UNIVERSITY OF EDUCATION, WINNEBA

THE IMPACT OF ILLEGAL MINING (GALAMSEY) ON COCOA PRODUCTION AND LIVELIHOOD: A CASE STUDY OF AMANSIE WEST DISTRICT

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2017

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A Dissertation in the Department of Management Studies, Faculty of Business Education, Submitted to the School of Graduate Studies, University of Education, Winneba, in partial fulfillment of the requirements for the award of Master of Business Administration (Organizational Behaviour and Human Resource) Degree.

JULY, 2017

DECLARATION

CANDIDATE'S DECLARATION

I, ADJEI ANTHONY, declare that this thesis, with the exception of quotations and references contained in the published works which have been identified and duly acknowledged, is entirely the results of my own original research work, and it has not been submitted, either in part or whole for another degree in this University or elsewhere.

Signature……..……

Date……...……

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines on supervision of project work laid down by the University of Education, Winneba.

NAME: DR. LORD OPOKU ANTWI

Signature…….……

Date…….……

ACKNOWLEDGEMENTS

Words cannot describe how I appreciate the innumerable assistance and guidance offered me by Dr. Lord Opoku Antwi (my thesis supervisor), whose careful supervision and comments helped to shape this work to its conclusion.

My profound gratitude also goes to my wife Mrs. Josephine Adjei, and my children Franklin Ofori Adjei, Anthony Ofori Adjei and Emmanuel Ofori Adjei. Again much appreciation must also be shown to Mr. Kweku Ahinful Gasie (the Chief manager PBC Ltd. Accra).

DEDICATION

I dedicate this work to my family.

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ABSTRACT

Gold mining is a very important segment of the extractive sector but has one of the most serious and disastrous environmental consequences; conflicting with the livelihood and cocoa production and survival of resident communities. This research was conducted in Amansie West district of Ghana to assess the effect of small scale illegal mining (*Galamsey*), its impact on cocoa production and livelihoods. The modified random sampling technique was used. Data collected was analyzed with Statistical Package for Social Scientist (SPSS) software. Descriptive statistics tools were used for the data analysis. The study revealed that many inhabitants in the communities face several challenges from small scale mining activities such as water pollution from excessive use of chemicals, air pollution and land degradation from indiscriminate heavy use of machines. Cocoa farmers have also observed early dropping of immature pods, wilting, yellowing of leaves and low yield on cocoa produce. Majority of the youth opined that their engagement in the *Galamsey* activities is as a result of unemployment; desire to get quick money and the fact that cocoa farming is seen as a job or business that does not pay well. The study advocates for drastic government and media support aim at educating the youth and the various small scale mining communities about the repercussions on indiscriminate destruction of farm land (especially cocoa production) and a lot of adverts on television and radio to create awareness on the dangers that *Galamsey* poses to the cocoa sector which is the mainstay of the economy and an aggressive land reclamation campaign.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Since independence, Agriculture has been the key player in Ghana's economic development and growth. Averagely, it accounts for about 40 percent of the country's gross domestic product (GDP) and generates 55 percent of the foreign exchange earnings. The agriculture sector today employs about 51 percent of the labour force in Ghana, and is the main source of income and sustainable employment for nearly 70 percent of Ghanaian rural folks. The cocoa industry alone employs close to about 60 percent of the national agricultural workforce in the country (Asuming-Brempong et al., 2006).

Again cocoa can be considered a relative success story to Ghana. Six variables are cited-peace and stability, democracy and governance, control of corruption, macroeconomic management, poverty reduction, and signs of an emerging social contract-to suggest the country's admirable political and economic progress. Gold mining and cocoa are the major sectors of the economy for more than a century now (Moss and Young, 2009) until the discovery of oil in commercial quantities.

The Amansie West District was carved out of the former Amansie District in 1988. The District shares common boundaries with eight districts namely: Atwima Nwabiagya and Atwima Mponuah to the west, Bekwai Municipality, Amansie Central and Obuasi Municipal to the east, Atwima Kwawhoma to the north and Upper Denkyira and Bibiani to the south. The District serves as a regional boundary between Ashanti Region on one side and Central and Western Region on the other side. The

Amansie West District spans an area of about 1,364 square kilometers and it is the one of the largest districts in Ashanti forming about 5.4% of the total land area of the Ashanti Region. Manso Nkwanta is the District Capital and it is about 65 km from Kumasi. Other bigger settlements include Aponoapono, Manso Adobea, Kumpese, Datano Abore, Agroyesum, Ahwerewa, Ankam, Antoakrom, Aponapon, Datano, Esaase, Esuowin, Keniago, Mpatuam, Moseaso, Nipankyeremia, Odaho, Pakyi No. 1 and 2 and Watreso.

