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FACULTY OF DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCE

MANAGEMENT

EFFECTS OF SMALL-SCALE GOLD MINING ON FARMING IN ATIWA WEST

DISTRICT

A dissertation submitted to the Department of environmental and Natural Resource Management of the faculty of Development studies, Presbyterian University College, Ghana in partial fulfillment of the requirements for the award of Master of Science in Environmental Health and Sanitation.

BY

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SEPTEMBER, 2019

## DECLARATION

### Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature.....Date.....

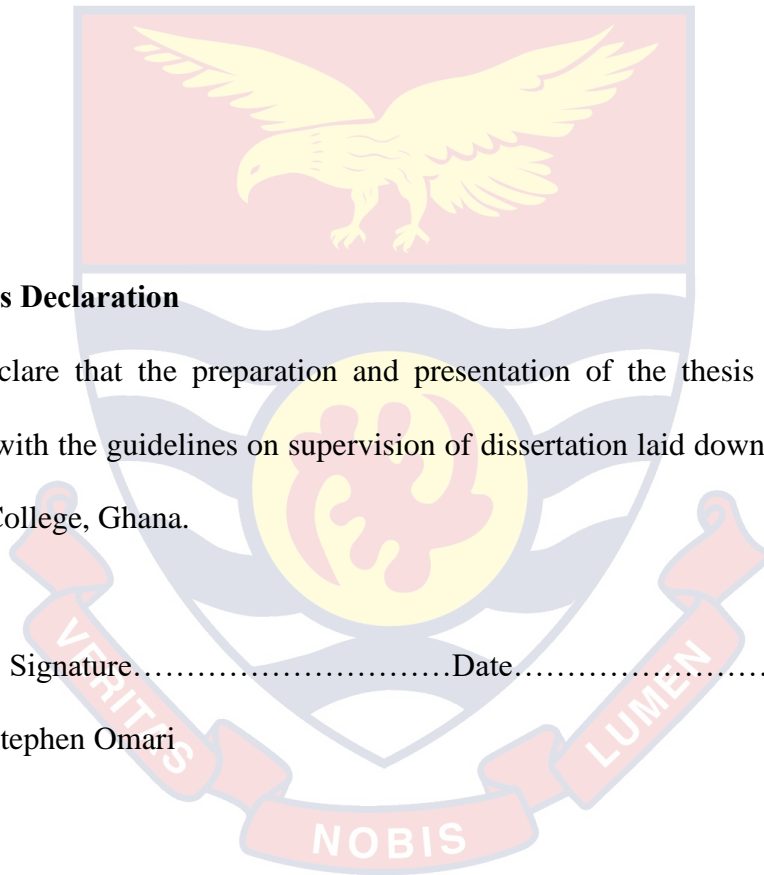
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### Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of dissertation laid down by the Presbyterian University College, Ghana.

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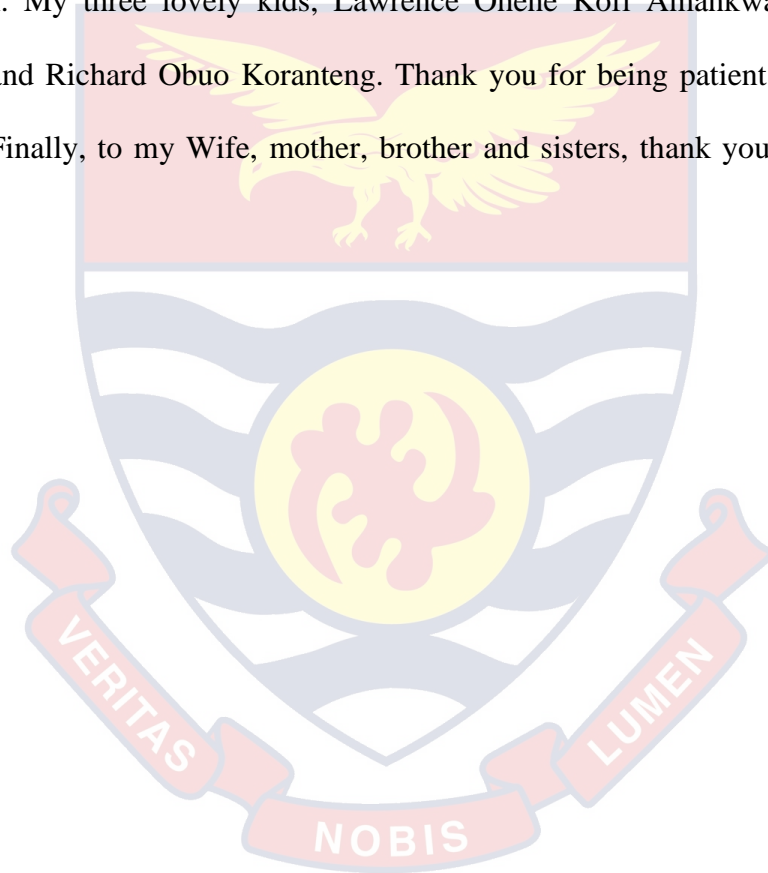
## ABSTRACT

Mining in developing countries are located in rural areas where agriculture is the main source of livelihood, mining communities in Ghana's mineral-rich regions engage in food and cash crop production. Mineral exploitation contributes significantly to economic growth and development in most world economies. In Africa, Ghana is the first largest gold producer, contributing to about 8.7% of the country's GDP. The mining sector in Ghana consists of both small-scale and large-scale mining, each of which has varying environmental impacts. The paper is examining the effects of gold mining on staple food crop production, water bodies and the impacts on the health of people living in the area as well as cost of living in these areas. The paper mainly focused on the mining activities in Atiwa West District in the Eastern region of the country. The data collection involved both primary and secondary sources. These included research tools such as review of relevant literature including personal observation, in-depth interviews with mining communities and government officials, environmental assessments of various mining sites in the study area. The findings from the study showed that mining activities, especially that resulting from illegal small-scale mining (popularly known as 'galamsey') deplete environmental resources such as water, soil, the landscape, vegetation, the ecosystem, among others. Important soil organisms have been destroyed, stable soil aggregates disrupted, and eventually depriving the soil of organic matter and low levels of macronutrients and soil fertility necessary for plant growth and crop production and this can leads to food insecurity in most parts of Ghana, in the long term. On the basis of the above, the study recommended that there should be effective community participation in environmental decision making to ensure sustainable mining activities; easing of the registration process for small-scale mines; addressing the various weaknesses in the policies and their enforcement in the mining sector.

## ACKNOWLEDGEMENTS

A special word of thanks go to Dr. Stephen Omari for his constructive and encouraging advice and suggestions throughout this study. The insight and in-depth discussions and knowledge gained from lecturers and colleagues throughout the programme cannot go unmentioned. I will also like to thank both teaching and non-teaching staff of the programme for the attention and a very well organized and coordinated programme.

Again, I will like to acknowledge the assistance of my friends, Charles Adu-Sakyi, and Opoku Seth. My three lovely kids, Lawrence Ohene Kofi Amankwah, Kelvin Kwakye Koranteng and Richard Obuo Koranteng. Thank you for being patient with Daddy during this study. Finally, to my Wife, mother, brother and sisters, thank you for being there for me.



## DEDICATION

I dedicate this work to my mother, Mrs. Comfort Ohene Obuo.



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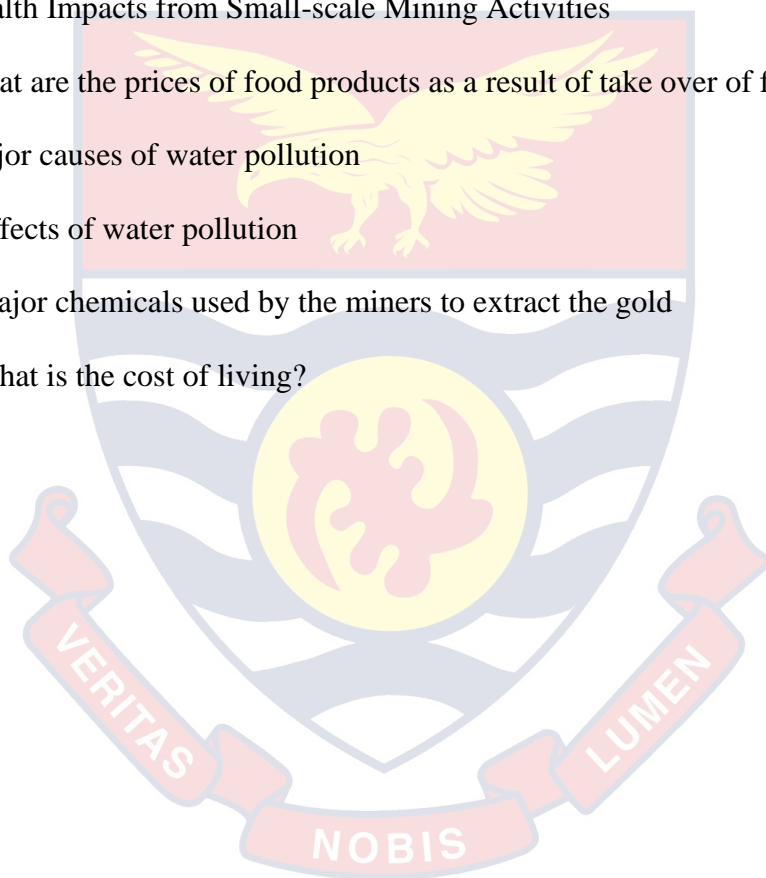
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## LIST OF ABBREVIATIONS

AFL	Agricultural Labour Force
ASM	Artisanal and small-scale mining
ASMP	Artisanal and small-scale mining Production
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization
GMC	Ghana Mineral Commission
GPRS	Ghana Poverty Reduction Strategy
ICMM	International Council of on Mining and Metal
ILO	International Labor Organization
IMF	International Monetary Fund
MDF	Mineral Development Fund
MFL	Mining Labour Force
NGGL	Newmont Gold Ghana Limited
OASL	Office of the Administrator of Stool Lands
SLA	Sustainable Livelihoods Approach
UNCED	United Nation Commission on the Environmental & Development
UNDP	United Nation Development Program
UNEP	United Nation Environmental Program
WCED	World Commission on Environmental and Development

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

Ghana is now the leading producer of gold in Africa followed by South Africa. Ghana has been a producer of gold since the 16th century and boasts of one of the largest and richest gold reserves in the world with a long history of mining. Ghana's largest mine is Tarkwa, owned by Gold Fields Limited. Other important gold mines in Ghana are the Obuasi Gold mines, Bogoso / Prestia Gold mines, Damang Gold mines, Newmont Gold mines and Chirano Gold mines Banchirigah (2006)

Mining of gold in Ghana is grouped into small-scale mining and large-scale mining. Large-scale mining usually involves a company with many employees and heavy-duty equipment. The company mines at one or two large sites and usually stays until the mineral is completely exhausted, Small-scale gold mining refers to all formal and informal, manual and mechanized mining that uses crude methods to extract gold from primary and secondary ore bodies. Small-scale mining is currently seen globally as a source of subsistence for the poor, especially in developing countries, and as a determinant of environmental degradation and resource depletion in areas where such precious minerals are mined (United Nations, 1996; Barry, 1996). Although mining provides livelihoods to many Ghanaians, its contribution to water pollution and environmental degradation cannot be quantified.

Small-scale mining / galamsey in Ghana has come under the intense spotlight recently because of its side effects on the environment. Galamsey has experienced a rise in significance as a source of livelihood for people living in and around mining communities in sub-Saharan Africa. Banchirigah (2006) argues that throughout sub-Saharan Africa, small scale (galamsey) has proved to be an 'indispensable source of

income for those made redundant providing an alternative source of income for people from the public sector and large-scale mining industry with jobs. Despite the fact that, the contributions from mining is significant, economic and social conditions of mining communities have not seen significant improvements in Ghana. Mining operations have come under unprecedented debate during the past few years and have been argued that revenues that are accruing to the state have not been invested in these mining communities to support livelihoods.

Meanwhile, the rising contestation is that mining has had considerable environmental and social impacts in rural communities, as argued by Wonder (2005) that the degradation of ecosystems like land and water may lead to conflict among land users. Surface mining is a vivid example of land use practice that can lead to such conflicts. For example, surface mining results in the removal of vegetation, destruction of the ecosystem and the permanent loss of farmlands. Small-scale mining has a direct implication on food production.

