influx of newcomers can have a profound impact on the original inhabitants, and disputes may arise over land and the way benefits have been shared. (These were among the factors that led to violent uprisings at Grasberg in the 1970s

and the 1990s. “Sudden increases in population can also lead to pressures on land, water, and other resources as well as bringing problems of sanitation and waste disposal. “Migration effects may extend far beyond the immediate vicinity of the mine. Improved infrastructure can also bring an influx of settlers. For instance, it is estimated that the 80- meter-wide, 890-kilometre-long transportation corridor built from the Atlantic Ocean to the Carajas mine in Brazil created an area of influence of 300,000 square kilometres”(IFC/World Bank , 2007)

According to UNEP (1997) surface mining results in the eviction of communities and their relocation to marginal sites, often with inadequate compensation also causes a lot of tensions and distrust between mining companies, the chiefs and the people. According to Antwi-Boasiako (2003), a major principle of the environmental impact assessment (EIA) process is that the proponent is required to give notice and advertises the proposal in the national press to enable the public to express its interest or concerns or to comment on the project. On receipt of a draft EIA report, EPA publishes it for people with specific interest or concerns to study the report and raise such concerns within a period of 21 days from the first day of publication. The channel for notifying and soliciting information from interested and affected people does not provide a level playing field for the communities who are directly impacted by such mining projects. However, Antwi-Boasiako (2003) notes that the sources of information, which are primarily the national press or the premises of District Assemblies, are inaccessible for these communities. Worse still, EIA reports are presented in technical language and these communities do not have the capacity to study and understand the issues raised in the reports. The input of the affected communities is thus lost in the process, resulting in distrust between mining companies, the chiefs and the people. Sumanth (2005) observes that relocation and compensation measures implemented by various mining companies in Ghana have had serious consequences for the family as a



close-knit social unit. New housing arrangements for resettled communities have also disrupted long established family networks in the area. Akabzaa's (2000) study showed that in many instances, the housing units provided by the mining companies have not conformed to the size of households. For instance, a family that had a house with five rooms and large space was resettled in a house with three rooms in a crowded space. Many of the residents of the resettled communities complained of inadequate internal space (number of rooms, size of rooms) and open external space for other domestic activities (Akabzaa, 2000). Sumanth (2005) study also showed that the compensation scheme has helped disorganize some families. In the Tarkwa area, irresponsible, male family heads opted for relocation instead of resettlement. This enabled them to collect cash compensation and they subsequently abandoned their families. This deepened the plight of affected rural women and children. Biney (1998) observes that in direct and indirect ways, mining accounts for the high rate of unemployment in the mining community. He notes that large-scale surface mining has taken up large tracts of land from farmers while at the same time mining activities do not provide enough jobs to match the total number of people laid off from agriculture.

Mining greatly affect the livelihood of catchment communities. When mining activities are not adequately managed, the result is degraded soils, water, biodiversity, and forest resources, which are critical to the subsistence of local people. When contamination is not controlled, the cost of the contamination is transferred to other economic activities, such as agriculture and fishing. The situation is made worse when mining activities take place in areas inhabited by populations historically marginalized, discriminated against, or excluded. Proponents of mining projects must insure that the basic rights of affected individuals and communities are upheld and not infringed upon. These include rights to control and use land, the

right to clean water, and the right to livelihood. Such rights may be enshrined in national law, based on and expressed through a range of international human rights instruments and agreements. All groups are equal under law, and the interests of the most vulnerable groups (low-income and marginalized) need to be identified and protected (Bebbington, A., & Williams, M., 2008)

## **2.7 Concept of Sustainable Mine Exploitation**

Van Zylet et al. (2003) notes that the efficiency of a mine-land management programme is closely related to the efficiency of certain measures that must be applied during the active mining period. Therefore, the development of a procedure that allows periodical review of the applied measures is necessary. According to Pavloudakis and Roumpos (2004), this procedure can be based on series of economic, environmental, and social indicators, which are representative of the monitored system, have a scientific basis, are quantifiable, without social bias, and represent manageable processes. Talking about sustainable development and why it has become a must for the mining industry in the 21st Century, as part of the coverage for the Johannesburg Summit, the World Bank web site specified that “Sustainable Development means ensuring that actions today to promote development and reduce poverty do not result in environmental degradation or social exclusion tomorrow” ( World bank, 2001 cited in Pavloudakis and Roumpos (2004)

According to Pavloudakis and Roumpos (2004) the implication of the above statement from a layman’s perspective is that any economic policy aimed at improving the lots of the people must take into consideration environmental and social security of future generations. In May 2003, the members of International Council on Mining & Metals (ICMM) committed

themselves to implement and measure their performance against 10 sustainable development principles. The 10 principles were developed by benchmarking against other leading global standards including: the 1992 Rio Declaration, the Global Reporting Initiative, the OECD Guidelines for Multinational Enterprises, the World Bank Operational Policies, etc. (Antwi-Boasiako, 2003). These principles, which provide to the mining and metal companies a process framework for moving things towards sustainability, are the following (ICMM, 2007):

- Implement and maintain ethical business practices and sound systems of corporate governance
- Integrate sustainable development considerations within the corporate decision making process.
- Uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by mining activities
- Implement risk management strategies based on valid data and sound science
- Seek continual improvement of health and safety performance
- Seek continual improvement of environmental performance
- Contribute to conservation of biodiversity and integrated approaches to land use planning
- Facilitate and encourage responsible product design, use, re-use, recycling and disposal of mining and metal products
- Contribute to the social, economic and institutional development of the local communities
- Implement effective and transparent engagement, communication and independently verified reporting arrangements with stakeholders. In the United States for instance

Sustainable Mining Roundtable (SMR), an open collaboration scheme sponsored by US Forest Services and US Geological Survey, has proposed a series of indicators that cover a broad range of attributes of energy and minerals systems. The indicators are organized based on four criteria and 18 sub-criteria (van Zylet al., 2003):

- Capacity to produce commodities

- Resources- Exploration capacity- Production (extractive) capacity- Processing capacity (smelting, refining, and transportation) - Use of energy and minerals

- Environmental quality

Environmental protection and pursuing environmental quality is key in achieving sustainable mining. According to Pavloudakis &Agioutantis(2008), relevant terms and conditions must be employed to regulate issues concerning the management of various waste ‘streams’ and the control of emissions that can deteriorate the quality of certain environmental components (e.g. air, surface water, groundwater, soil). In particular, these terms and conditions refer to the following issues:

- Implementation of programs for the collection, temporary storage and disposal of used lubricants, tires, batteries, etc., in collaboration with recycling companies that hold all necessary approvals
- Operation of wastewater treatment plans at the end of sewerage pipelines of buildings, equipment repair facilities, etc.
- Operation of auxiliary facilities (e.g. petrol stations) under the terms and conditions referred permits of activities of this type. - Control of particulate emissions during haulage of excavated material

- Disposal of waste that is not produced from the excavation process within the mine site
- Control of access in active mining areas
- Monitoring of radioactivity
- Management of used spare-parts and equipment beyond further repair in collaboration with recycling companies that hold all necessary approvals
- Treatment and discharge of water in aquatic receivers
- Mapping of all streams and diversion of those crossing the mining area
- Determination of the water balance in the greater mining area, after elaborating the necessary studies, and implementation of measures aiming at a rational use of water sources
- Operation of equipment repair facilities in a way that minimizes the release of dangerous substances to the environment.
- Limitations for carrying out repair and maintenance works in-situ

In addition, land reclamation terms and conditions listed below introduce some critical aspects of environmental management in surface mining sites and champions achieving sustainable mining:

- Development and implementation of a reforestation program, according to specific guidelines that determine the type of trees, spacing, etc., and at the same time, try to minimize the gap between completion of mining works and beginning of land reclamation.
- Submission of technical studies that describe in detail the land reclamation works planned for various parts of the disturbed area as well as for the final pit that will remain after mine closure.

- Implementation of supplementary rehabilitation works in areas where the initial rehabilitation - reforestation projects did not prove efficient (a 80% efficiency in reforestation is considered a limit value for adopting supplementary works).
- Development of optical barriers by planting trees around the disturbed areas.
- Construction of mine wastes heaps that follow the topography of the greater mining area and result in limited visual impacts.
- Implementation of certain measures for preventing landslides and other types of soil deformation.
- Management of topsoil in a way that minimizes loss of fertile agricultural land such as topsoil removal prior to mine pit excavation works, temporary storage (if necessary) and spreading on the final surfaces of waste heaps.
- Realization of a rehabilitation plan even if the mine operation might stop suddenly due to economic problems or reasons of other nature. For this purpose a bonding system is applied.

According to this, the mine operator commits a certain amount of money, which is considered enough for financing the basic mine decommissioning and land rehabilitation works. This amount is gradually reduced as rehabilitation proceeds on waste heaps that have reached the specified elevations and will not be further utilized during mining works.

•Economic, cultural and social benefits

- Local. - National.- Recreation and tourism- Cultural, social, and spiritual needs- Equity (poverty levels)- Legal and institutional framework (8 indicators)- Legal- Institutional- Economic framework. According to Pavloudakis and Roumpos (2004), sustainability indicators are useful as analytical, explanatory, communication, planning, and performance assessment

tools that turn vast amounts of analyzed data into meaningful and relevant information. These indicators allow a holistic comparative analysis, which takes into account numerous economic, environmental, social and political aspects of surface mines development, operation and closure. In this way, sustainability criteria and indicators may contribute to a viable future of mining industry, recognizing the essential role of metals and minerals for modern living (Pavloudakis and Roumpos, 2004).

According to Antwi-Boasiako (2003), talking about whether sustainable ideas should be a matter of concern, many research findings and development reports have come to the conclusion that any development project that discards the ideas of sustainability must be rejected entirely by governments and communities which those projects affects at the feasibility stage. Downing (1999) notes that sustainable mining matters because we have reached a point in history where communities are demanding - and rightfully so - that the benefits of commercial development outweigh the negative impacts. This involves moving from a narrow definition of “environmental sustainability” to a broader definition which embraces “sustainable communities”, that is communities which are able to turn part of the wealth generated by mining into assets which help ensure that the community has a sustainable future after the mine closes. This broader sustainability is absolutely essential in order for a mining project – or any other project for that matter – to contribute to poverty reduction and economic development at the local and regional level (Downing, 1999).

### **2.7.1 Manage expectations through effective communication and consultation**

Exploration often marks the first contact between any mine and the communities, and these interactions are critical for shaping positive future relationships. Community attitudes

toward exploration and mining are formed not only by the impacts of these activities but by the expectations and concerns of the local communities themselves.

The fundamental mismatch between local expectations and what a mine can actually deliver in terms of benefits is a driver of frequent social tensions around resource projects. Companies need to manage expectations by establishing and sustaining dialogue with communities, and being frank about the number of jobs created and the skills they require. It is essential to recognise that benefits for the community will be more limited if large-scale mining displaces pre-existing livelihoods of artisanal miners.

Managing expectations is not a once-off event. Expectations can change quite quickly and, as a result, there needs to be constant attention given to understanding how expectations are changing through time and across different stakeholders. Thus, to understand current thought and areas where expectations are false, distorted and/or out of date, a process needs to be put in place to continually monitor expectations. This will ensure that timely and thoughtful mitigation measures are also put in place.

## **2.8 Sustainable/Alternative Livelihood (AL) and Mining in Ghana**

A livelihood is the means, activities, entitlements and assets by which people make a living, which is immediate and continuous, not necessarily for mine closure. It is also a framework that seeks to build the capacity of people to continuously make a living and improve their quality of life without jeopardizing the livelihood option of others, either now or in the future by coping and adaptive strategies (Aubynn, 2004; Labonne and Gilman, 1999). Within the mining sector, the livelihood concept has been adapted and defined as alternative livelihoods (AL), which are projects that are primarily aimed at compensating and re-establishing those who have been



relocated or adversely affected by mine activities. ALs are basically defined as projects or activities not relating directly to the primary business of the companies in Ghana's mining industry (Afenu, 2006). Mining companies are not willing to assume the traditional functions of government in providing general services to their areas of operation. However, these companies are increasingly pressured by growing international advocacy groups to minimize the negative impacts of mining activities on the environments and the local people. Additionally, in recognition of the scale of impact of mining activities on the livelihood of local inhabitants in the project area and the fact that mining companies could not provide the needed direct employment to most of the local youth, the companies are obliged to consider other alternative means for contributing to the community needs.

A study conducted by Temeng and Abew (2009) on Livelihood Projects in Some Mining Communities in Ghana discussed and analysed the focus and the rationale behind the ALPs in relation to consultations with affected communities prior to implementation as indicated below.

### **2.8.1 Golden Star Bogoso/Pestea Ltd. (GSBPL)**

GSPBL embarked on sericulture, grasscutter rearing (grasscutters are both a delicacy and a source of protein in Ghana and other African countries) and an assortment of agro-based activities ranging from cassava to oil palm cultivation as ALPs. In the process the company harvested 80,000 silkworm eggs. These projects failed to address the key issues of involving the community to provide local ownership and control and also local markets for products (Hilson and Yekovleva, 2006). Respondents generally indicated that the projects were not effective because they were not involved in the conception of the projects. Some respondents viewed

sericulture and grasscutter rearing as ‘fashionable projects’ which do not consider local community dynamics. The silkworm project which started in 2002 was discontinued in 2007 as it could not be sustained. Some other mining ALPs are batik design and creation, poultry (fowl) farming, soap production and pastry making. These projects worked well with support from the mine but there were some unanticipated initial problems. For example, the market was saturated with chicken, and it was also clear that there was a finite market for soap and pastry (Thorpe, Quarm and Boateng, 2008). When companies phased out their support for the programs (e.g. grasscutter rearing and sericulture) they could not be self supporting and many of the participants returned to farming. Due to the spotty nature of the success of various ALPs initially adopted by GSBPL, it has adopted a new approach where the affected community is consulted extensively. The ALPs are selected based on their proven ability to work within Ghana, capacity to be sustainable beyond mine closure and the potential for building on or enhancing existing skill sets within the catchment communities (Thorpe *et al.*, 2008). GSBPL identified oil palm production as a suitable ALP and started palm oil farming in 2006. The project is a 10,000-ha plantation, and is expected to create full-time employment for up to 2,500 smallholder farmers. Funding and support are provided currently by the mine, 223 Victor Amoako Temeng and Joseph Kweku Abew committed to contribute \$1 to Golden Star Oil Palm Plantations (GSOPP) for every ounce of gold produced from its Ghanaian mining operations and 1% of total gross profit (Thorpe *et al.*, 2008).

### **2.8.2 Gold Fields Ghana Limited, Tarkwa Mine**

At Gold Fields’ Tarkwa Mine, there is a five-year sustainable community development programme known as Sustainable Community Empowerment and Economic Development

(SEED) Foundation, which started in 2006. The specific goal of SEED is to improve the livelihood and the quality of life of the 30,000 men, women and children of the 16 primary stakeholder communities of their operations by 2010 (Anon. 2007b). The SEED programme is also designed to prevent ongoing dependence on the Foundation by maximizing the participation of other stakeholders and requiring the beneficiary community to formally allocate land and labour contributions to approved projects. Improved access to basic education was identified as a critical developmental need in Gold Fields' primary stakeholder communities. In consultation with the Ghana Education Service, and with the financial support of three of Gold Fields Ghana's major business partners – Caterpillar, Shell, and Sandvik – the Foundation funded the construction of three schools with associated early childhood development centres, office blocks, store rooms, teachers' quarters and toilets. The scholarship programme for children in primary stakeholder communities was also expanded during year 2007 by supporting 50 students in senior secondary, tertiary and vocational schools. The ALPs were expanded by continuing the training of farmer groups and 2,411 farmers were assisted with training in livestock rearing, oil palm, vegetable and cocoa farming. Access roads to four primary stakeholder communities were upgraded and two new access roads constructed at a total cost of US\$135,000 to facilitate sustainable economic activity and efficient transport of agricultural goods from rural communities to market. The Foundation also partnered with the government's rural electrification programme and funded the supply of electricity pylons to two communities to facilitate the establishment of a basic power distribution system.