Aragon and Rud (2012) in their study on gold mining in Ghana found that pollution that emanates from mining has reduced agricultural productivity by almost 40%. Other studies have documented the effects of pollutants on crop yields (Emberson, 2001; Marshall, 1997). These studies found out drastic reductions in yields of main crops, e.g. rice, wheat, and beans, coming from the exposure to air pollutants associated to the burning of fossil fuels, such as nitrogen oxides and ozone. Depending on the crop, the yield reductions can be as high as 30 to 3, which is a 60% reduction (Aragon and Rud, 2012). The little attention in scholarly works on exploring this complex relationship between small-scale mining and environment and their consequences on poverty and food security is clear. This study will therefore, explore the small-scale mining and its impact on the environment in rural mining communities in Ghana. The analyses between

small-scale mining and the environment will focus on land use, water resources and labour. The unequal balance between small-scale mining and environment disrupts the rural livelihoods of people with further ramifications on food security and poverty.

## 1.2 Problem Statement

Small-scale / galamsey gold mining in Ghana is facing stiff opposition presently because of its adverse environmental and social side effects, especially on land and water pollution. Mining is destructive to the environment as trees and vegetation are cleared and burnt for mining and is one of the major causes of deforestation in Ghana as at now. Small-scale mining has direct implication on food, Martha(2014) . Aragon and Rud (2012) in their study on gold mining in Ghana found that pollution that emanates from mining has reduced agricultural productivity by almost 40%. Other studies have documented the effects of pollutants on crop yields (Emberson,2001; Marshall,1997). These studies, mostly in controlled environments, found drastic reductions in yields of main crops, e.g. rice, wheat, and beans coming from the exposure to air pollutants associated to the burning of fossil fuels, such as nitrogen oxides and ozone. Depending on the crop, the yield reductions can be as high as 30 to 60% (Aragon and Rud, 2012). The little attention in scholarly works on exploring this complex relationship between small scale mining and food production and their consequences on poverty and food security is clear. This study will, therefore, explore the small scale and its impact on food production in rural mining communities in Ghana. The analyses between small scale mining and food production will focus on land uses, water resources and labour. The unequal balance between small scale mining and farming disrupts the rural livelihoods of people with further ramifications on food security and poverty. When the environment is drastically affected, naturally, the people will be affected too. The chemicals such as

cyanide and mercury used to amalgamate the gold are discharged into rivers and streams, thus contaminating the water bodies and killing the aquatic organisms such as fish living within the water bodies. People who consume such contaminated aquatic organisms are prone to serious health hazards.

### **1.3 Purpose of the Study**

The purpose of the study is to examine the impact of small-scale mining/galamsey activities on farming in Atiwa – District.

### **1.4 Research Objective**

The main objective is to examine the impact of small-scale activities on farming in Atiwa - District.

1. To evaluate the major causes of destruction to farmlands in the selected communities?
2. To access the effects of small scale mining on agriculture in the selected communities.
3. To access the strategies employed by stakeholders to reduce the negative effects of small scale mining in the selected communities.

### **1.5 Research Questions**

The primary question to be addressed during this research is to look at the extent that small-scale mining affects the livelihoods of local communities and the environment as well as food security in Ghana. This will then lead to a number of secondary questions including:

- What are the major causes of destruction to farmlands in the selected communities?

- How does small-scale mining affect farming in the selected area?
- What are the measures put in place to mitigate the negative impacts of mining on farmlands in the selected communities?

### **1.6 Significance of the Study**

The study will be of great importance because all stakeholders including the case study District and other districts in Ghana where illegal gold mining is being done. Students and the government stand to benefit immensely from it since it will serve as a guide for other people's work. The study will therefore come out with the current situation, practices of small-scale mining in the district, and create the needed awareness for policy makers to recognize it in order to narrate their effort and resources towards improving the extraction in the Atiwa District and Ghana as a whole.

### **1.7 Scope of the Study**

Small-scale mining has become an albatross for some district, municipal and metropolitan assemblies in Ghana Aryee (2014). For convenience sake, this study would only focus in the Atiwa - West District with emphasis on communities with high galamsey potentials such as Kwabeng, Abomosu, Bomaa and Asamama with respect to rates at which illegal mining is being done in these towns.

### **1.8 Delimitation**

The study was delimited to four towns in the Atiwa District; the towns were selected because most of the galamsey activities go on in these towns and were convenient. The respondents were the farmers, miners, nurses, teachers and businessmen. This was because these people are in the best position to provide the needed information.

### 1.9 Limitations of the Study

Within the study period, time constraints, and cost is an anticipated limitation. The study is also expected to have challenge with data collection due to recall bias or better still, incomplete responses. Lack of co-operation and willingness on the part of some respondents to provide answers to the questionnaire is an anticipated limitation. Due to the above mentioned reasons, it would be difficult to get reliable data from the respondent for the fact that some would not be sincere in answering the questionnaires.

### 1.10 Definition of Terms

**Artisanal and Small Scale:** ASM refers to informal mining activities carried out using low technology or with low machinery. The definitions vary from country to country according to the “macroeconomic situation, the geological framework, the mining history and the legal conditions. These include: level of employment, annual production output, capital investment, size of claim, artisanal operations (low levels of mechanization and/or the use of simple equipment), and depth of mining operations” (ILO, 1999). In Ghana, small-scale (gold) mining is defined as; “mining (gold) by any method not involving substantial expenditure by an individual or group of persons not exceeding nine in number or by a co-operative society made up of ten or more persons.” The definition therefore includes (1) what has been termed “artisanal”, those operations using only rudimentary/artisanal implements. (2) more sophisticated mining activities operating at a relatively low level of production and which generally require limited capital investment” Aryee (2002). Small Scale Miners are ‘poor people; individual or small groups who depend upon mining for their living: they use rudimentary tools and techniques (pans, pickaxe, etc.) to exploit their mineral deposit, Aryee, (2002).

**Food Security:** According to the World Food Summit Plan of Action (1996) by



the FAO, food security exists when all people at all times have physical and economic ‘access to sufficient, affordable, safety and nutritious’ food to meet their dietary needs and preferences for an active and healthy life. The Right to Food is the basic right of people, is the availability of food, access to food, stability and food utilization, which are the pillars of food security. (FAO, 2011).

**Agriculture:** Agriculture is the science, art and occupation of cultivating the soil, producing crops and raising livestock for human consumption. “Farming involves financing, processing, marketing, and distribution of farm produce; farm production supply and service industries; health, nutrition and food consumption; the use and conservation of land water resources; development and maintenance of recreational resources; and related economic, sociological, political, environmental and cultural characteristics of the food and fiber system” ( Plant Earth 2001). There is some focus also on sustainable agriculture and can be defined as a process of “sustaining farmers, resources and communities by promoting farming practices and methods that are profitable, environmentally sound and good for communities”. “It rewards the true values of producers and their products. It draws and learns from organic farming. It works on farms and ranches large and small, harnessing new technologies and renewing the best practices of the past” SARE (2012).

**Biodiversity:** Biodiversity is a combination of life forms and their interactions with one another and with the physical environment, which has made earth habitable for people living. (Sudumeier-Rieux and Ash (2009).

**Ecosystem:** Ecosystem is changing complexes of living things (plants, animals and other living communities) and non-living environment interacting as functional units Millennium Ecosystem Assessment, (2005). To Sudumeier- Rieux and ASH (2009). “Ecosystems sustainability or healthy ecosystems imply that ecosystems are largely

intact and functioning and that resource use or demand for ecosystem services does not exceed supply because of the future generation safety”.

The above definitions are important because of the interrelation of all living things and non-living things and their environment. Human activities such as overexploitation of resources; unregulated artisanal mining activities, land use and land cover changes due to conversion to mining, croplands, urbanization and pollution from chemical waste, agricultural inputs and mining (Sudumeier-Rieux and Ash, 2009). The link between mining and agriculture is clear, considering the definition given above. Both mining and agriculture make use of the ecosystem; used land, water, human beings, technology and many more to produce or gain their products for human consumption. In a nutshell, there is a strong and varied links that exist between human wellbeing, human security, livelihoods, and health and intangible benefits with ecosystem services Millennium Ecosystem Assessment, (2005). However, continued mismanagement of the environment may lead to disaster.

### **1.11 Organization of the Chapters**

This research is organized into five chapters. Chapter One covers the introduction to the study which highlights the background of the study by looking at the history and the situation of mining regimes in the country. It also contains the problem statement, research objectives and questions as well as the limitations of the study. The Chapter Two contains the literature review which highlights other research works by other individuals. A brief summary of literature reviewed is also provided in this chapter. Chapter Three describes the research methodology that was used to carry out the study including the research design, target population, sampling methodology, sample size, data collection methods, reliability and validity of research instruments, data collection

procedures as well as data processing, analysis and presentation. Chapter Four presents the research findings that have been discussed under sub sections in line with the study objectives and finally Chapter Five presents the summary of research, discussions, conclusions and recommendations.



## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

Mining in most African countries presents a livelihood challenges, small-scale mining in particular generates negative spillovers that have put livelihoods at extreme risks. In an attempt to explain this conundrum, three main bodies of theories have been put forward: sustainable livelihoods framework, institutional resource regime and political ecology. The following sub-sections will briefly describe these theories. These theories will provide useful insights for my study on how small-scale mining shapes the environment. The study will, on the other hand, concisely introduce the topic of mining within the context of economic globalization and pay special attention to the question on the specificity of the cultural, social, economic and environmental changes that mining creates among local communities in Ghana.

Ghana has a long history of mining but many stakeholders are of the view that there are no commensurate benefits of mining to indigenous households in local communities located in the mining areas (Kapstein and Kim, 2011). In the 2012 budget, the Minister of Finance in Ghana indicated that many stakeholders in the mining industry believed that there is little or no evidence to show that the expansion in the mining sector since the early 1990s in Ghana has led to poverty alleviation and local economic development. This according to the Ministry of Finance was due to the lack of transparency and incentives to reform the extractive industry's value-chain" (Ministry of Finance Ghana, 2012). Rather, mining activities have been associated with increased environmental pollution and loss of agriculture livelihoods (Aragon and Rud 2012). Mining is usually characterized by various forms of displacement of people and their properties such as loss of shelter, land, forest cover and other livelihood activities.

The Ahafo Mining Project of Newmont Ghana Gold Limited started active mining in 2006 after several years of exploration and payment of compensation to all affected individuals and households. It is estimated that the total land coverage of the Newmont Mining Project is about 8,030 acres of farm lands of which about 4,854 acres were active farm fields destroyed belonging to about 3000 individuals in approximately 1,700 households (Newmont Ghana Gold Limited, 2006). Even though the affected households were resettled and paid a total of \$14,309,030 initial compensation for the lost farms, many of the households are perceived to be unable to maintain and expand their new farms continuously due to the high cost of farm inputs and associated competition from the mine to utilize the limited farm lands and labour (PAB Development Consult 2008). It is also estimated that prior to the commencement of the mining project, about 97% of the displaced households identified farming as their main source of economic activity (Kintampo Health Research Center, 2011).

Mining activities are perceived to be negatively impacting on farming activities in the surrounding communities. This is because, apart from losing their farm lands, these farmers are not skillful enough to get employed in the mines, which are considered an alternative source of income. The counter argument however is that the displaced households have been duly compensated by the mining company including the payment of royalties to promote local community development. Additionally, the mining company has put in place the Livelihood Enhancement and Community Empowerment Program (LEEP), the Agricultural Improvement and Land Access Program (AILAP), and the Vulnerable People's Program to mitigate the potential social, economic and environmental impacts resulting from the development of the mining project (PAB Development Consult 2008). These projects were also intended to increase alternative livelihood opportunities in order to raise household income among persons affected by

the mining activities. It was therefore expected that individuals might generate income from sources other than farming and would invariably contribute to decreasing poverty in communities directly impacted by the Ahafo mining project. The main objective of the study is to examine the effects of mining on farming activities and the well-being of households within the operational proximity of the Ahafo Newmont Ghana Gold Mining Limited.

Similar to the situation in many other resource-endowed nations, mining in Ghana witnessed significant reforms and huge capital investment since the late 1980s following the Structural Adjustment Programs (SAP) that prescribed massive private sector-led investments into the mining sector in order to maximize tax revenues and other economic development (Akabzaa and Darimani 2001). To this end, Ghana's mining sector witnessed "significant institutional development and policy changes" to reflect the prescriptions of the SAP. For instance, the Ghana government established the Minerals Commission in 1984 and promulgated the Minerals and Mining code of 1986 and the Small-Scale Mining Law in 1989. The government also established the Environmental Protection Agency in 1994 to enforce environmental regulations in Ghana including mining-related regulations. Ghana is currently Africa's first largest producer of gold after South Africa. The country also produces substantial quantities of manganese, aluminum and diamonds. However, the mining industry shrouded in controversies and contentious viewpoints among stakeholders because of the perceived environmental damages mining operations cause to the ecosystems and other livelihood activities operated with the communities in which they operate. (Kapstein and Kim, 2011).

Nevertheless, mining is still one of the mainstays of the Ghanaian economy. In addition to providing substantial revenue to the national government, it also provides majority of the raw materials for other industries to produce most of the goods and services essential

for daily life. For instance, in the year 2011, even though the mining sector contributed about 6.8% to Ghana's GDP, it accounted for about 40% of Ghana's foreign exchange earnings and about 14% of direct taxes to the government (Ministry of Finance Ghana 2012). A study by Kapstein (2011) estimated the direct contribution of Newmont Ghana Gold Limited to the Ghanaian economy in the year 2009 as follows; 1.3% contribution to GDP; 9% to total gold export; 1% to domestic revenues and 4.5% to direct investment in Ghana (Kapstein and Kim, 2011).

Despite the impressive statistics of the positive contributions of the mining sector to Ghana's national economy, some stakeholders asserted that the benefits of mining are not felt locally within the Ghanaian society by ordinary citizens. They rather argued that the negative environmental and social impacts of mining far outweigh these macro-economic performances (Akabzaa and Darimani 2001). Also, mining operations are generally located in rural areas where majority of the inhabitants identify farming as their main source of livelihood. However, the nature of mining in Ghana is characterized by major socio-economic effects such as displacement of people and property, loss of arable lands, livelihoods and environmental pollution such as acid rain, contamination of ground water, air pollution, dust and noise pollution (Aragon and Rud, 2012).

In the mist of the mixed effects of mining sector on the Ghanaian economy, the policy environment in Ghana still favors huge capital investment into the mining sector. This is still influenced by the World Bank's policy of promoting private-led investment in the mining sector. Aryee (2012)

## 2.2 An Overview of Mining Activities in Ghana

Mining activities in Ghana can be grouped into small scale and large-scale mining. Small-scale mining usually requires less capital investment and mostly undertaken by small artisans; while foreigners are the main actors of the large-scale mining sector in Ghana. However, small-scale mining activities are statutorily restricted to only Ghanaians. Surface mining is the dominant method of mining used by small-scale mining artisans due to its cost effectiveness, low capital intensity and minimal technical skill requirement. Large scale mining, on the other hand, often account for less than 15% of the shares in the mines employs the deep-pit method as it requires huge capital investment, sizable number of workers and sophisticated technology (Amponsah-Tawiah, Dartey-Baah, 2011). In addition, it usually needs government approval as licensing is required. Before 1989, small-scale mining was considered illegal in Ghana and was highly unregulated. As part of the Economic Recovery Programme (ERP), however, the government attempted to modernize the sector and formalize it through the enactment of the Small Scale Gold Mining Law (PNDC Law 218). Despite this development, only a few small-scale mining artisans are registered (Akabza, Darimani, 2001). Thus, majority of artisanal miners are unregistered and operate illegally, making monitoring of their activities and enforcement of mining regulations very difficult (Aryee, 2001). Even though the law requires individuals to register with the Minerals Commission so they can be assigned specific areas to operate, the bureaucratic nature of the registration process renders many of them frustrated (Akabza, Darimani, 2001), Ghana has the potential to produce a variety of minerals including limestone, manganese, silica sand, kaolin, mica, stone, feldspar, quartz, chrome, salt, among others. However, the main minerals produced by large-scale companies are gold, diamond, bauxite and manganese; while small-scale operators mainly produce industrial minerals such as



kaolin, limestone and silica sand. Silver is produced as a by-product from gold mines, while aluminium is produced from imported alumina. There is also growing potential for commercial gas and oil exploitation, with announcements of significant discoveries of off-shore oil in June 2007, which commercial exploitation started in 2010. Gold, however, is by far the most important mineral currently being exploited in Ghana. It contributes more than 90% of the total value of minerals in the country and has attracted the largest number of large and small-scale operators gives the breakdown of minerals revenue.

Currently, there are about seventeen (17) large-scale mining companies and three hundred (300) registered small-scale mining groups involved in mining exploration in Ghana. The key players in the large-scale sector include AngloGold Ashanti Ltd, Goldfields Ghana Ltd., Golden Star Resources Ltd., Newmont Mining Corporation, Red Back Mining, Adamus Resources Ltd, Alcoa Inc., Alcan Aluminum Ltd, Ghana National Manganese Corporation, and the Ghana Consolidated Diamonds Ltd (2011). (Amponsah-Dartey, 2011). The Obuasi mine of Ashanti Goldfields Corporation (AGC), which started in 1890, is by far the largest and oldest operation in the country. It accounts for more than 50% of Ghana's total annual gold production. Other mines operated by the company in Ghana through its expansion programme include the Bibiani, Anyanfuri and Iduapriem mines (Akabza, Darimani, 2001).

Diamonds are mined from alluvial sources mainly from the Birim Diamond field at Akwatia and the Bonsa diamond field in the Eastern and Western regions respectively. Ghana Consolidated Diamonds Limited (GCD) undertakes large-scale diamond mining. However, this company has been on the divestiture list since 1993.

Its share of the nation's diamond output has been dwindling, currently accounting for less than half of the total annual output (Akabza, Darimani, 2001).Manganese, on the

other hand, is mined at Nsuta, Western region, by Ghana Manganese Company Limited (GMC), while bauxite is mined at Awaso by Ghana Bauxite Company Limited (GBC).

### **Evolving Policies and Institutions in the Ghanaian Mining Sector**

The long tradition in the extractive sector has enabled Ghana to build an institutional framework and organizations to support the mining industry. The key organizations include the Ministry of Mines and Energy, the Minerals Commission, the Geological Survey Department, the Chamber of Mines, the Mines Department, the Environmental Protection Agency, Lands Commission, Land Valuation Board and the Forestry Commission. These organizations provide support to ensure optimal exploitation of the country's natural resources (Akabza, Darimani, 2001). The Minerals and Mining Law of 1986 provides the overall legislative framework for mining in Ghana. This law established the royalty and corporate tax rates in this industry; but was however amended in 1994 and 2005 as Ghana transitioned into a constitutional rule. The amendments focused on revising the corporate tax and royalty rates and limiting the duration for mining lease. In addition, three new mining laws were implemented after the legalization of small-scale mining. They were the Small-Scale Gold Mining Law, the Mercury Law and the Precious Mineral Marketing Corporation Law. The Small Scale Gold Mining Law covers the registration, licensing and the establishment of support centres for small-scale mining. The Mercury Law legalizes the purchase of mercury for mining purposes, while the Precious Minerals Marketing Corporation Law provides official marketing services for small-scale gold and diamond miners and promotes trade in precious metals, diamond, and jewelry in and outside Ghana (Bonsu, Quansah, 1992).

The two main institutions with direct supervisory and oversight responsibilities over the mining sector in Ghana are the Ministry of Lands and Natural Resources and the Minerals Commission. The Ministry of Lands and Natural Resources is responsible for

all aspects of mineral resource exploration in Ghana. It formulates policies and grants licenses for mining and mineral exploration. The Mineral Commission, established under Article 269 of the 1992 Constitution of Ghana and the Minerals Commission Act of 1986, is the principal institution for providing regulatory framework for mining in the country. It administers the Mining Act, making mineral policy recommendations, promoting mineral developments in the country and advising government on mineral related issues. It also ensures compliance with the mining and mineral law and regulation. It operates under the purview of the Ministry of Mines. Samuel Antwi Darkwah (2007).

These institutions are also supported by agencies such as the Environmental Protection Agency, the Geological Survey Department, the Mines Department, the Lands Commission, and the Chamber of Mines. The Environmental Protection Agency (EPA), established under the Environmental Protection Agency Act of 1994, is responsible for all environmental issues in the country. This agency formulates and implements environmental policies and enforces compliance with environmental laws and regulations. The Mining Section of EPA provides direct oversight on the mining industry with key responsibilities such as processing environmental permits and certificates; monitoring of mining activities; environmental assessments; investigating complaints relating to mining activities; and creating environmental impact awareness. The Geological Survey Department provides geological study support to the government and the mining industry. The Mines Department has the oversight responsibility for ensuring compliance to health and safety inspections standards by mining companies. The Lands Commission provides legal records of issued mining licences and examination of all new applications. The Chamber of Mines is an association of mining companies and has the responsibility of addressing immediate concerns of all stakeholders within its jurisdiction

(Hilson, 2002)

### 2.3 Resource Curse Theory

There is a phenomenon that social scientists refer to as the “Resource Curse” (Auty, 1993). According to the Resource Curse Hypothesis, countries with large endowments of natural resources, such as gold, diamond and oil and gas, tend to register lower economic growth and social progress. Paradoxically, despite the prospects of wealth and opportunity that accompany the discovery and extraction of oil and other natural resources, such endowments all too often impede rather than further balanced and sustainable development (Sachs and Warner, 1995; Auty 2001; Karl, 2004; Humphreys.(2007).

This hypothesis occurs in many different reasons; there is a decline in the competitiveness of other sectors as a result of real exchange rate appreciation as resource revenues enter the economy. This phenomenon is known as the “Dutch Disease” (Ebrahim-Zadeh, 2003). The rise in the value of natural resource exports causes the appreciation in the real exchange rate. This, in turn, makes exporting non-natural resource commodities more difficult and competing with imports across a wide range of commodities almost impossible (called the “spending effect”) (Humphreys et al. 2007: 5). Though this connotation “Dutch Disease” originated from the experience of the natural gas and manufacturing sector of the Netherlands in the 1970s, in developing countries, it tended to be more related to agriculture (Humphreys,2007). In the annals of development, literature on the resource curse has been argued that, from the onset mining boom generates critical concerns about traditional agriculture, infrastructure and environment. In the first place, over concentration of resource-rich countries on their natural resources sector has driven attention from agriculture. This has resulted in acute

under investment and the consequent collapse of the agriculture sector. In the second instance, the activities of resource extraction, for example, gold mining have a direct impact on agriculture in terms of land access and water pollution. These explain the situation of local economies of districts that host mining and agriculture in Ghana.

Another way that the resource curse occurs is what has emerged as the ‘greed’ and ‘grievance’ argument. This has fueled civil wars linked to natural resources. According to Collier and Hoeffler (2002), civil wars stem from the greedy behavior of a rebel group in organizing an insurgency against the government. This is motivated by to control and have access to natural resources. What is significant in these studies is that natural resources play a central role in armed conflicts that have occurred in resource-rich countries in developing countries particularly in Africa. This applies in the case of the long-standing armed conflict in the Democratic Republic of Congo (DRC). DRC is endowed with substantial mineral wealth. Natural resources like diamonds, copper and Colton have been the backbone of the economy of DRC. But, the benefits of these resources have not translated into economic growth.

The reality has been that these natural resources have spurred widespread civil war between warring states and the government and rebel groups in the DRC. The economic attractiveness and loot ability of alluvial diamonds, copper and other minerals caused third party intervention of Uganda and Rwanda with the purpose to exploit these natural resources. The various United Nations Panel Reports have confirmed that the war has been fueled by exploitation of the DRC’s natural resources. According to these reports: “the main reasons for the conflict in the DRC have become access to five key mineral resources: diamonds, copper and gold as well as control and trade.” Dispossession was presumably encouraged, sometimes organized and coordinated, by high-ranking army commanders of Rwanda and Uganda, with the consent of key

officials in their respective governments. Humphreys ,Sachs & Stiglitz, (2007)

What the ‘greed’ and ‘grievance’ argument offers for the case of Ghana is the fact that there is a scramble for natural resources by few powerful elites to the neglect of the majority of people and it will be a mismatch to situate the ‘greed’ and ‘grievance’ argument in a democratic environment like Ghana. Of course, Ghana has never suffered any civil conflict that is sparked by natural resources, but what is happening is that the benefits that are supposed to accrue to the majority of people are highly competing for by the few powerful elites. This draws a distinction between powerful actors and weak actors with the former benefiting while the latter loses. This goes to explain why profits from mining do not reach some people and do not contribute to boosting local food production. The resource curse hypothesis is central to explaining why small-scale mining has not contributed to enhancing local food production and food security. Small-scale mining has tended rather drive food insecurity and poverty in mining communities in Ghana. Martha, (2014)

#### **2.4 Political Ecology**

Political Ecology provides the background to knowing in detail the cost-benefit relationship in resource-rich countries particularly those categorized as developing. Political ecologists look at actors and their roles in mediating local, regional, and global forces to meet their desired goals (Walker, 1991; Bryant, 1998; Robbins, 2004). The use of a resource is mostly varying and conflicting perspectives to different users. The political ecology approach, therefore, makes effort to bring into the spotlight the human-environment relations under the lens of politics of resource use. Politics is central to explaining the human-environment interaction. This ought to be appreciated and unpacked if one is to understand and solve the various natural resource crises.