### **2.8.3 Anglo Gold Ashanti - Iduapriem**

At AngloGold Ashanti's Iduapriem mine, the central focus of sustainable development activities is the 'Hand-in-Hand' programme. The programme, which is still on-going, was established at the beginning of 2005 through a partnership between AngloGold Ashanti and Opportunities Industrialization Center International (OICI). Besides the initial funding of approximately \$268,000 to the programme (representing about 80% of the mine's total social investment budget), AngloGold Ashanti has also provided a field office for the OICI programme manager and five supporting officers, who are running the programme. The Hand-in-Hand programme aims at building capacity and promoting economic activity (Anon. 2007c). The capacity-building component includes training in entrepreneurial skills; micro-credit management; animal husbandry and livestock; food processing and value-adding technologies; water, sanitation and personal hygiene; participatory decision-making and problem solving; and teacher-training for Early Childhood Development Centres (ECDCs). The initial three-year 'Hand-in-Hand' programme aims to assist as many people as possible in the eight neighboring communities – Adisakrom, Adieyie (Mile 8), Mile 7, Techiman, Nkwantakrom, Wangarakrom, Teberebie and Abompuniso. The youth, who comprise 25% of the 7,500-strong population, are being specifically encouraged to take part in the programme, which offers alternative employment opportunities to artisanal mining. Almost 700 people have participated in the capacity-building programme since it was launched at Adieyie in January 2005. Ninety people have learnt the art of soap- and pomade-making as part of enterprise development. Over 500 have been trained in lending and credit management. An amount of US\$36,000 of the annual budget was placed in a revolving fund and loaned to 18 groups, comprising 317 participants, for creating new businesses or expanding existing ones (Anon. 2007c).

## CHAPTER THREE

### METHODOLOGY

#### 3.0 Introduction

This chapter presents the methodology that was employed in conducting the study. It discussed the source of data, research design and instruments, sampling method, and methods of data collection and analysis.

#### 3.1 The Study Area

The headquarters of the Wassa Mine (Akyempim) is in the Mpohor Wassa East District of the Western Region of Ghana and is 62 km north of the district capital, Daboase, 35 km northeast of Tarkwa and 40 km east of Bogoso. Cape Coast is approximately 90 km to the south.

The Wassa/Akyempim project area is predominantly rural and there are no major urban settlements within 50 km by road. The villages of Akyempim, Akyempim New Site, (formally Akosombo which was resettled by the company), Kubekro and Togbekrom are the closest to the mine. Historic gold workings are also known to occur in the lease area but are on a relatively small scale.

The Hwini Butre & Benso (HBB) mine sites are in the Western Region about 35 km NW of the Port of Takoradi and about 20 km SE of Tarkwa. The key communities within and outside the concession are Subriso, Odumase, Ningo, Akyakrom, and Anlokrom. The Benso Township is approximately 5 km from the Benso mine site to the south and the Mpohor Township is approximately 2 km west of the Hwini Butre mining site. The project areas are close to well-developed infrastructure. The southern cluster of deposits is only about 15 km to the NW of

Takoradi, which has a major port and railway facility. The northern cluster is about 35 km NW of the port (Golden Star-Wassa Limited Environmental Management Plan, 2010-2013).



Figure 1: Location of GSWL Operational Areas

Source: Golden Star (Wassa) Limited Environmental Management Plan 2010-2013

### **3.2 The study population**

GSWL has approximately 18 communities within its operational area. Averagely, the population size of the catchment communities is 150 people per community. Sampling considered the closeness of the community settlement to the operational area. About 10 persons were selected.

### **3.3 Sampling and sampling techniques**

The study aimed at investigating the impact of GSWL mining operations on living standards of its catchment communities. In all, there were 18 communities within GSWL catchment area. Respondents were randomly sampled or selected from these communities and their views sorted for. Individual respondents as well as the focus groups made up of chiefs and opinion leaders of the communities, other professionals and environmental officers, were also considered. Purposive sampling technique was used to select the following authorities to be part of the sample – the Municipal/District officers, health and other professionals, community, environmental and safety officers of GSWL and the Environmental Protection Agency (EPA). In all, a total of 40 respondents were involved in the study. They comprised 30 inhabitants, 4 professionals, 4 officials from GSWL and 2 environmental and community regulatory agencies.

### **3.4 Data Collection**

Before data collection began, the selected communities (chiefs and the opinion leaders) and the identified professionals were contacted for permission to carry out the research. Questionnaires were administered in the form of an interview (self-administered where possible). Questionnaire administration and collection were carried out in six days. With the

Municipal/District offices, EPA and GSWL staffs, letters were first sent to them to introduce the study. Receipts of letters were confirmed by telephone, after which questionnaires were delivered. Two weeks was allowed for the questionnaire to be filled, after which they were collected for analysis.

### **3.5 Sources of Data**

Data for the study was gathered from both primary and secondary sources. Primary data collection involved visiting the selected catchment communities to gather information from the inhabitants and staff of various departments in GSWL operational zone. This data was collected to assess the depth of impact from the viewpoint of the people affected by GSWL mining activities. This source of data helped to uncover certain issues which might not have been tackled by previous studies. It also ensured that the researcher had a firsthand knowledge of the source of his data. Secondary data was sourced from existing literature on mining and its impact. Such data was sourced from books, articles, journals and other written documents. Literature on surface mining and its impact on local, regional, and national levels made up the secondary information. Secondary data was used because to an extent, it is free from credibility issues which arise with primary sources.

### **3.6 Research Instrument**

The research instrument used in the survey was the questionnaire. Because of the descriptive nature of the research, the questionnaire as a quantitative instrument was appropriate for the survey. Also, due to the large nature of the study, questionnaires were believed to be the most practical and economical tools in gathering data. The questionnaires were developed



by reviewing and modifying questions from previous studies, as well as reviewing various literatures and using them as guidelines. Both open-ended and close-ended question formats were used. Close-ended questions were used in order to place responses within certain ranges; to make coding and analysis easier. Open-ended questions were also used to capture issues not covered fully by the close-ended questions. Items in the questionnaire were centered on the issue of the extent to which mining have benefited the catchment communities or otherwise. Questions for example, were developed to capture how surface mining had affected settlements, economic activities and livelihood (centering on agricultural) health, social and the general economic life of the people.

### **3.7 Validity and Reliability of the Instrument**

After constructing the questionnaires, its validity, reliability and layout were taken into consideration. The aim was to avoid any weakness before producing the final version for implementation. Examination of the validity aimed to make the adopted instrument measure what it was supposed to measure (Cohen & Manion, 1994). Several types of validity were used to demonstrate the validity of the questionnaire. These include content validity; construct validity, internal validity and external validity.

Then the initial versions of the questionnaires were revised by the supervisor who commented on the layout of the questionnaire, the wording and some statements. After that the questionnaires were reviewed by specialists in Measurement and Evaluation. The aim was to reveal any ambiguities, threatening items and other problems which needed to be resolved before trying out the questionnaires. Their constructive and informative responses were used to improve

the questionnaires and to produce the final form of the questionnaires which was approved by the supervisor.

### **3.8 Research Design**

The research design used for the study was the administration of questionnaire. Questions were administered in an interview form, and where possible was self-administered. Focus group discussions were held with the chiefs and opinion leaders of some selected communities. This design aimed to overcome the difficulty of unavailable data and expectations, which are not easily quantified.

### **3.9 Data Analysis**

Data collected from the field survey were coded and analyzed using the Statistical Products for Service Solutions (SPSS). Tables and graphs were used to present variables obtained. Descriptive statistics were used to describe and summarize data, while conclusions and generalizations were made using inferential statistics.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.0 Introduction**

This chapter deals with the presentation of results and discussion. Questionnaires were administered to people from GSWL catchment communities, employees and other relevant stakeholders.

The questionnaire sought to unveil both positive and negative impacts associated with GSWL operations on human health, environment, and to assess the standard of living of surrounding communities. In addition, it pursues to find out the level of commitment of GSWL in meeting its social responsibility requirements. Data collected from the exercise were analyzed using the Statistical Products for Service Solutions (SPSS) and results presented below.

#### **4.1 Demographic Characteristics of Respondent**

The researcher sought to gather data on the socio-demographic characteristics of the respondents. Facts obtained are shown below.

##### **4.1.1 Gender composition of respondents**

The interest of the researcher was in determining the gender/sex of the respondents which he strongly believed, was germane to ensuing the other data collected. The information obtained from the questionnaire administered is shown in Table 1.

**Table 1: Sex composition of respondents**

| <b>Sex</b>   | <b>Frequency</b> | <b>Percent (%)</b> |
|--------------|------------------|--------------------|
| Male         | 28               | 70                 |
| Female       | 12               | 30                 |
| <b>Total</b> | <b>40</b>        | <b>100</b>         |

Source: Field survey, 2011

From Table 1, out of the 40 (100%) respondents, only 12 (30%) were females. On the contrary, 28 (70%) were males. This indicates that majority of the respondents to the questionnaires were males.

#### 4.1.2 Age group of respondents

In this context, the researcher was concerned about the age group of the respondents. The age groups ranged between 20-30, 31-40, and 41-50 years. The information obtained is presented in Table 2.

**Table 2: Age group of respondents**

| <b>Age groups</b> | <b>Frequency</b> | <b>Percent (%)</b> |
|-------------------|------------------|--------------------|
| 20-30             | 20               | 50                 |
| 31-40             | 12               | 30                 |
| 41-50             | 6                | 15                 |
| 51-above          | 2                | 5                  |
| <b>Total</b>      | <b>40</b>        | <b>100</b>         |

Source: Field study, 2011

As depicted in Table 2, 20 (50%) of the respondents were within the 20-30 age group, 12 (30%) of them were between 30-40, 6 (15%) were between and 2 (5%) were within the 51 or more age group. This implies that majority of the respondents were within the 20-30 age group indicating the presence of a lot of youth within the communities who are either natives or might have migrated to area in such of job.

#### 4.2 Operational Activities of GSWL

The researcher was keen in determining the activities that constitutes GSWL operations from raw material acquisition to the final product and their associated (adverse) impacts. Information imported from GSWL Environmental Management Plan (2009-2012) regarding the above is shown in Table 3.

**Table 3: Summary of GSWL Activities and Potential Effects on the Environment**

| Activity            | Aspect                         | Potential Effect   |
|---------------------|--------------------------------|--|
| EXPLORATION         | Clearing of vegetated areas    | • Soil erosion and subsequent stream sedimentation                                     |
|                     |                                | • Loss of animal habitat   |
|                     |                                | • Loss of forest resource  |
|                     | Clearing of farms              | • Loss of farmlands  |
|                     | Noise and vibration generation | • Nuisance to nearby communities due to operational activities                         |
|                     | Construction of roads          | • Soil erosion and subsequent stream sedimentation<br>• Improve access to remote areas |
|                     | Source labour                  | • Local employment opportunity   |
|                     | Machinery maintenance          | • Localized hydrocarbon contamination (soil and water)                                 |
| Generation of waste | • Exploration site littering   |  |

|   |   |   |
|---|---|---|
| MINING (GENERAL OPERATIONS)             | Occupation of mining area                   | <ul style="list-style-type: none"> <li>• Loss of forest resource/vegetative cover</li> <li>• Soil erosion and subsequent stream sedimentation</li> <li>• Loss of agricultural land</li> </ul> |
|   | Fugitive Dust Emissions                     | <ul style="list-style-type: none"> <li>• Affecting local air quality</li> </ul>   |
|   | Noise and vibration generation              | <ul style="list-style-type: none"> <li>• Affecting the amenity of nearby communities.</li> </ul>  |
|   | Combustion of fuel by equipment             | <ul style="list-style-type: none"> <li>• CO2 emissions and global warming</li> </ul>  |
|   | Alteration of natural drainage.             | <ul style="list-style-type: none"> <li>• Affecting supply to downstream users</li> <li>• Localized flooding</li> </ul>  |
|   | Run-off from mine site<br>In-pit dewatering | <ul style="list-style-type: none"> <li>• Increased sediment in receiving waters</li> <li>• Possible contamination of receiving waters</li> </ul>  |
|   | Potential for acid generation (ARD)         | <ul style="list-style-type: none"> <li>• Possible release of metals and lowering pH of receiving waters</li> </ul>  |
|   | Unauthorized access to operational areas    | <ul style="list-style-type: none"> <li>• Affecting public safety</li> </ul>   |
| SERVICE AND MAINTENANCE OF MACHINERY    | Potential hydrocarbon contamination.        | <ul style="list-style-type: none"> <li>• Localized hydrocarbon contamination (soils and water)</li> </ul>   |
| DUMPING OR STOCKPILING OF WASTE AND ORE | Sediment in run-off                         | <ul style="list-style-type: none"> <li>• Increased sediments in mine site drainage and receiving waters</li> </ul>  |
|   | Change in local landform                    | <ul style="list-style-type: none"> <li>• Visual effects</li> </ul>  |
|   | Potential for acid drainage (ARD)           | <ul style="list-style-type: none"> <li>• Possible release of metals into and lowering pH of mine site drainage</li> </ul>   |
|   | Fugitive dust emission                      | <ul style="list-style-type: none"> <li>• Affecting local air quality</li> </ul>   |
| DRILL AND BLAST OPERATIONS              | Noise generation                            | <ul style="list-style-type: none"> <li>• Nuisance to nearby residents</li> </ul>  |
|   | Blast Vibration propagation                 | <ul style="list-style-type: none"> <li>• Affecting amenity of nearby residents</li> </ul>   |
| CRUSHING                                | Point source dust generation                | <ul style="list-style-type: none"> <li>• Poor workplace air quality</li> <li>• Affecting local air quality</li> </ul>   |

|  |   |   |
|--|---|---|
|  | Noise and vibration generation                                  | <ul style="list-style-type: none"> <li>• Affecting amenity of nearby residents</li> </ul>   |
|  | Elevated sediments in facility wash down                        | <ul style="list-style-type: none"> <li>• Increased sediments in mine site drainage and receiving waters.</li> </ul>                               |
| MILLING AND PROCESSING                       | Potential release of contaminated water                         | <ul style="list-style-type: none"> <li>• Chemical contamination of receiving waters</li> </ul>  |
|  | Accidental Spillage   | <ul style="list-style-type: none"> <li>• Chemical contamination of receiving waters/soils</li> </ul>  |
|  | Noise and Vibration generation                                  | <ul style="list-style-type: none"> <li>• Affecting amenity of nearby residents</li> </ul>   |
| TAILINGS DISPOSAL                            | Accidental spillage of slurry (pipeline or impoundment failure) | <ul style="list-style-type: none"> <li>• Contamination of receiving waters</li> </ul>   |
|  | Seepage from storage facility embankments                       | <ul style="list-style-type: none"> <li>• Contamination of receiving ground and surface waters</li> </ul>  |
| TRANSPORT AND STORAGE OF HAZARDOUS MATERIALS | Accidental spillage of materials en-route to mine site          | <ul style="list-style-type: none"> <li>• Contamination of receiving waters/soil.</li> <li>• Risk to nearby residents health and safety</li> </ul> |
|  | Accidental spillage of materials on mine site                   | <ul style="list-style-type: none"> <li>• Contamination of receiving waters/soil.</li> <li>• Risk to employee health and safety</li> </ul>         |
|  | Potential leakage from fuel and oil storage facilities/areas    | <ul style="list-style-type: none"> <li>• Contamination of ground water/soils.</li> </ul>  |

Table 3 shows a summary of GSWL operational activities, which includes exploration, mining (general operations), service and maintenance of equipment, dumping or stockpiling of waste or ore, drill and blast operations, crushing, milling and processing, tailings disposal and tailings and storage of hazardous materials. In a nutshell, the various activities have the potential to pollute air, ground and surface water, and pose risk to employees' as well as health and safety.

This is equivocal by Antwi-Boasiako (2003) that the overall effect of mining is therefore negative.

### 4.3 Occupation

In this section, the researcher's main purpose was to find out the various indigenous occupations of native people in the mine catchment area. Responses obtained are shown in Table 4.

**Table 4: Artisanal occupation of communities**

| Occupation               | Frequency | Percent (%) |
|--------------------------|-----------|-------------|
| Farming and hunting      | 24        | 60          |
| Petty trading and sewing | 6         | 15          |
| Herbalists               | 2         | 5           |
| Artisans                 | 4         | 10          |
| Galamsey                 | 4         | 10          |
| Total                    | 40        | 100         |

As depicted in Table 4, regarding the occupation of indigenous people within the mine catchment, 24 (60%) of the respondents stated farming and hunting, 6 (15%) stated trading and sewing, 2 (5%) said herbalist, 4 (10%) stated galamsey activities and 4 (10%) artisans as common occupations. Respondents argued that as a result of GSWL operational impact especially blasting, noise, air and water pollution, they have become relatively worse off due to a drop in economic viability and profitability of their indigenous occupation. This is in agreement with Mensah (1998) that mining might use natural resources such as land and water on which in particular the poor may depend by limiting opportunities to generate incomes from agriculture, fishing, or hunting;



### 4.3.1 Sustainable Livelihood Intervention by GSWL

The researcher is keen in finding out from the respondents' whether there has been any alternative livelihood intervention initiated by GSWL as a result of impact of the company's operations on indigenous occupations/livelihood. Responses received are shown in Table 4.