The central argument of political ecology is that access, control and use of ecological resources generate varying and at times competing interests from diverse actors and that the process of meeting these interests is at the core of the cost-benefit mismatch (Tsuma, 2010). Political ecology offers the role of power in influencing the control of resources and interactions of actors who are placed on a platform of asymmetrical power relations (Escobar 1996). Thus in "Third World Political Ecology," Bryant and Bailey (1997) argue that the unequal power relations among different actors dictates the patterns of resource use, human-ecology relations, actor interactions and environmental conflicts and management outcomes (Bryant, 1997). In hindsight, power (that could emanate from property rights system and/or public policies) is a significant tool for advancing the interest of a particular user.

Political ecology, therefore, makes substantial explanations that shape the conceptual understanding upon which this study is built. In terms of control and access to land and water resources, political ecology is deterministic of the outcome of who gains control. It is as such imperative to build understanding as to why farmers lose the battle with miners for controlling land and water resources. Political ecology will help understand the communication that takes place between artisanal and small-scale gold mining and agriculture in the case of Ghana.

## **2.5 Small-scale mining**

Small-scale mining in Ghana is defined as mining by any method not involving substantial expenditure by any individual or group of persons not exceeding nine in number or by a cooperative society made up of ten or more persons (Government of Ghana 1989). They are estimated to number over 6,000,000 in Ghana, of which many operate illegally on concessions belonging to larger companies or restricted area in

Ghana (Ghana Academy of Arts and Sciences 2003). These are locally referred to as galamsey (Hilson, 2002). Gold is the most important mineral mined on a small scale in Ghana.

The most common equipment used are basic hand tools such as axe sluice boxes and shovels, although occasionally water pumps, explosives and washing machines are seen on sites. The ore is crushed into pebbles by hand or machines, and is contained in storage sacks in sheds. The pebbles undergo various stages before the gold is extracted from the soil or rocks, (Hilson, 2002).

## **2.6 Environmental Impacts of Mining Activities in Ghana**

Despite all these policies and institutions, environmental degradation in most of mining communities in Ghana is still of a major threat and concern. The extent of environmental devastation caused by mineral mining in Ghana is well documented Armah, Luginaah , Taabazuing , Odoi,(2013) Nevertheless, the magnitude of damage caused largely depends on the mining method being used. This has become increasingly alarming, raising serious concerns among key stakeholders. Low entry barriers; improper research methods; lack of coordination among regulatory bodies; poor mercury management; inadequate personnel and resources Okoh , Hilson,(2011) inadequate research; ineffective community participation; cumbersome and lengthy processes in registering small scale mines; and lack of environmental education and awareness creation have been found as contributory factors to the persistent environmental devastation caused by mining in Ghana. In Prestea, one of the mining communities in Ghana, increased mining activities have resulted in disproportionate contamination of major water bodies leading to loss of aquatic organisms, destruction of the biodiversity, removal of vegetation, depletion of soil resources and loss of farmland. For instance, a



study by Serfor-Armah , Nyarko, Dampare, Adomako (2006) in Prestea, found high levels of arsenic and antimony concentrations in the rivers ranging from 0.90 – 8.25 ppm and 0.09 – 0.75 ppm respectively, far exceeding the World Health Organizations recommended values of 0.01 and 0.005 ppm respectively. Again, Singh , Koku,Balfors(2007) reported a spillage caused by BGL (Bilington Bogoso Gold now called Golden Star Resources Bogoso/Prestea Limited) on 23 October 2004, a major surface mining company found in the area. This spillage, according to, Singh Koku ,Balfors (2007) emanated from the new tailings dam of the company into the River Aprepre, which flows into other rivers, including Egya Nsiah, Bemanyah, Manse and others. They indicated that the cyanide spillage affected Bomaa and other towns, including Goloto, Juaben and Egyabroni and that some residents of Dumasi and other villages in this area picked up and ate dead fish, crabs, shrimps and other aquatic organisms that were found floating on the surface of the river. It is against this background that this paper assesses the environmental impacts of mining activities in mining communities in Atiwa District with particular reference to the current situation at Atiwa District.

Illegal and small-scale mining account for the most significant part of the environmental damage, Legal small-scale miners must have environment permits and field officers should monitor them regularly. According to (Ntibery 2003), the main environmental problems are mainly: Land degradation, atmospheric impacts from mercury fumes during gold recovery, dust, pollution of rivers and streams by mercury, (Carboo, Sarfo-Armah,1997)

## **2.7 Socio-economic impact of small-scale mining**

Small-scale mining offers some benefits to Ghanaians mainly in employment and

revenue. On small-scale mining, no one can give accurate and precise employment figures in Ghana, although it is estimated that about one to six million (1,000,000 – 6,000,000) people are involved directly in the extraction of gold and diamond (Ghana Chamber of Mines report, 2017). Although not capital intensive, small-scale miners required sufficient manpower, labor-intensive small-scale mining operations are economically feasible because investment cost per job is typically only 10% to 12% as those costs in large scale mining operation (United Nations 1992). Small-scale mining has a major impact on the employment situation in Ghana especially in rural areas where there are few alternative jobs. It is estimated that only fifteen percent (15%) of the miners work on resisted plots, the rest operate illegally.

It is estimated that gold production from small-scale gold mining accounts for approximately one-sixth of the world total gold production (United Nations, 1992). In Ghana since the complete legalization of its small-scale mining sector, significant revenues have been generated in the sector until recently that it was band due to their activity and its effect on the environment. Notwithstanding artisanal small-scale mining positive contribution to Ghana's economy, it has also caused some environmental impact as well. Many scholars have shared their views on the ongoing environmental impacts of the extraction industries (Hilson Gavin, 2001; Aryee 2002, Coakley, 2003, Ofofuo-Mensah, 2011). Hilson, argue that probable no other activities have caused more harm to the environment than the mining industry. This section highlights some of the problems and complication that have plagued Ghana as a result of rapid illegal mining. Some of the environmental problems are as follow; land degradation, deforestation, water and air pollution, erosion, releasing of chemicals that cause danger to the health of both the miners and people in the mining communities.

Small-scale mining has several benefits to developing countries, in terms of

employment and revenue generation. It was noted by the World Bank Group that “small scale mining is driven by mostly poverty and mainly practiced by poorly educated population with few employment ” but I disagree with the world Bank Group that small-scale mining is being done by less educated poor people in society. In recent times people who are involved in small-scale mining are rich and educated people in society especially politicians. Despite the fact that small-scale mining is not capital intensive, it however requires sufficient manpower; labor-intensive. Small-scale mining operations are economically feasible because investment costs per job are typically only 10–12% per cent as those costs in large mining operations. Hilson, (2012). Small-scale mining, therefore undoubtedly, has a major impact on the socioeconomic development of a state.

## **2.8 Some Problems Associated with Mining Activities**

### **2.8.1 Environmental Concerns**

Despite small-scale mining positive contribution to the Ghana’s economy, it has also caused its share of environmental impact. This section highlights on some of the problems and complications that have plagued Ghana as a result of the rapid expansion of mining. Some of the environmental problems are as follows; land degradation, deforestation, water and air pollution, erosion, releasing of chemicals that cause danger to the health of both the miners and people in the mining communities,(Fonseca,Hersilia,2004)

### **2.8.2 Social livelihoods and mining**

The social impact of mining is very well documented (Amonoo-Neizer and Amekor 1993; Hilson 2002, 2004, 2013). Mining is always an attraction to people who go job hunting. Because of this, every mining town has sizeable number of non-

indigenes who are there because of the attraction of the mines. As more and more people from different social and economic backgrounds converge in one community, many social problems are played out. The impact of mining is the dislocation of communities. Large-scale mining often leads to the dislocation of some communities that are sited too close to the mining companies' operational areas (Oxfam America, 2005). Like clearly stated by Curtis and Lissu,( 2008) in Tanzania, 400,000 people were evicted in one community alone (Bulyanhulu) to allow for the development of a large-scale gold mining project. To avoid the hazard that is likely to occur as a result of the operations, large numbers of people will have to be located elsewhere. As at 2007, over 50,000 indigenous people had been dislocated from their ancestral lands by mining companies operating in the country, Owusu-Koranteng, (2008).

### **2.8.3 Overview of Agriculture in Ghana**

Ever since, agriculture has been the largest sector of Ghana's economy for many years, contributing about 39 percent of GDP compared to about 26 percent for the industrial sector and 31 percent for the services sector (Ghana Statistical Service, 2014). It also employs the largest number of Ghanaians (55 percent) especially those who live in the rural areas (Ghana Statistical Service 2008). Farming in Ghana is predominantly practiced on a smallholder basis with about 90 percent of farm holdings are less than 3 hectares in size (Chamberlin 2007). In understanding the overview of agriculture in Ghana, it is imperative to analyze the historical trend of how agriculture has traversed various policies from colonial era to post-independence. The proceeding discussion as such builds on this historical trend and analyzes the various policies that have underpinned agriculture. This has intrinsic link with how agriculture can be improved to ensure increased food production and food insecurity in the midst of alarming

externalities that mining generates in local communities.

### **Agricultural Policies in Ghana: Historical Trend and Analysis**

Agricultural policies and development in Ghana have a long history dating as far back in the colonial era in 1874. A major turn-around in agricultural policy and development occurred from 2002 when FASDEP was formulated. Since then, successive agriculture policies implemented adapts to sector-wide approach with contributions from international organizations including inter alia, the World Bank, IMF, and the International Fund for Agriculture Development (IFAD). This part examines the various major agricultural policies that have been formulated and implemented from the colonial period to date. This will help elucidate the trend of agricultural policies in Ghana.

During the period of the British Colonial rule, the focus was to re-orient agriculture to enhance export in Ghana (then Gold Coast) to feed growing industries in Europe. In the 1980s, the Colonial Department of Agriculture encouraged the production of cash crops mainly for exports.

The cash crops were often exported in their raw form to the booming market and high demand in Europe. The major crops were cocoa. Little priority was given to other farmers who grew food crops (Brooks 2007). This resulted in exodus of farmers into cocoa production in order to benefit from the massive government support and booming international market. Agriculture was further boosted when in 1919 the first ten-year (10) development plan was introduced by the colonial administration under the leadership of the then Governor Gordon Guggisberg. The plan provided the framework to advance the development of infrastructure mainly to support agriculture and industrial sectors. The priority behind these infrastructure

developments was to link major agricultural production centers directly to the harbor towns to facilitate easy export of cocoa and oil palm. During 1950-60, GDP grew annually by 4.1 percent and agricultural output by 4.3 percent (Sarris and Shams 1991, 1). As such Ghana became the leading cocoa producer in 1911. However, there was disproportionate policy focus on local staples. This resulted in low production of food and consequently increased food insecurity prior to independence in 1957.

### **Agricultural Policies and Structural Adjustment Programme (1983-1992)**

Before the introduction of SAPs, Ghana had gone through statist approach to agricultural development from 1957 to 1966 mainly with military regimes. Economic policies including agriculture were driven mainly by socialist orientation. Thus the state controlled large farms. Miracle (1970) points out the “The Government production ‘front’ organisations principally the State Farms Corporation and the United Ghana Farmers’ Cooperatives Council (UGFCC) received nine-tenths of the ordinary development budgets for agricultural production.” By 1964, there were about 64,000 and 99,000 acres put into crop production under government production organizations, of which 50 per cent was accounted for by state farms, 24 per cent by cooperatives, 13 per cent by Workers’ Brigade farms, and the remainder by institutional farms (ibid.) Change of governments through military uprisings represents the dark side of the country’s history and this brought remarkable economic crisis that affected agriculture as well.

Ghana was plunged in a protracted economic recession and financial crisis in the 1980s. Kraus (1991) argues that the “disastrous economic conditions and the absence of other resources made turning to the IMF and World Bank the only alternative”. Ghana then became the first country in sub-Saharan Africa to undergo Structural

Adjustment in 1983. In the context of agriculture, SAP introduced aggressive reforms that totally re-oriented government policies. During the structural adjustment period, the country apparently had no coherent policy on agriculture. The preoccupied priority of agriculture was the export of cocoa that contributed significant revenue to the economy. Food crop sector was virtually neglected. The portion of the recurrent budget devoted to agriculture fell from 10 percent in 1981-82 to between 3.0 and 3.8 percent in 1988-90 (Kraus 1991). These were as a result of weak macroeconomic indicator like inflation. The annual rate of inflation rose from about 6 percent during 1965-73 to 50 percent overall in the following decade (Sarris and Shams 1991)

It is important to indicate that the major part of the reform that changed the economic orientation of the country was a move from state-controlled policies to open market or liberal policies that increased the participation of the private sector. The government privatised state farms, removed price controls and gradually reduced subsidies on inputs such as fertilizer. In 1990 the government removed the guaranteed minimum price paid to farmers for selected food crops (mainly maize and rice) and in 1992 abolished input subsidies altogether (Brooks,2007).

These had overwhelming impact on the operations of farmers especially in the crop sector who were largely smallholders. Nevertheless, some positive economic indicators were recorded. Agriculture growth increased at an average of 3.57 percent per year during 1984-89. Non-cocoa agriculture rose by about 4.25 percent per year during 1983-90, or 1.25 percent per capita (Kraus, 1991). These, however, had little impact in reality and the country was at risk to food insecurity and rampant poverty levels. This is because the removal of subsidies compelled farmers to produce at high production cost.

### 2.8.3 Food and Agriculture Sector Development Policy (FASDEP I) (2003-2005)

In 2002, the Ministry of Food and Agriculture (MOFA) developed a 'Food and Agriculture

Sector Development Policy' (FASDEP) as an overall policy for the agriculture sector. FASDEP I, which was implemented in 2003, represents the first major coherent and sector-wide agriculture policy in the post-independence era. On the back of the increased economic recession and financial crisis, the country opted to implement the Highly Indebted Poor Countries (HIPC) program of the IMF and World Bank. The country's Interim Poverty Reduction Strategy Paper (I-PRSP) subsequently became the Growth and Poverty Reduction Strategy (GPRS) (2003–2005). This resulted in the formulation of a broad national development framework, the Ghana Poverty Reduction Strategy (GPRS I) from 2002 to 2004. This pro-poor economic policy framework was predicated on the role of agriculture.

FASDEP I was introduced to provide the framework that stimulate the national vision of lifting Ghana to become an agro-industrial economy by the year 2010. It was meant to provide a framework for modernising the agricultural sector and making agriculture a catalyst for rural transformation and poverty reduction, in line with the goal set for the sector in the Ghana Poverty Reduction Strategy (GPRS I) (Ghana 2007; Brooks et al.2007). The objectives of

FASDEP I was informed by an earlier agriculture policy, Accelerated Agricultural Growth and Development Strategy (AAGDS) which was prepared in 1996. The objectives of FASDEP I included: (1)To ensure food security; (2)To facilitate production of agricultural raw material for industry; (3)To facilitate production of agricultural commodities for export; (4)To facilitate effective and efficient input supply and distribution systems; (5)To facilitate effective and efficient output



processing and marketing systems; and (6) To facilitate and coordinate the implementation and monitoring of sector policies and programmes.

FASDEP I objectives operated broadly under Pillar 2 of the GPRS I: modernisation of agriculture based on rural development. This pillar specifically focused on: (I) reforming the land tenure system; (II) assisting the private sector to increase food production through facilitating extension, research and financial services, and irrigation facilities; (III) encouraging cash crop production; and (IV) supporting the private sector to add value to traditional crops. The major difference between FASDEP I and previous policies was that the former focused on a sectorwide approach to agricultural development, in contrast with the discrete project approach pursued in the past (Brooks et al. 2007). The increased instrument used to drive investment in agriculture under FASDEP I was tax policy that granted tax holidays of up to 10 years. Tax rebates, export credit, and value-added tax exemptions have been the policy instruments used to drive investment in agriculture and infrastructure development.

It is important to indicate that FASDEP I under the broad direction of GPRS I brought remarkable contributions to agricultural development. Significant among them include the increased level of food production for domestic consumption and agriculture development assistance. Dewbre and Battisti (2008) indicate that from 2001 to 2005, the total number of donor aid targeted at agriculture amounted to over 0.5 percent of Ghana's agricultural GDP. These were largely predicated on sound macroeconomic instrument. Real GDP growth reached 5.8 percent in 2004 (Brooks 2007). However, the policy was fraught with some challenges. The major objective of promoting and enhancing smallholder agriculture production could not be achieved.

In 2004, a poverty and social impact analysis (PSIA) concluded that FASDEP I did not adequately target the poor and was a one-size-fits-all policy (Brooks 2007; Kolavalli 2010). One critical reason given for the failure of FASDEP I is that “the expectation of modernising poor smallholder agriculture was unachievable because of improper targeting of the poor within an environment where the drivers of modernisation, access to credit and technology, good infrastructure, and markets are very limited”. This validates the argument of this paper that though smallholder agriculture dominates, it has had little recognition in various agricultural policies. The policy goal of modernising agriculture within the three-year period was overly ambitious and failed to take into consideration that production systems and technology are mainly traditional, based on intercropping and use of simple implements and hand tools, with little use of modern inputs such as improved varieties and fertilizers and other agrochemicals (Kolavalli et al. 2010).

#### **2.8.4 Food and Agriculture Sector Development Policy (FASDEP II) (2008-2015)**

In response to the apparent weakness identified, FASDEP I was revised in 2007 with substantial participation of various stakeholders (Kolavalli, 2010). This led to the introduction of the second phase of the agricultural policy strategy. FASDEP II first operated under the Growth and Poverty Reduction Strategy (GPRS II) (2006-2009).

It currently runs under the Ghana Shared

Growth and Development Agenda (GSGDA). FASDEP II has six main objectives:

(1) Food Security and Emergency Preparedness; (2) Increased growth in incomes; (3) Increased competitiveness and enhanced integration into domestic and international markets; (4) Sustainable management of Land and the Environment; 5) Science and

Technology for Food and Agricultural Development; and (6) Institutional co-ordination.

The overarching objectives of FASDEP II are to ensure modernised agriculture, a structurally transformed economy, food security, employment and reduced poverty. These distinguish the second phase of the agricultural policy from the previous phase. The major difference between FASDEP I and II has do with the approach that led to the formulation of the policy. While

FASDEP I had little participation of stakeholders that contribute to the agricultural sector, FASDEP II engaged increased and diverse number of stakeholders, including farmers, researchers, district assemblies, input dealers, traders, and non-governmental organisations through regional consultations (Kolavalli et al. 2010). It is also important to indicate that the FASDEP II is being implemented through METASIP (Senadza and Laryea, 2012) with the latter serving as a corresponding investment plan. FASDEP II again seeks for more integration between agriculture and industry. This was lacking under FASDEP I.

Currently, the implementation of FASDEP II is broadly driven by the framework Ghana Shared Growth and Development Agenda (GSGDA). The specific policy objective on agriculture under

GSDA is found in thematic area 3: **Accelerated agricultural modernisation and natural resource management**. The main strategies to drive the agricultural modernization include the following:

1. Improving Agricultural Productivity
2. Increasing Agricultural Competitiveness and Enhanced Integration into Domestic and

International Markets

3. Reducing Production and Distribution Risks/Bottlenecks in Agriculture and Industry
4. Selected Crops Development
5. Livestock and Poultry Development
6. Promotion of Fisheries Development
7. Improving Institutional Coordination (GSGDA, 2010)

The national policy document puts forward several instruments to promote the achievement of the above-stated objectives. These include promotion of mechanization, technology use by farmers, seed development, post-harvest management practices, irrigation, financial investment and sustainable land management. More to that FASDEP II provides some major policy instruments aiming to spur agricultural growth and development. These include Macroeconomic Policy, Land Policy, National Water Policy, National Transport Policy and Private Sector Development Trade Policy.

#### **2.8.5 Medium Term Agriculture Sector Investment Plan (METASIP) (2011-2015)**

METASIP is a transformative agriculture policy that coordinates the policy objectives of FASDEP II with a focused financial investment plan. The strategies of METASIP are to improve agricultural performance in contributing to the broad innovation of ensuring modernised agriculture, structurally transformed economy, food security, employment opportunities and poverty reduction, and as well focus on investments to address sector constraints on productivity, market access, sustainable production and institutional coordination (Ghana 2010). A common challenge that besets agricultural policies in Ghana has been the stark disconnect between the goals of policies and the available funds to implement these policies. METASIP aims to

build a synergy that ensure that there is adequate and dedicated financial support to implement agricultural policies. It tends to drive this goal by ensuring that there is a well-focused plan. For example, under the first objective of FASDEP II (that is, improving agricultural productivity), METASIP has estimated that GHC565.6 million would be needed from 2011 to 2015 and GHC853.70 million is estimated for the objective of ensuring increased growth in incomes in the same period. This gives a set direction that guides public and private investments in agriculture in Ghana.

### **2.9 Effects of illegal mining on water bodies**

Illegal gold mining activities known as galamsey along small rivers and streams is posing a lot of danger to the water treatment plants in the Akim –Kwabeng and its environs. The Eastern Regional Quality Control Manager of Ghana Water Company has lamented that the high level of pollution as a result of this illegal gold mining activity is posing a great danger to residents due to the washing of mineral bearing rocks and soil into the river bodies in these areas. He said the fluoride content in the water which is supposed to be 1.5 for human consumption has rising to 2.3 standards, describing it as unacceptable and dangerous to humans as far as dental health was concerned. He said the said another mineral found in the water which was equally dangerous was mercury been used along rivers in the Eastern Region in the extraction of the gold by the miners. He said because of these activities, the company spends a lot of money to treat the water in those mining communities. According to him, miners have been diverting the courses of the various rivers to suit their operations, which, he said would be a great cost to the Ghana Water Company (Aryee,2014).

Illegal mining activities on water bodies have been identified as one of the major causes affecting production and supply of water in these areas and the Western Region.

The Pra River, which serves as major source of water for the production in the region, has been taken over by these illegal gold miners also known as galamsey whose inhuman activities destroy or pose great danger to the continuous availability of water. The then minister for Water, Works and Housing on a working visit to a number of rivers to access the level of water crisis in the region, he admitted that illegal mining activities pose a great challenge to the operation of Ghana Water Company. She said that both Ntweaban and Daboase treatment plants have the capacity to produce six million gallons of water a day to serve the twin city but production is low and inadequate. These illegal mining activities pose problems for the treatment plants and make cost of production very high. She admitted that the current situation in the Region needs was bad and could affect industry and even household's consumption.

Determining of heavy metals in water bodies in Tarkwa and Obuasi areas by the Wassa Association of Communities Affected by Mining Changes, particularly on Nyam River in Obuasi showed that arsenic concentration of 13.56mg/l as against 0.01mg/l required by the World Health Organization WHO and Environmental Protection Agency (EPA). This was due to pollution by small-scale mining activities. Data from Asuakoo River revealed that it had 22.72mg/l as against 0.4mg/l of manganese prescribed by the WHO permissible guideline. The executive director of this association said the level of pollution of our water bodies in mining areas pose serious health implication to the people who were found to be suffering from various illnesses. He said the result of the research showed that most water bodies in the studies in the study areas were polluted with high arsenic level ranging from 0.005 to 35.4mg/l Manganese, Lead and Mercury are neurotoxic metals, which could affect the IQ of children exposed to high levels in drinking water. He continued that, in 2011, 400 water samples made up of 200 from Obuasi and 200 from Tarkwa areas were collected between May and

September 2008 and each sample was analyzed separately for toxic chemicals including Arsenic, Manganese, Cadmium, Iron, Copper, Mercury, Zinc and Lead. He said physiochemicals parameters such as pH, conductivity, turbidity and total dissolved solids were measured using standard methods of analysis as prescribed by the American water works Association (AWWA, 1998). The turbidity of some of the water bodies and alternate sources of water provided had low pH and high turbidity values, which exceeded the WHO and GEPA permissible limits.

Studies conducted by the Ghana Atomic Energy Commission (GAEC) on water bodies and streams sediments as a result of small-scale mining activities at Tarkwa and its environs in the Western Region indicated excessive pollution of high mercury concentration, toxic that elements affect human health. The result suggested that the level of mercury detected from the samples from the Western Region gold mining towns exceeded the WHO tolerable limit of 0.001mg/l for drinking water. According to GAEC, areas that contained high concentration of mercury are sites that experienced extensive galamsey gold mining activities, showing that mercury concentration varied between 6.80mg/l and 19.82mg/l for water and 28.90mg/kg and 84.30mg/kg in sediment at sites with extensive small-scale mining activities.