**Table 4: Sustainable livelihood intervention by GSWL**

| Programme   | Frequency | Percent (%) |
|---|-----------|-------------|
| Agro-base support (vegetable farming, Golden Star Oil Plantation Programme-GSSOP) | 24        | 60          |
| GSSTEP (Carpentry, Masonry, Mobile phone repairing etc.                           | 12        | 30          |
| No response   | 4         | 10          |
| Total   | 40        | 100         |

Table 4 presents livelihood programmes instituted by GSWL to support its catchment communities. It is evident that 24 (60%) of the respondents confirmed agro-base support which comprises vegetable farming, GSSOPP and fish farming as one of the main livelihood programmes being run by GSWL. In addition, 12 (30%) also affirmed GSSTEP as another livelihood programme instituted by GSWL. GSSTEP include such fields as masonry, carpentry, and mobile phone repairing. Nonetheless, 4 (10%) gave no response. This confirms the work conducted by Temeng and Abew (2009) that Goldfields Ghana Limited expanded their ALPs by continuing the training of farmer groups and 2,411 farmers were assisted with training in livestock rearing, oil palm, vegetable and cocoa farming. Access roads to four primary

stakeholder communities were upgraded and two new access roads constructed at a total cost of US\$135,000 to facilitate sustainable economic activity and efficient transport of agricultural goods from rural communities to market.

#### 4.4 Awareness of GSWL community relation’s policy statement

In this context, the researcher was concerned about the level of awareness of respondents of GSWL community relations policy statement. Information obtained is detailed in Table 5.

**Table 5: Distribution of respondents of GSWL community relation’s policy statement**

| Response | Frequency | Percent (%) |
|----------|-----------|-------------|
| Yes      | 22        | 55          |
| No       | 12        | 30          |
| Not sure | 6         | 15          |
| Total    | 40        | 100         |

Source: Field survey, 2012

Table 5 shows that 22 (55%) of the respondents were aware of GSWL community relation’s policy statement. Contrary, 12 (30%) were not aware of the policy and 6 (15%) were not certain whether the mine had a community relation policy. It can be deduced that a reasonable number of the respondents were aware of the mines policy which indicates the company’s commitment in Stakeholder consultation and engagement.

#### 4.5 GSWL has impacted positively on its catchment communities

In this section, the researcher purposefully wanted to established whether the existence of the mine has benefited the people in the surrounding communities or otherwise. Information obtained is displayed in Table 6.

**Table 6: Respondents' view on impacts of GSWL activities on catchment communities**

| Response       | Frequency | Percent (%) |
|----------------|-----------|-------------|
| Strongly agree | 26        | 65          |
| Agree          | 10        | 25          |
| Disagree       | 4         | 10          |
| Total          | 40        | 100         |

Source: Field survey, 2012

Information obtained in relation to the mines impact on its catchment communities indicated that 26 (65%) strongly agree, 15 (25%) agree but 4 (10%) disagree that GSWL has had positively impacts on communities in its operational areas. The data suggests that the coming into existence of the mine has brought greater benefits than harm as asserted by Antwi-Boasiako (2003)

#### 4.6 Opportunities to Employment Avenues

This section sought to find out whether job vacancies are advertised internally or locally within the communities first before external advertisement is made on condition that no qualified persons are obtained from within the communities. Data obtained is shown in Table 7.

**Table 7: Views on advertisement of employment opportunities**

| Response          | Frequency | Percent (%) |
|-------------------|-----------|-------------|
| Strongly agree    | 24        | 60          |
| Agree             | 6         | 15          |
| Disagree          | 6         | 15          |
| Strongly disagree | 4         | 10          |
| Total             | 40        | 100         |

Source: Field survey, 2012

Information obtained from the respondents in relation to internal advertisement of job vacancies or opportunities within communities indicated that 18 (45%) strongly agreed, 6 (15%) agreed, 6 (15%) disagreed and 4 (10%) strongly disagreed that job vacancies are first advertised within catchment communities and then externally on condition that eligible persons are not obtained from the communities. The data suggests that job vacancies are advertised first in surrounding communities within the mine operational area. This holds true for studies conducted by Barry (1996). According to him aside from a mining operation's direct employment impact, there is substantial potential for developing downstream and lateral economic activity with suppliers and refiners, particularly for small- and medium-sized enterprises, in turn generating employment opportunities for non-miners surrounding area. He argues that employment generated indirectly by a mining operation amounts to a range of between 2 to 25 times the number of direct employees, in certain cases even more than that.

#### 4.7 Determination of Community Projects through Community Consultation

The researcher's objective in this section was to determine how community projects are arrived at, thus, is it in consultation with community people? Table 8 shows data obtained

**Table 8: Respondents views on how community projects are determined**

| Response       | Frequency | Percent (%) |
|----------------|-----------|-------------|
| Strongly agree | 32        | 80          |
| Agree          | 6         | 15          |
| Disagree       | 2         | 5           |
| Total          | 40        | 100         |

Source: Field survey, 2012

With reference to whether community projects were determined in consultation with the catchment communities, 32 (80%) strongly agreed, 6 (15%) agreed but 2 (5%) disagreed that projects carried out for communities were determined in consultation with the communities. Data shown in Table 4 indicates that catchment communities are involved in the decision making process for development projects.

#### 4.8 Promotion of local Economic Development

In this section, the researcher sought to establish whether GSWL was acting in accordance with its social commitment of promoting local economic development as emphatically stated in its community relation policy. Information obtained is presented in Table 9.

**Table 9: Views on GSWL social commitment of promoting local economic development**

| Response          | Frequency | Percent (%) |
|-------------------|-----------|-------------|
| Strongly agree    | 10        | 25          |
| Agree             | 16        | 40          |
| Disagree          | 10        | 25          |
| Strongly disagree | 4         | 10          |
| Total             | 40        | 100         |

Source: Field survey, 2012

As depicted in Table 9, 10 (25%) strongly agreed, 16 (40%) agreed, 10 (25%) disagreed and 4 (10%) strongly disagreed that GSWL has been acting in accordance with its social commitment of promoting local economic development. This data affirms that to a large extent GSWL has been acting in line with this social commitment. This confirms Antwi-Boasiako (2003) that mining has over the years contributed immensely towards Gross Domestic Product (GDP) and socio-economic development of Ghana in terms of provision of employment (direct and indirect) and social infrastructure.

#### **4.9 Local employment (community workers) with GSWL**

The researcher was interested in finding out the level of engagements of local people in terms of employment. Indeed, whether or not the share of local community workers has been increasing steadily over time. Table 10 contains data obtained.

**Table 10: Respondents view on the proportion of local workers engaged by GSWL.**

| Response       | Frequency | Percent (%) |
|----------------|-----------|-------------|
| Strongly agree | 24        | 60          |
| Agree          | 10        | 25          |
| Disagree       | 6         | 15          |
| Total          | 40        | 100         |

Source: Field survey, 2012

As represented in Table 6, regarding the steady increase of local community workers in GSWL operations, 24 (50%) strongly agreed, 10 (25%) agreed but 6 (15%) that local community workers have steadily increased over time in the various sectors or divisions of operations since the commencement of the mine. The innovative approach by GSWL in providing employable skills/vocational training (GSSTEP-masonry, carpentry, and mobile phone repairing and cookery) for the youth of catchment communities is a compliment to the general agro-based practice of providing alternative livelihood for community people as indicated by the existing literature (Temeng and Abew, 2003).

#### **4.10 GSWL influence on education, livelihood, property acquisition and relation with community**

In this section, the researcher purposefully wanted to establish whether; mining has promoted education such as the provision of scholarship for brilliant but needy community students, whether some form of vocational/skills training have been provided, whether the community are satisfied with livelihood empowerment program initiative of GSWL(if there is any),whether sponsored community graduates are able to get employment placement after

school, whether catchment communities are aware that the company pays royalties to both the central and the local government authorities, whether road networks/transport system have improved owing to mining in the area, whether people were resettled/relocated with good compensation packages and finally to determine the frequency of youth action/demonstration against GSWL. Data obtained is displayed in Table 11.

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**Table 11: GSWL influence on education, livelihood, property acquisition and relation with community**

| Questions   | Yes |    | No |    | No Response |     |
|---|-----|----|----|----|-------------|-----|
|   | N   | %  | N  | %  | N           | %   |
| Mining has promoted education in the community?   | 32  | 80 | 8  | 20 | -           | -   |
| The company has sponsorship (Scholarship) package in place for brilliant but needy community students           | 28  | 70 | 10 | 25 | 2           | 5   |
| Is GSWL sponsored community graduates able to get employment placement after school?                            | 22  | 55 | 18 | 45 | -           | -   |
| GSWL has provided some form of vocational training for the youth of the community                               | 36  | 90 | 4  | 10 | -           | -   |
| Are you satisfied with the livelihood empowerment program initiative of GSWL?                                   | 34  | 75 | 4  | 10 | 6           | 15  |
| Are you aware that catchment communities are paid royalties through the center of local government authorities? | 22  | 55 | 10 | 25 | 8           | 20  |
| Do you know the amount paid as royalties?   | 8   | 20 | -  | -  | 32          | -   |
| The communities transport system has improved owing to mining in the area.                                      | 38  | 95 | 2  | 5  | -           | -   |
| Were you relocated/resettled by GSWL  | -   | -  | 24 | 60 | 16          | 40  |
| If yes, were you compensated?   | -   | -  | 8  | 20 | 32          | 80  |
| Were you pleased with the compensation package?   | -   | -  | 8  | 20 | 32          | 100 |
| Are there frequent community demonstrations against GSWL?   | 4   | 10 | 36 | 90 | -           | -   |

Source: Field Survey, 2012

As displayed in Table 11, on the issue of as to whether mining has promoted and improved education within catchment communities, 32 (80%) of the respondents stated categorically that mining has indeed promoted and improved education within the area. Contrary, 8 (20%) of the respondents believed that effort by GSWL to promote education has been nil. This means that promotion of education within the surrounding communities has been one of the areas the company has been providing support.

The views of respondents pertaining to the availability of scholarship package for brilliant but needy community students were also sought and displayed in Table 11. Out of the total 40 respondents, 28 (70%) testified that there was such scholarship package for brilliant but needy community students but 10 (25%) believed otherwise. Two (5%) of the respondents did not provide any response. The data detailed above confirms that GSWL has a scholarship package in place for brilliant but needy students of the communities.

Regarding whether community graduates get employment placement upon completion, 22 of the respondents (55%) confirmed that some community sponsored graduates get employed by the company. However, 18 (45%) of the respondents asserted that it was very unlikely to get employed by the company upon graduation. This means that being sponsored by the mine in education was not an absolute assurance that one would be employed upon completion.

From Table 11, a significantly large number of the respondents (90%) stated that the mine has provided some form of vocational training for the youth. Contrary, a relatively small number 4 (10%) were of the view that no vocational training was being conducted for the youth. Interviews conducted indicated that vocational training covering masonry, mobile phone repairing, carpentry etc was on-going as at the time of the study. This affirms that GSWL has shown some level of commitment in providing vocational training for persons without any trade.

As to whether the communities were satisfied with the livelihood empowerment programmes of the mine, 34 (75%) responded that the communities were satisfied with the kind of livelihood empowerment programmes that have been implemented by the mines but 4 (10 %) were against this while 6 (15%) gave no response. This means that majority of the people were content with the livelihood empowerment programme.

As to whether respondents were aware that the catchment communities are paid royalties through the central and local government authorities and as to whether they knew the amount paid, 22 (55%) stated that they are aware of the payment royalties to communities, 10 (25%) were of the view that there is no payment of royalties to communities and 8 (20%) gave no response. Regarding the exact amount of royalties paid, out of the 40 respondents, only 8 (20%) had an idea of the amount. The remaining 32 (8%) had no idea about the exact amount of royalties paid to the communities.

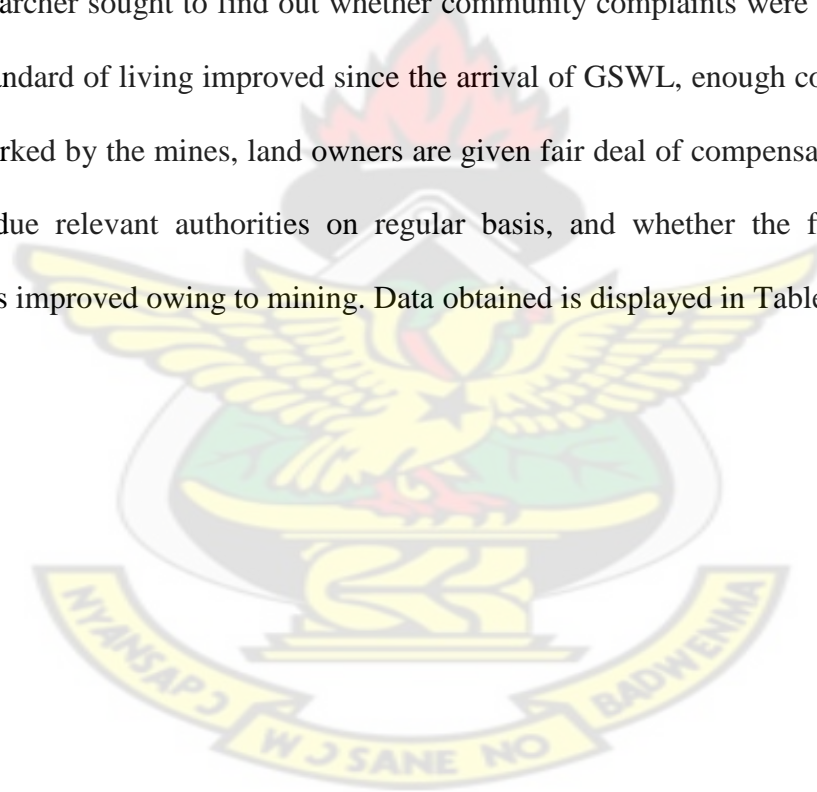
With reference to the communities transport system, a significantly large number of the respondents (90%) confirmed that transport system has improved so much owing to mining in the area but 2 (5%) were not in support of this assertion. This means that until the commencement of mining activities in the area, the road or transport routes were not in good of conditions.

As shown in Table 11, respondents were asked whether they were resettled or relocated. Out of the 40 respondents, 24 (60%) stated that they were not resettled but the remaining 16 (40%) gave no response. As to whether respondents were compensated for resettlement, 8 (20%) stated that they were not compensated while the remaining 32 (80%) gave no response. Also, as to whether respondents were pleased with the compensation, 20% stated the compensation package was inadequate. The remaining 80% of the respondents provided no response.

As depicted in Table 11, 10% of the respondents confirmed that there have been frequent community demonstrations against GSWL while the remaining 90% of the 40 respondents acknowledged that there have rather been fewer demonstrations against the mine. This means that GSWL has seemingly good relationship with its catchment communities.

#### **4.11 Potable water sources, conflict resolution, payment of royalties, compensation and living standard**

The researcher sought to find out whether community complaints were swiftly addressed, communities standard of living improved since the arrival of GSWL, enough community projects have been embarked by the mines, land owners are given fair deal of compensation, the company pays royalties due relevant authorities on regular basis, and whether the financial status of communities has improved owing to mining. Data obtained is displayed in Table 12.



**Table 12: Views on Potable water sources, conflict resolution, payment of royalties, compensation and living standards**

| Questions  | SA |    | A  |    | D  |    | SD |    |
|--|----|----|----|----|----|----|----|----|
|  | N  | %  | N  | %  | N  | %  | N  | %  |
| Alternative potable water sources have been provided by GSWL                 | 36 | 90 | 4  | 10 | -  | -  | -  | -  |
| The company swiftly addresses all community complaints                       | 20 | 50 | 10 | 25 | 2  | 5  | 6  | 15 |
| The communities standard of living has improved since the arrival of GSWL    | 26 | 65 | 8  | 20 | 6  | 10 | -  | -  |
| Enough community projects have been initiated by GSWL                        | 10 | 25 | 10 | 25 | 10 | 25 | 10 | 25 |
| Community famers/land owners are given fair deal of compensation.            | 6  | 15 | 6  | 15 | 20 | 50 | 8  | 20 |
| The company pays royalties due relevant authorities on regular basis         | 10 | 25 | 4  | 10 | 16 | 40 | 10 | 25 |
| The financial status of communities has improved owing to mining             | 6  | 15 | 4  | 10 | 16 | 40 | 14 | 35 |
| Best environmental practices are employed in addressing environmental issues | 14 | 35 | 10 | 25 | 6  | 15 | 12 | 30 |

Source: Field survey, 2012

Source: Field Survey

SA = strongly agreed, A = Agreed, D = Disagreed, SD = strongly disagree

With reference to Table 12, out of the 40 respondents, 36 (90%) strongly agreed and 4 (10%) agreed that alternative potable water sources (boreholes & wells) have been provided by GSWL for most of the communities in the operational area.

Concerning the standard of living of communities within GSWL operational area, 26 (65%) strongly agreed, 8 (20%) agreed, but 6 (15%) disagreed that the standard of living of the mine catchment communities improved since the arrival of the mine in the area.