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## 2.10 Policy Framework

Small-scale mining operates in a different policy framework compared to large-scale mining though they both share some similarities. As with large-scale mining, ASM is vested in the president of Ghana and on behalf of the people. In the spirit of the provisions in the constitution, the government retains the rights to subsurface minerals and reserves the absolute right to take possession of any land, even if it is legally owned by another group. The 1992 Constitution (Article 257-6) of the Republic of Ghana states that: “Every mineral in its natural state in, under or upon any land in Ghana, rivers, streams, water courses throughout Ghana, the exclusive economic zone and any area covered by the territorial sea or continental shelf is the property of the Republic of Ghana and shall be vested in the President on behalf of, and in trust for the people of Ghana.”

The process for the granting of mineral rights is well governed by both the 1992 Constitution and the Minerals and Mining Act 703 (2006). The government grants a mining right to a mining company after the president has assented to it. It is further required that this goes through the Parliament of Ghana for ratification. Once this is done, the mining company reserves the right to resettle communities living on the concession. What comes to play is that mining companies move to acquire ‘social license’ to operate. Social license involves the process of getting the collaboration and understanding of the communities involved in order to avert resistance to operations. Even though companies are legally required to mine, the ‘resistance of a community can prove very expensive and derail plans of extraction. This has often resulted in conflicts in parts of resource-rich countries in Africa. It is the scale of this challenge that has carved



the perverse phenomenon of the “resource curse” (see: Sachs and Warner 1995; Auty 2001; Karl 2004; Humphreys 2007). Communities affected by mining in Ghana are compensated for loss of properties and livelihoods ranging from houses, crops and economic trees.

## 2.11 Institutional Framework

Several state and non-state actors govern mining. In the past decades, and during the era of the structural adjustment programmes by the World Bank and the IMF, attention was more on reforming these state institutions to leverage responsible mining. The goal was to make mining conducive and attractive to foreign direct investments. The start of 2000s saw the emergence of active participation of non-state actors including local and international non-governmental organizations. Below are some key institutions that help govern and regulate the activities of mining in Ghana:

1. The Ministry of Lands, Forestry and Mines: The ministry is responsible for all aspects of the mineral sector within the Ghanaian economy. A license for exercising a mineral right can only be granted by the Minister of Mines, no matter who owns the surface land. The power referred to the minister must be exercised contingent upon the advice of the Minerals Commission (Akabzaa and Darimani 2001, Sarpong, 2006).
2. The Minerals Commission: It was set up in 1986 to be a one-stop service for investors. The Commission has the authority to coordinate policies relating to minerals and to control and manage the exploitation of mineral resources (Sarpong, 2006). Its key tasks are formulating regulations, amending existing legislation, recommending on minerals policy, advising the government in mineral matters and much more. Their main goal is promoting the minerals sector (Akabzaa and Darimani, 2001).
3. The Lands Commission: The Commission maintains legal records of exploration and

mining licenses. It also initiates policies in relation to stool and state lands. Its valuation board provides the rates for valuation of property affected by mining operations (Akabzaa and Darimani, 2001).

4. Environmental Protection Agency (EPA): The Agency has the task to strike the balance between growing mining operations and economic development and the protection of the country's natural resources and maintaining a sustainable environment. The law requires an Environmental Impact Assessment (EIA) for every mining project that has to be approved by the EPA before mining can start.

## 2.12 Labour Mobility

There is one form of nexus between mining and agriculture that has received very little attention, though it is critical for conditioning food production and security. Artisanal and small-scale mining and agriculture compete for common labour who often resides in and close to communities that host mining. People move in and out of artisanal mining mostly on seasonal basis. These people are mostly farmers. The time to spend on food production is reduced should the farmer venture into mining. The reasons why individuals enter into small-scale mining are varied and include both 'push' and 'pull' factors. In Africa, increased participation in small-scale mining has been linked to a decline in the viability of agriculture, or as a way to supplement agricultural income. Other push factors include poverty, conflict, natural disasters, or economic crisis Blocher, Joseph (2006). Pull factors that encourage people to enter this sector include the potential for high profits or gold-rush type situations.

The mystery and perception of getting quick money or making wealth a shorter period of time has always been the main reason for people particularly the youth (the energy population) embark on galamsey. Gavin noted that way back in history, the

message resonated by policymaking circles was that small-scale mining was populated by businessmen looking to ‘get rich quick’ (Hilson 2009). Indeed, it is argued that in Tarkwa for example historically, that most of the mining communities engaged in small-scale mining, because is a trade that was passed on through generation (Tsuma, 2010).

### 2.13 Small-scale mining and destruction of farmlands

Aryee (2003) provide compelling description of the cost of small-scale mining on agriculture by indicating that “Large tracts of agricultural lands are also destroyed as a result of excessive vegetation removal and disturbance of soil structure and is in consistence with my work. Growth supporting topsoil is usually removed during mining, and the land is rendered virtually incapable of supporting plant growth, in addition to being left exposed to erosion.” The co-existence of mining and agriculture is uneasy. Mining renders land very infertile even after folding up operations. Communities in the Western, Ashanti, Eastern and Brong-Ahafo regions have faced these conditions. The negative spillover effects on agriculture have been captured by the study conducted by Aragon and Rud (2012). It is of this reasons that was why Ex-President Mahama said Kyebi is the headquarters of galamsey. <http://www.myjoyonline.com/news/2014/March-27>).

Mining communities in Ghana’s mineral-rich regions engage in food crop production. These regions are actually leading the production of cash crops like cocoa, oil palm and citrus. They also produce in large quantities food staples like plantain, maize, cocoyam, legumes and an assortment of vegetables. The paradox, however is that these regions have seen unprecedented boom in activities of artisanal and small-scale mining. Their interconnectedness has been unbalanced.

Agriculture and food production suffer the most. Aragon and Rud, (2012) provide

the evidence that ‘the expansion of mining production has reduced agricultural productivity by almost 40%, but is not associated with changes in the use or price of agricultural inputs.’ This is strong evidence that mining (and more so ASM) reduces food production. Even more is that, the environmental impact inflicted by mining on agriculture increases rural poverty. Aragon and Rud, (2012) reveal that ‘rural poverty in mining areas shows a relative increase of almost 18%. The effects are present not only among agricultural producers, but extend to other residents in rural areas



## CHAPTER THREE

### METHODOLOGY

This chapter describes how the study was conducted; the method employed to collect the data. The area covered under this chapter includes research methodology, research design, the study population, the study sample sizes, data collection method and study site.

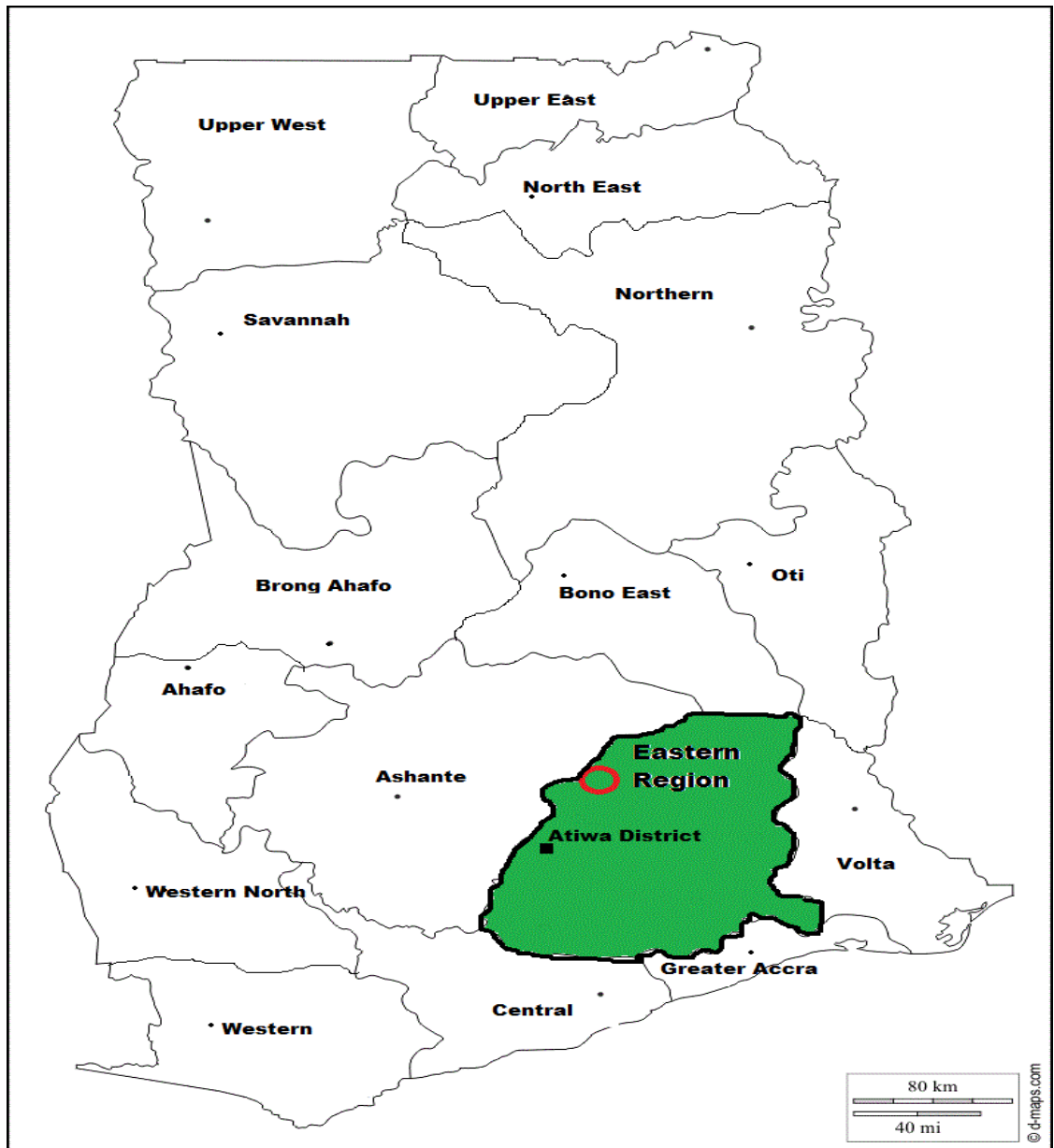
#### 3.1 Study Area

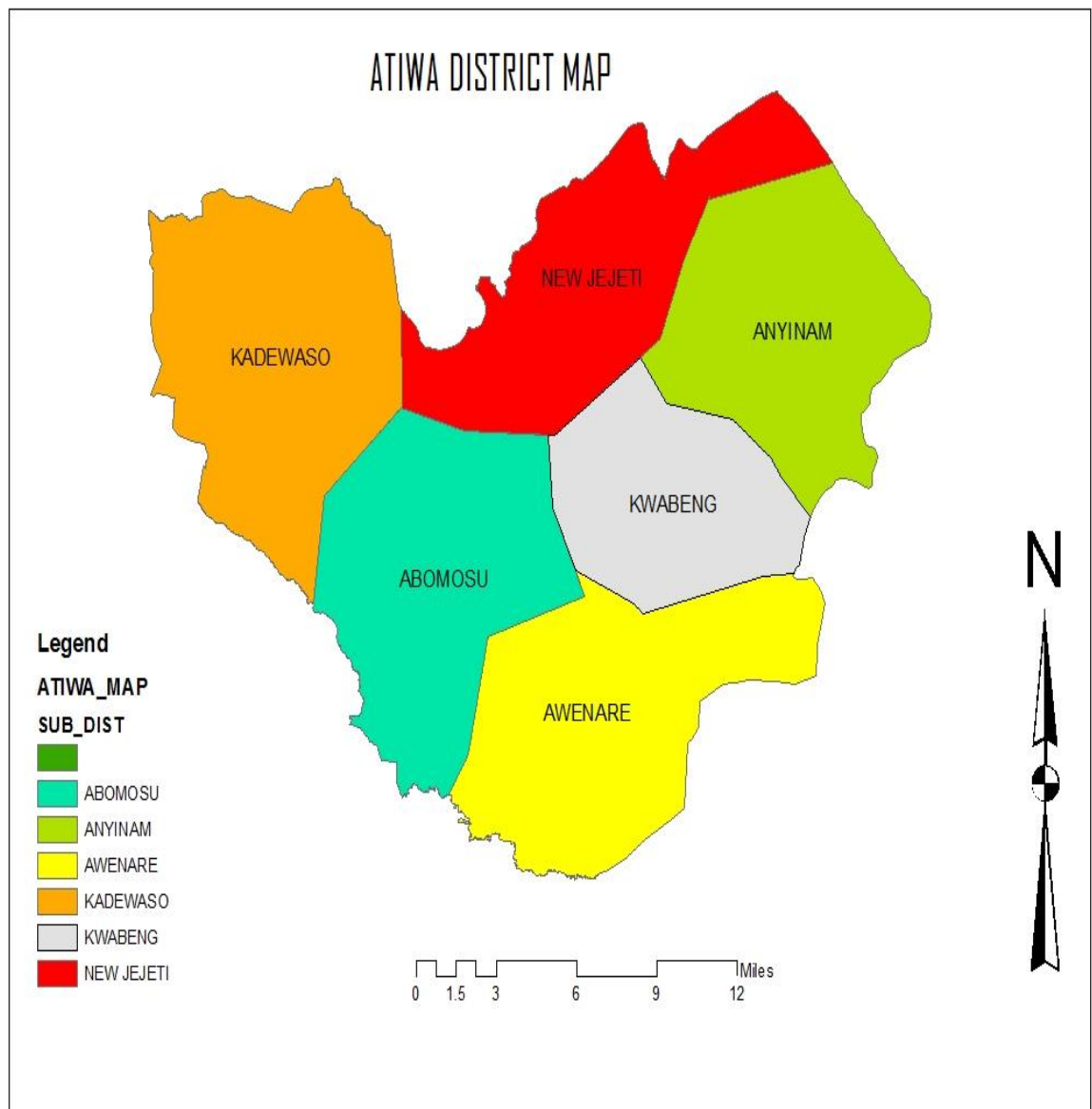
Atiwa West, formally Atiwa District is one of the new districts created by the ministry of local government recently with its capital being Kwabeng. The district was carved out from East Akim Municipal in 2005. Atiwa West Assembly is located at the central portion of the Eastern Region and for that matter, just a stone throws along the Kumasi to Accra Road. It forms a major link between the Southern and then the Northern sectors of the country. Its capital is Kwabeng about 55 kilometers from Koforidua, the Regional Capital and 112 kilometers from Accra, the National Capital.