Furthermore, in determining the adequacy of projects initiated by GSWL, 10 (25%) strongly agreed, 10 (25%) agreed, 10 (25%) disagreed and 10 (25%) strongly disagreed that enough community projects have been initiated and completed by the mine. This confirms the Antwi-Boasiako (2003) that mining has over the years contributed immensely towards Gross Domestic Product (GDP) and socio-economic development of Ghana in terms of provision of employment (direct and indirect) and social infrastructure.

In addition, regarding the manner the company addresses reported complaints, 20 (50%) strongly agreed, 10 (25%) agreed, 2 (10%) disagreed and 6 (15%) strongly disagreed that GSWL swiftly addresses all reported community complaints.

In addition, regarding compensation issues, respondents' opinions were ascertained; 6 (15%) strongly agreed, 6 (15%) agreed, 20 (50%) agreed and 8 (20%) strongly disagreed farmers or land owners were given a fair deal of compensation. This implies that majority of the respondents were against the assertion that land owners were fairly compensated.

The views of respondents pertaining to the payment of royalties were also sought and results displayed in Table 8. From Table 7, it is evident that out of the total 40 respondents, 10 (25%) strongly agreed and 4 (10%) agreed that GSWL pays royalties due relevant authorities on

regular basis. Nonetheless, 16 (40%) disagree and 10 (25%) strongly disagree that payment of royalties has not been consistent. This confirms that inconsistency of payment of royalties or poor communication between local authorizes and people of the communities.

With reference to improvement of financial status of the various catchment communities, 6 (15%) strongly agreed and 4 (10%) agreed that the financial status of communities within the mine operational area has improved since their arrival. Contrarily, 16 (40%) disagreed and 14 (35%) strongly disagreed with the assertion that the financial status of communities have improved. This means that majority of the respondents believed that GSWL has narrowly improved on the financial status of the surrounding communities.

Finally, on the issue of environmental practices employed by GSWL in its operations, 16 (35%) strongly agreed while 10 (25%) agreed that best environmental practices are used. On the hand, 6 (15%) disagreed and 12 (30%) strongly disagreed with this assertion. In conclusion, GSWL employ best environmental practices in controlling the environmental aspects of its activities.

## **Summary**

In this chapter, the data collected were presented and analyzed. First of all, focus was on determining whether GSWL had a community relation policy. It came up that most of the respondents were aware of the mines policy on community relations. Also, respondents' views on the improvement of the standard of living, payment of royalties, resettlement/relocation and compensation, economic development, conflict resolution, employment opportunities, environmental practice etc. were sought for.

## CHAPTER FIVE

### SUMMARY, CONCLUSION, AND RECOMMENDATIONS

#### 5.0 Introduction

The chapter consists of information regarding the summary of the study, conclusions based on the findings of the study, and recommendations that are aimed at addressing the problems identified in the study.

#### 5.1 Summary of findings

The rationale behind this study was to assess the living standards of mining communities of Golden Star (Wassa) Limited. The descriptive survey design was used to collect, analyze and describe the data of the survey. Questionnaires developed by the researcher were used to obtain data after which they were analyzed using the Statistical Products for Service Solutions (SPSS) programme. The purpose of the study was to investigate the impact of GSWL operations on its catchments communities.

The information obtained indicates that GSWL has initiated and implemented livelihood programmes to augment traditional occupations such as farming, hunting, sewing, galamsey and traditional artisan such as masonry, carpentry, and blacksmithing to meet the ever increasing expectation/demands for employment by the catchment communities. It was confirmed by a vast majority of the respondents that GSWL currently have initiated the agro-base support programme which consist of vegetable and fish farming, oil palm plantation programme (GSOPP) and oil palm processing. In addition, the company has also established and implementing the GSSTEP programme which involves providing skills training in the fields of masonry, carpentry, mobile phone repairing and cookery.



An appreciable proportion of the respondents (50%) admitted that GSWL is indeed compliance with its social commitment of promoting local economic development and the welfare of the local people as detailed Community Relations Policy.

The information obtained also indicates that GSWL has a community relations policy that is used as the framework for meeting the company's social obligations. This was affirmed by 55% of the respondents. In addition, the findings revealed that almost all the mine catchment communities (Akyempim, Benso and Mpohor) have benefited in various ways from GSWL. This was also affirmed by 65% of the respondents. It was also found out that the 'local content policy' is also being adhered strictly to GSWL because almost all unskilled and semi-skilled employment are reserved for the locals, while skilled employment are also advertised first in the local communities, and priority given to qualified people from the communities. Furthermore, it was determined that the number of people from within the surrounding communities that have been employed by GSWL have steadily increased over the years.

It was realized from the study also that all development projects carried out for any particular community were determined in consultation with the communities through the Community Consultation Teams (CCT) and the Community Mine Consultation Committees (CMCC). This means that there has been full involvement and local participation of the people in determining which project to be initiated and implemented. This was affirmed by a significant proportion of the respondents (i.e. 80%).

Additionally, it was realized that education is highly supported by the mine through the establishment of scholarship package for needy but brilliant students from the communities and the provision of buses to transport pupils to and from school, 70% confirmed this. Furthermore, graduates who benefited from the scholarship programme were sometimes signed on by GSWL

for their internship and national service. However, it was also established that employment opportunity for GSWL sponsored graduates is not automatic. More so, 90% of the respondents also affirmed that GSWL provides some form of vocational/technical training through the Golden Star Skill Training and Employable Programme for the youth within the communities.

Again, a gargantuan proportion of the respondents, 90%, admitted that the access roads are occasionally maintained by the company which goes a long way to enhance transportation in the area.

With respect to resettlement/relocation, 70% of the respondents believe that the compensation given to people affected by the activities of the company was inadequate. It can be concluded farmers' involvement in the computation of compensation packages are very minimal. More so, 90% of the respondents disagreed with the assertion that there have been frequent community demonstrations against GSWL. This means that there exist a good relationship between the mine and its catchment communities.

One can therefore summarize that there exists mutual understanding between the two parties. Again, majority of the respondents, 75%, also confirmed that GSWL is most of the time responsive to community complaints through the maintenance of complaint registers, and report all resolved complaints to the Environmental Protection Agency (EPA)

In terms of environmental compliance, all the respondents, 100%, acknowledged that GSWL has provided alternative potable water sources for communities within its immediate environs whose surface waters have been impacted on. In addition, an encouraging proportion of the respondents, 60%, also confirmed that GSWL adopt the best environmental practices in dealing with the various environmental issues.

It was also found out that the standard of living of the people has improved since the commencement of mining in the area. This was affirmed by 85% of the respondents. Nonetheless, 50% believe that they are indifferent and that community projects are inadequate.

It was also determined that only a few of the respondents were aware that royalties are paid to central and local authorities.

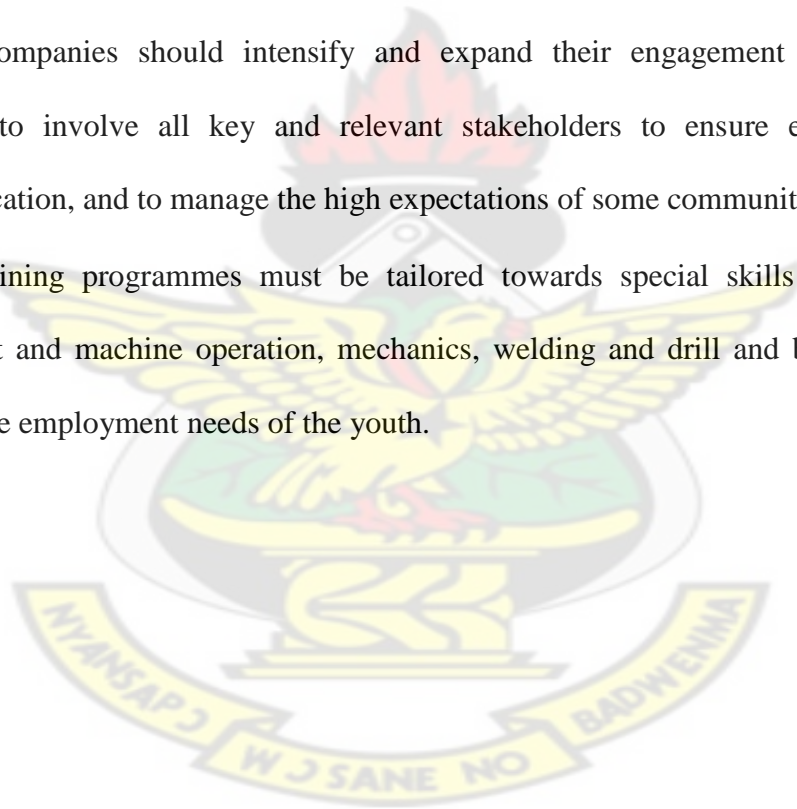
## **5.2 CONCLUSION**

In conclusion therefore, one would not be far from right to say that catchment communities within GSWL operational area have essentially benefited in various ways owing to mining in the area. These include employment opportunities, scholarship package for brilliant but needy students, provision of school buses, construction of school blocks, provision of potable water sources, construction of clinics and other social/community centers, provision of alternate livelihood programmes and other forms of developmental assistance. In a nutshell, a strong assertion can be made that to a large extent, the standard of living of communities within GSWL operational areas has improved significantly, notwithstanding however; the very high expectations of some section of the people are yet to be met.