Atiwa District Assembly is a district in which Atiwa East was carved from. It currently has a population of about forty-eight thousand. The district is in one of the forest zones in Ghana, well endowed with natural resources like timber, bauxite, gold and hospitable people. Because the district is in forest zone, the main economic activities are trading, farming and small-scale mining as well as galamsey. Apart from the districts assembles common fund, the assembly generates its major revenue from market tolls, property rate, royalties, fines, and licensing and user fees. The district serves as one of the seats of Akim Abuakwa traditional area. The study would be conducted in this district. With about eighteen towns area council, only four will be chosen because of its

strategic nature. The four capital towns of the area council are farming potential area. The towns chosen are Kwabeng, Asamama, Abomosu, and Bomaa.

These towns are chosen because their location can give the researcher a wider coverage of the district Assembly and they are the various places where gamsey and small scale mining is done mostly in the district. With these towns, the questionnaires would be given to farmers, market women, store operators, taxi, drivers, government workers and other self-employed people.





### 3.2 Research Methodology

To ensure reliability, accuracy and validity, in this research work, the researcher would employ both the primary and secondary data to ascertain the real impact of small scale and illegal gold mining (galamsey) in Atiwa West District Assembly. Primary data gives first-hand information and secondary data gives the data, which has been already analyzed.

This research is a descriptive survey aim at the impact of small scale and illegal mining and way forward to eliminate them in the Atiwa West District. The descriptive survey gives the chance for selection of samples from the population being studied and then makes generalization from the study of the sample. (Ghauri 2002).

Questionnaires are a set of questions drawn up for answering by a number of people independently, usually to provide statistical information. With the questionnaire drawn, the researcher's objective is to identify the effect of illegal gold mining in Atiwa West District. The researcher used the primary and secondary data collection method to obtain his information.

### **3.2.1 Primary Data**

The researcher adopted questionnaire as a data collection tools for the miners and populates. To find out the impact of illegal gold mining on farming, This procedure would enable the researcher to obtain answers to questions, the effect of illegal gold mining and the way to eliminate them when the data is analyzed.

### **3.2.2 Secondary Data**

Secondary data as a source was also employed. The data includes textbooks, journal, magazines, dictionary, dailies and the internet. Library research also played an important role in the gathering of the information.

### **3.3 Population**

This refers to the number of people chosen to be part of the study or full set of cases from which sample is taken. The population of the study consists of some of the miners in Akim Kwabeng and its environs. There are about 48,780 people in the District



including children, aged, and active force both in public and private sector. For the purpose of this study, 80 members were sampled by means of random sampling method.

### **3.4 Sampling**

Sampling according to Pervez and Knell in their book entitled “Research Method in Business Studies” means saving time and money by examining a sample instead of the whole population.

The researcher used random method of sampling in order to avoid choosing one particular group of people as respondents. However, the researcher purposely used a purposive sampling method to choose respondent for the miners and farmers who in his opinion thought to be relevant to the research topic.

### **3.5 Sample Size**

The sample size is the exact number of respondents, which the data would be elicited from. For the purpose of the research, (20) respondents would be chosen from the four major towns named earlier making (80). Questionnaires would be sent to them for the data to be collected. In congruence with the sampling techniques, representative sample of 80 respondents were used as the sample. Due to factors like determination of target population size and time frame, the study was classified as a small-scale research, which normally involves between 30 and 250 cases (Denscombe, 2007).

### **3.6 Personal Observation**

The researcher also made use of personal observation in collecting the data. The researcher visited some of the galamsey sites. This strategy was adopted to verify whether answers given in the questionnaire were true.

### 3.7 Data Analysis

The data gathered through the research questionnaire were analyzed using frequency tables, percentage distribution and tables with the help of Statistical Package for Social Science and Microsoft Excel. This assisted the interpretation and discussed the data to draw conclusion and recommendations



## CHAPTER FOUR

## RESULT AND DISCUSSIONS

## 4.0 Introduction

This chapter presents data collection from the Atiwa West District through questionnaire administration. The questionnaire was sent to four towns within the District.

If the table 1 below is considered, it could be realized that farmers represent the higher proportion of the people living in the area followed by those who do their personal businesses. Miners represent the third group of workers in the District followed by teachers, nurses and students. From the above chart, it is clear that farmers are likely to suffer most due to the activities of small-scale miners.

**Table 1: Occupation of respondent**

Response	Frequency	Percent
Farmer	25	20
Milner	15	12
Teacher	8	6.4
Nurse	8	6.4
Business/Trade	20	16
Student	4	3.2
Total	80	100

Source: field survey 2019.

#### 4.1 Some of the Environmental Impacts as a Result of the Gold Mining

Table 2 shows responses and observed environmental impacts as a result of small-scale mining in the communities where the study was conducted. 40% of the respondents pointed out that the activities of small-scale mining have effects on their farm lands. Another 35% indicated that small-scale mining activities have effect on water bodies in the area, erosion and destruction of forest was also mentioned as some the effects they have encounter due to the mining activities representing 5% and 20 % respectively.

**Table 2: Some of the environmental impacts as a result of the gold mining**

Response	Frequency	Percent
Erosion	4	5.0
Destruction of farmlands	32	40.0
Pollution of water/river bodies	28	35.0
Destruction of forest	16	20.0
Total	80	100.0

Source: field survey 2019.

#### 4.2 Major Causes of Destruction to the Environment

Four major causes of destruction to the environment were identified, been disposal of mining waste and tailing of the soil, the use of heavy machines, clearing of virgin lands and the process of extraction. 40% of the respondents said disposal of mining wastes and tailing is the major cause of destruction in the area followed by the use of heavy machines which represented 35% of the respondents. Clearing of virgin lands and the process of extraction also represent 20% and 5% respectively.

**Table 3: Major causes of destruction to the environment**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Disposal of mining waste	32	40.0
Use of heavy machines	28	35.0
The process of extraction/washing	4	5.0
Clearing of virgin land	16	20.0
Total	80	100.0

Source: field survey 2019



### 4.3 Factors that Contributes to the Destruction of the Farmlands

Table 3, shows that 50% respondents said although there are laws governing the mining activities in the country, the responsible authorities do not enforce the laws. Thirty-five per cent also said lack of regulations is causing the destruction of the environment. Ten per cent of the respondents said lack of awareness on the part of the miners is also a contributing factor. Five per cent of the respondents also said the miners who cause this destruction are not punished that is why the illegal mining is still ongoing. Concerning impacts on the ecosystem, the study found out that greater proportion of the land area have been rendered bare due to mining activities. Large tracts of land in many areas such as Kwabeng, Bomaa, Abomosu, Pameng among others, have lost their vegetation cover as a result of mineral mining. The resultant repercussions are massive gullies, excessive runoff, heavy erosion, reduced soil infiltration, reduction in groundwater recharge and consequent loss of land productivity. According to (Aryee,2012) the land has lost viability for agricultural purposes, as well as loss of habitat for birds and other animals, in addition to erosion. This has culminated in the destruction of the luxuriant vegetation, biodiversity, cultural sites and water bodies and it was also clear that small-scale gold mining has been responsible for the removal of vast quantities of surface vegetation and mass deforestation in Ghana. In addition, miners typically

**Table 4: Factors that contributes to the destruction of the farm lands**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Lack of regulation	28	35.0
Non enforcement of existing regulation	40	50.0
No punitive measure for offenders	4	5.0
Lack of awareness on the part of the miners	8	10.0
Total	80	100.0

Source: Field survey 2019

#### **4.4 How Effective is the Mitigation Measures**

A question was asked about the effectiveness of measures put in place to mitigate the side effects of small scale mining, 64 respondents representing 80% of the people said the mitigation methods put in place by the miners to solve or reduce the impact of their activities is ineffective and only 16 people representing 20% also said their mitigation methods are effective.

**Table 5: How effective is the mitigation measures**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Ineffective	64	80.0
Effective	16	20.0
Total	80	100.0

Source: field surveys, 2019.

**Table 6: Disease normally reported at health facility**

Response	Frequency	Percent
Malaria	54	65.0
Skin diseases	12	15.0
Headaches and cold	4	5.0
Asthma	4	5.0
Diarrhea	8	10.0
Total	80	100.0

Source: field survey, 2019

#### 4.5 Health Impacts from Small-scale Mining Activities

Five diseases were reported by respondents as some of the health issues which is or are either on the increase or identified as a result of increasing small-scale mining activities in these communities. Sixty-five per cent of the respondents indicated that Malaria as one of the health issues resulting from the small-scale mining activities while Skin Diseases and Diarrhea Disease were reported by 15% and 10% of the respondents. 5% of the respondents also indicated headaches and cold as another health issues respondent have to cope with, as well as asthma due to the dust representing 5%.

**Table 7 Effects of Small-scale Mining Activities on farming**

Response	Frequency	Percent
Loss of farm land	32.0	40.0
Low food production	36.0	45.0
Excessive use of farm inputs	10.0	15.0
Total	80	100.0

Source: Field survey 2019.



Effects of small-scale mining on agriculture, from table 7, 36 respondents representing 45% said production of food crops has gone down due to the mining activities, 32 people also representing 40% said because of the mining activities their farmlands have been taken over by the illegal and small-scale gold mining activities. 10 people representing 15% said because of the mining activities they would have to apply more farm inputs in their farming.

#### 4.6 What are the Prices of Food Products

On prices of food products ,48 respondents said the prices of food products is very high representing 60% of the respondents and 32 people representing 40% of respondents said is high and this goes to confirm earlier study by HILSON, G.M.(ED.) 2012.

**Table 8: What are the prices of food products as a result of take over of farming lands**

Response	Frequency	Percent
High	32	40.0
Very high	48	60.0
Total	80	100.0

Source: Field survey 2018.

#### 4.7 Major Causes of Water Pollution

From the table below, 86 respondents representing 95% said mining is the major cause of water pollution in the area which is very alarming and only 4 respondents representing 5% said is farming or agriculture that causes water pollution. Results from

the field observations in the study area revealed that major rivers in the area such as Bremu and Awusu which used to serve as the main sources of water for domestic purpose in the surrounding communities, had been heavily polluted by mining activities especially those of illegal small-scale mining (popularly known as ‘galamsey’). Moreover, (Armah, 2006) discovered that between 1994 and 2001, five major cyanide spillages and leakages occurred resulting in contaminating some major rivers in Ghana. He indicated that cyanide spills and leakages by mining companies such as Teberebie Goldfields Ltd and Ashanti Goldfield Company Ltd (now AngloGold Ashanti) resulted in polluting the Anikoko River and this confirms my findings.

**Table 9: Major causes of water pollution**

Response	Frequency	Percent
Farming	4	5.0
Mining	76	95.0
Total	80	100.0

Source: Field survey 2019.

#### **4.8 Effects of Water Pollution**

A question was asked why polluted water is harmful to use and 40 respondents representing 50% said it can cause death, 20 respondents representing 25% said it contains chemicals, which can be harmful to the health of people, and another 20 respondents, which represents 25% of the respondents, said using the water could cause skin diseases.

**Table 10: Effects of water pollution**

Response	Frequency	Percent
It can lead to death	40	50
It contains chemical	20	25
It causes skin rashes	20	25
Total	80	100

Source: field survey 2019

#### 4.9 Major Chemicals used by the Miners to Extract the Gold

From below, 44 respondents representing 55% said the miners use mercury in the extraction of the gold which is a potential health impact should increase if it gets into human body and 36 people said they don't know the chemicals used in the extraction of the gold, representing 45% of the respondents.

**Table 11: Major chemicals used by the miners to extract the gold**

Response	Frequency	Percent
Mercury	44	55.0
I don't know	36	45.0
Total	80	100.0

Source: field survey 2019

#### 4.10 What is the Cost of Living?

A question was asked about the cost of living in the area and 64 people representing 80% of the respondents said the cost of living in the area is very high and

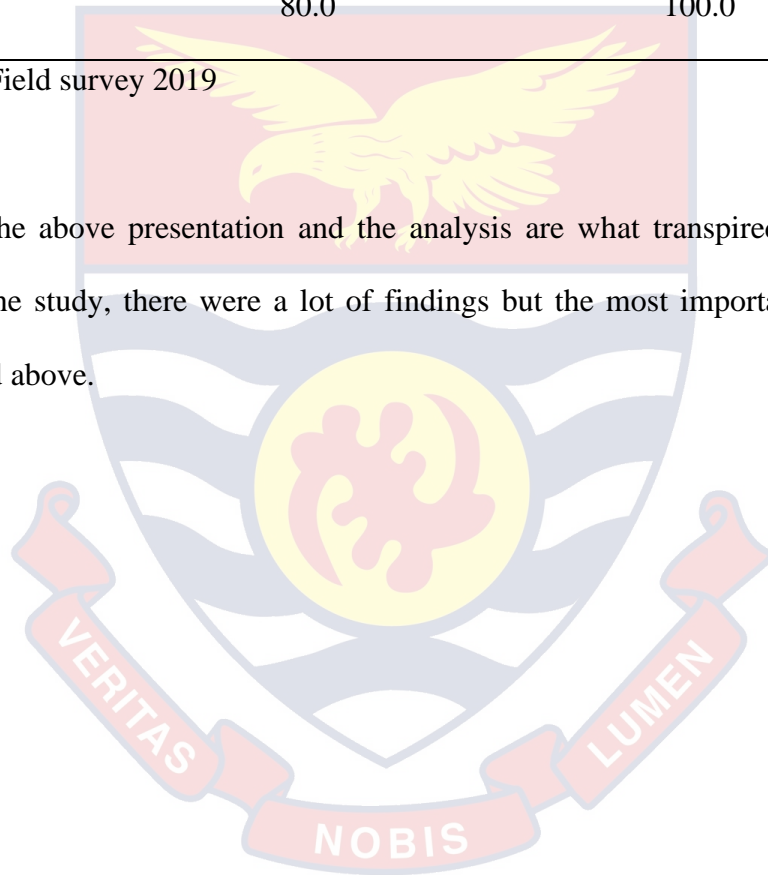
the rest of the respondents said are high representing 20%. Meaning due to activities of small scale mining the cost of living in the district is very high.

**Table 12: What is the cost of living?**

Response	Frequency	Percent
High	30.0	30.0
Very High	50.0	70.0
Total	80.0	100.0

Source: Field survey 2019

The above presentation and the analysis are what transpired during the study. During the study, there were a lot of findings but the most important ones have been presented above.



## CHAPTER FIVE

### 5.0 SUMMARY, CONCLUSION AND RECOMMEDATION

#### 5.2 Summary of Findings

Although small-scale mining provides some benefits to the people but comparatively agriculture is still the leading source of employment to people in these rural communities. Agriculture employs majority of people, about 70 per cent in the area. The rise of activities of small-scale mining is having serious repercussion on both cash and food crops production. The major issue is how Ghana as a country going to weigh the benefits of small-scale mining and at the same time protects our farmlands for agricultural activities. It has been made clear from Chapter 4 that small-scale mining and agriculture compete for inputs like land, water and labour.

Farmers that branch into small-scale mining earn income that is invested back into farming, but it is worth indicating that the benefits farmers get from mining are very limited to selected farmers as young and able farmers have now ventured into small-scale mining and galamsey.

The battle between small-scale mining and agriculture also generates negative effect, where agriculture and food production are the hard hit in that the most vital asset in rural farming communities is land and the mining take over these lands. This reduces the availability and size of land for farmers. This inhibits the ability of farmers to expand land acreage to increase production. Aside this, the assets of farmers are under extreme risk since land is the vital asset in these communities, losing land to mining could trap more farmers and many households into poverty. Though farming is rain-fed, farmers make use of irrigation for their crops during dry seasons where there are no more rains but all these water bodies have been polluted to extend that farmers can no longer use

them to irrigate their farms.

Most of these miners are being sponsored by political power and they use their powers best to gain access to land rendering farmers rural mining constituencies. Miners use their 'agency' to sidestep the formal process of acquiring concessions. They connive with individuals, at times chiefs, and government authorities to take over land for mining. This reduces the politics on the part of farmers needed to make input into the utilization and exploitation of extractive resources. It was revealed in the analysis that mining and agriculture compete for labour.

The desire for quick money has attracted many energetic people whom should have been farmers away from farming. The worsened aspect of it is the growing challenges that have agriculture, including high prices of farm inputs and low producer prices in the markets as well as changes in the patens of rainfall. When you compare the money that is generated from mining and agriculture, the youth see more potential from small-scale mining and they have little motivation to go into farming. This situation has come with some implications on farming be it labour cost, farmers hire additional labour for their farms with a few numbers of youth ready to farm, farmers contend with high prices for the few youths who are into farming.

### 5.3 Conclusion

Small scale mining though offers some benefits but at the stark expense of farm lands and has many repercussions on food production and security as lives in mining communities are tied to agriculture. Destruction of these farmlands contributes to high poverty levels among rural communities who are mostly farmers. This study gives the background to understand the impacts of small-scale mining on farmlands and food security.

From the analysis, it was seen that land used by the miners gives them higher production of gold from the pieces land's they buy from the farmers and these have impacted negatively by reducing the food production and the sizes of their farmlands. Food is life and so anything that causes harm to land cause danger to life. FAO stated that, the right to food security is when everybody has the right to access sufficient, affordable, safety and nutritious food' (Pillars of food security, availability of food, access to food, stability and food utilization) to meet their dietary needs and preferences for an active and healthy. It has been proven in the qualitative literature reviews and the data analyzed that, indeed there is a link between small-scale mining and staple food crop production.

#### **5.4 Recommendations**

Some recommendations have been put forward to ensure that the negative impacts of small-scale mining on food production and food security as well as poverty could be reduced.

Although the government is doing much to control the activities of these small-scale miners, these small-scale mining activities are still ongoing in the area and these activities directly and indirectly affect agriculture. More revenues should be made available to the local government institutions to help mitigate the cost of mining. With this, government should empower the various District Assemblies, Traditional Councils and Stools to help solve this destruction of farmlands and water bodies as well.

Funds should be made available to the District Assemblies and Traditional Councils to undertake development projects, particularly in the agricultural sector to boost food production and hence food security.

From the analysis above, it is clear that the activities of small-scale mining

reduce the size of farm lands and affect productivity of staple food crop and cash crop as well, this effect mostly arise as a result of the method used by the small-scale miners to obtain the gold. The use of chemicals affects not only the crops but also the health of humans and a regular check on food produced in these areas to satisfy before consumption.

The authorities in charge for the implementation of Minerals and Mining Act, 2006 (Act 703) are not doing well as expected of them. This is because most of these institutions are found in the national level and these mining activities also goes on in the rural areas. The Minerals Commission is in charge for effective implementation of the act, it ought to do so by empowering local government authorities (District and Municipal Assemblies, and Traditional Authorities) to enforce those laws governing mining activities in the country to minimize the impact on the environment.

Effective implementation of the laws governing mining will help reduce these informal and illegal mining activities that destroy land and water resources, which are vital for sustaining and boosting food production.

Most activities of small-scale mining are not legal and the government should formalize small-scale mining to ensure that all their activities are made legal and properly regulated to reduce negative impact on other productive sectors of the economy like agriculture help make small scale mining formalization and institutionalization effective. The assembly must enact by-laws to control the activities of the miners in the sense that the mining activities go on in the various district and not in the cities so they should also come out with laws to protect their people.

Mining activities should not be allowed on the banks of rivers, the rate at which our water bodies are been destroyed is alarming and the authorities in charge of mining should revoke the license of the various companies that pollute our water. Mining



companies must rehabilitate or cover the pits that they create to prevent people from falling into them and breeding of mosquitoes, it is the duty of the miners to reclaim the farmlands that they destroy but they are not doing so.

The Environmental protection Agency (EPA) and other responsible agencies need to be pro-active to withdraw licenses of the companies that flouts the rules of mining set as example to prevent other companies from doing same. There is a need for mass education in other to create awareness of the effects mining possess to human and vegetation.



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## APPENDIX

### QUESTIONNAIR ON THE EFFECTS OF SMALL SCALE MINING AT ATIWA WEST DISTRICT AND STRATEGIES TO ERADICATE IT.

**I would be grateful if you could provide the required information with regards to this questionnaire. Any information given would be treated confidential and shall be used for only academic's purposes.**

**INTRODUCTION: Please either tick or produce short answers where applicable.**

Personal information

1. Residence: .....
2. Sex of Respondent  
(a) Male (b) female
3. Age of Respondent  
(a) Below 18 years (b) 18-29 years (c) 30-40 years.
4. level of Education  
(a) No Formal Education (b) primary/JHS (c) secondary (SHS/Vocational/Technical) (d) Tertiary (Training College/Polytechnic/ 1University)
5. Marital Status  
(a) Single (b) Farmer (c) devoice (d) widow
6. Occupation of respondents  
(a) Farmer (b) Miner (c) Teacher (d) Nurse (e) Business/Trader
7. since when have you been leaving here?  
(a) Below one year (b) 1-5years (c) 6-10 (d) 10 years and above  
impact of Mining on the environment within the Atiwa West District.
8. In which mining sector or mining activity are you involved in?  
(a) Industrial Mining. (b) Small scale mining.
9. how is the mining activity done here?  
(a) Underground mining (b) surface mining.
10. What are some of the environmental impact as a result of these mining activities?



(a) Erosion (b) Destruction of farmlands (c) Pollution of water/river bodies (d) Destructions of Forest (e) Air pollution (f) Noise.

11. what could be the cause of the cause of the environmental impacts mentioned above?

(a) Disposal of mining waste and tailings (b) Use of Heavy machines (c) the process of extraction/washing (d) Clearing of virgin lands.

12. What factors contribute to the impacts from small scale mining on the environment and human health?

(A) Lack of Regulation (b) Non enforcement of existing regulation (c) No punitive measures for offenders (d) lack of awareness on the part of miner.

13. What measures do miners put in place to reduce or minimize the impacts?

(A) Re-afforestation (b) vary the timing of operation (c) Re-settlement to avoid impact (d) Proper maintenance of tailings (e) Construction of Gutters to channel waste water. (f) no measures are put in place by the miners.

14. How effective are these measures over the period? (a) Ineffective (b) effective.

15. What are some diseases, sickness or health impacts as a result of the mining? (a) Malaria (b) Skin Diseases (c) Headaches and cold (d) Respiratory Diseases (e) Asthma (g) Wounds (i) Diarrhea.

16. What effect does the small scale mining having an agriculture?

(A) Loss of farm lands (b) Low food production (c) excessive use of farm inputs.

17. What is the price of food products?

(a) Low (b)High (c) very high.

18. What is the cost of living in Atiwa West as a result of the mining?

(a) Low (b) high (c) very high.

19. What is the major cause of water pollution in this area?

(a) Farming (b) mining (c) flowing of drainages.

20. Why is polluted water harmful to use?

(a) it can cause death (b) it contains Chemicals (c) it causes skin rashes.

21. What is the major chemical used by the miners to extract the gold?

(a) Mercury (b) lead (c) I don't know.