## **5.3 RECOMMENDATIONS**

- Findings of the study are in line with literature that most mining companies establish and implement livelihood programmes for their respective catchment communities. However, readily available markets for products and services remain a challenge. Hence livelihood programmes must focus on those with readily available markets.

- Compensation packages for land owners, farmers and other affected people must be determined through consultation and involvement of such persons based on long term effective cost benefit analysis.
- Regular education must be given to the people on the payment of royalties made to government authorities and other public institutions to enable them appreciate the general amount of revenue generated from the area to be able to hold the leaders accountable. This can also reduce the occasional tension that ensue between mining companies and local communities
- Mining companies should intensify and expand their engagement programmes and structure to involve all key and relevant stakeholders to ensure effective two-way communication, and to manage the high expectations of some community members.
- Youth training programmes must be tailored towards special skills training such as equipment and machine operation, mechanics, welding and drill and blast assistance to address the employment needs of the youth.



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# APPENDIX

## QUESTIONNAIRES

A postgraduate student of KNUST offering Executive Master in Business Administration is assessing the living standards of mining catchment communities through the administration of this questionnaire. You are required to select an option amongst the alternatives provided for each question. Your answers will be anonymous and treated confidentially.

---

1. Gender of correspondent.

Male [    ]

Female [    ]

2. Age of respondent.

18-20 [    ]

21-25 [    ]

26-30 [    ]

31-35 [    ]

36-40 [    ]

41-45 [    ]

46-50 [    ]

51 & above

3. What are the constituents and impacts of GSWL operational activities?.....

.....  
.....

4. What were the main occupations of catchment communities until the arrival of GSWL?.....

.....

5. Sources of livelihood programmes initiated and implemented by GSWL include

Agro-base support programmes [    ]

Golden Star Sustainable Employable Programme [    ]

None of the above  Others.....

6. Which catchment community are you from?

Ningo  Subriso  Yayaho  Mpohor  Akyempim

Specify if not inclusive.....

7. How long have you lived/stayed in your community?

0-5 years  5-10  11-15years  16-20years  Above 20years

8. What is your level of qualification?

BECE  WASEC  HND  First degree  Second degree

9. What is your occupation?

Farming  Carpentry  Trading  Mining  Not working

10. Does GSR have a community relation policy statement? Yes  No  No idea

**Details of abbreviations used in the shown below are as follows;**

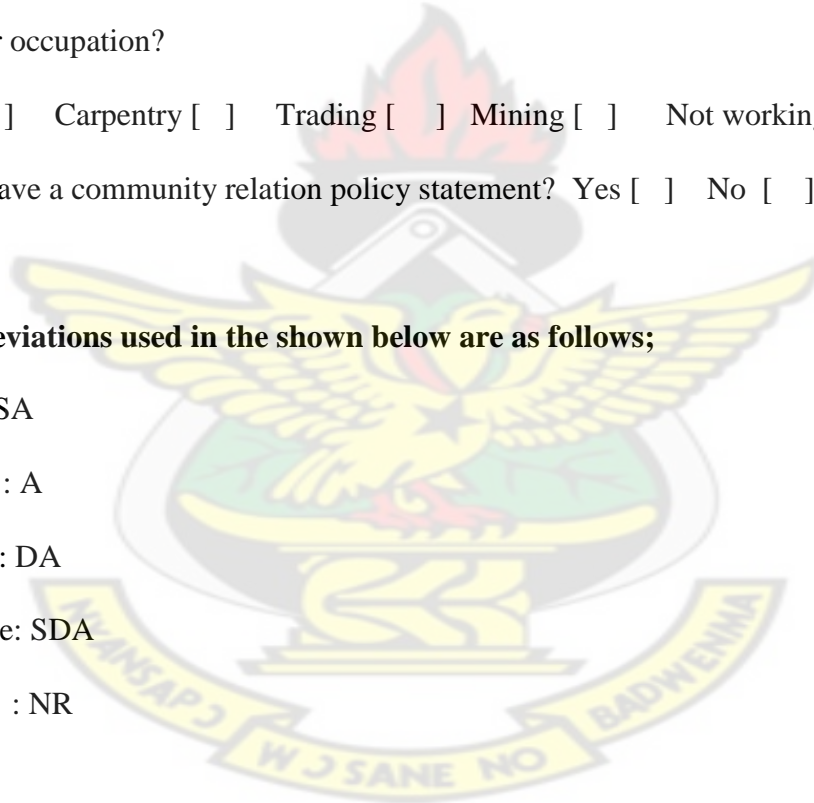
Strongly agree: SA

Agree : A

Disagree : DA

Strongly disagree: SDA

No response : NR



| No. | QUESTIONS  | RESPONSES |   |    |     |    |
|-----|--|-----------|---|----|-----|----|
|     |  | SA        | A | DA | SDA | NR |
| 8.  | GSWL has impacted positively on its catchment communities.   |           |   |    |     |    |
| 9.  | The company advertises all relevant job opportunities locally.   |           |   |    |     |    |
| 10. | Community projects are determined through community consultation.  |           |   |    |     |    |
| 11. | The company is acting in accordance with its public commitment about promoting local economic development. |           |   |    |     |    |
| 12. | The share of local community workers is steadily increasing over time.                                     |           |   |    |     |    |
| 13. | The company swiftly addresses all community complaints.  |           |   |    |     |    |
| 14. | The communities standard of living has improved since the arrival of GSWL                                  |           |   |    |     |    |
| 15. | Alternative potable water sources have been provided by GSWL.  |           |   |    |     |    |
| 16. | Best environmental practices are employed in addressing environmental issues.                              |           |   |    |     |    |
| 17. | Enough community projects have been completed by GSWL.   |           |   |    |     |    |
| 18. | Community famers/land owners are given fair deal of compensation.  |           |   |    |     |    |
| 19. | The company pay royalties due communities on regular basis.  |           |   |    |     |    |
| 20. | The financial status of communities has improved owing to mining.  |           |   |    |     |    |

21. What is the predominant livelihood in your community?  
 Farming  Mining  Trading  Carpentry  Mechanics
22. Mining has promoted education of the community youths?  Yes  No  No Response
23. The company has sponsorship package in place for brilliant but needy community students.  
 Yes  No  No Response
24. GSR has provided vocational training for the youth of the community.  
 Yes  No
25. If your answer to the Q4 is yes, specify the kind of vocation you are aware of?  
 carpentry  mobile phones Repairs  Construction  Mechanic
26. What current community based projects are been undertaken by GSR?  
 Construction of School  Borehole installation  construction of community center
27. Are you satisfied with the livelihood empowerment program implemented by GSR?  
 Yes  No  somehow  No Response
28. Is GSR sponsored community graduates able to get employment placement after school?  
 Yes  No  somehow  No Response
29. Are you aware that catchment communities are paid royalties? Yes  No  No response
30. Do you know the amount paid as royalties? Yes  No  No response
31. The communities transport system has improved owing to mining in the area.  
Yes  No
32. Were you resettled by GSR? Yes  No  No response
33. If yes, were you compensated? Yes  No

34. Were you pleased with the compensation package? Yes [ ] No [ ]

35. How will you rate GSR in terms of their social responsibility commitment to its catchment communities?

30% [ ] 40% [ ] 50% [ ] 70% [ ] 80% [ ] 90% [ ] 100% [ ]

**Mine Community Officers**

36. From records, how many people from the catchment communities were recruited into GSR or allied companies?

In 2008.....

In 2009.....

In 2010.....

In 2011.....

37. Are there frequent community demonstrations against GSR? Yes [ ] No [ ]