The surrounding regions and districts with respect to this location provide opportunity for marketing goods and services from the district. The location of the district makes it the gate way to Ashanti from western and central. This has a great potential for promoting hospitality industries such as hotels, restaurants and crafts products. With its vast land area, there is access to agricultural land for promotion of rice, citronella, cocoa, oranges and oil palm plantations to feed the local agro based industries and beyond. It however has vast deposit of gold ore in it river basins.

Gold dominates the mining sector and Ghana is Africa's second largest producer of gold after South Africa, the third largest producer of manganese and aluminium and a significant producer of bauxite and diamonds (Akabzaa and Darimani, 2001). No environmental problem associated with large-scale gold mining in Ghana has received more attention, both among Ghanaians and internationally, than deforestation. An astounding two million acres of forested land, including rainforest, are lost annually in Ghana to surface mining operations and this has adversely impacted rural communities by contributing to a decline in the productivity of agricultural lands.

A substantial proportion of Ghana's poor live in rural areas where hundreds of thousands of people, largely unexposed to the wage economy, derive their livelihoods directly from small-scale agriculture and the natural resources provided by the country's forests (Armstrong, 2008). Agricultural farmlands taken for mining operations have resulted in the shortage of food and cash crop production, fuelwood production and environmental degradation. Peasant farmers whose lands are taken over for surface mining loose huge sums of money which in effect can be described as subsidies provided by poor farmers to rich multinational mining companies (Owusu-Koranteng, 2005).

According to Yeboah (2008), mining activities have lots of environmental and health impacts. This has emanated from the methods of operation by the illegal small scale mining and even duly registered and permitted mining companies, its effects on the natural environment as well as the people in the surrounding communities. The health cost of mining operations sometimes outweighs the benefits gained. In view of this, Awudi (2002) has maintained that, "despite these positive indicators, the role of the mining industry in the economic development of Ghana is a suspect. Despite the over U$2 billion Foreign Direct Investment (FDI) in mineral exploration and mine development during the last decade indicating over 56% of total FDI flows to the country, (with the attendant increase in mineral export) the sector is yet to make any meaningful impact on the country's overall economy comparative to Foreign Direct Investment (FDI) from cocoa production (Yeboah, 2008).

Amansie West District Assembly is one of the Districts in Ghana where small- scale mining operations substantially dominates. In most cases, the concessions of the mines cover lands on which the rural households use for farming activities for a living

(Obara and Heledd, 2006). Consequently, the livelihoods of the rural communities are affected in one way or the other by the mining activities. Although, government's efforts in Ghana to legalize the sector have improved the efficiency of operations, environmental and socio-economic problems as well as affecting major cocoa lands and as a result land-use conflicts continue to exist and are becoming increasingly unmanageable in the Amansie West District area which the researcher intended to investigate. It is therefore unclear whether the mining industry in Ghana has actually contributed positively towards the development of the nation as many previous study claim. Consequently, it is important to ascertain the sustainability of the mining industry of Ghana by weighing the socio-economic benefits with the negative impacts.

Osei-Kuffour (2013) asserts the dominant approach in ameliorating the effects of mining on communities as well as individuals is through monetary compensation, yet this approach has not addressed vulnerabilities of mining communities (Sweeting & Clark, 2000) and mining activities have often led to the alienation of local communities because they lose access to their farmlands and sometimes they are relocated (Aubynn, 2003). The extent to which the amount of compensation equals the value of a loss, both short-term and long-term, is not the focus of most mining firms and other government agencies. Compensation payments are often not based on what the "sufferer" of impact is losing, but most often than not, the estimation of compensation is shaped by what the mining firms can potentially offer. Objectively quantifying communal and individual assets and converting them into direct cash payments is often problematic and leads to unintended negative consequences on the community and its members.

1.2 Problems Statement

Ghana is known globally for several things one of which is its mineral rich land and cocoa production ranking second worldwide with a record being the country with the highest quality of cocoa production (Cocobod release, 2017). As one of the world's leading and second largest producer of gold and cocoa respectively, it may be worth giving enough attention to all mining and cocoa contributors irrespective of their size so as to optimise output. Small scale miners may not individually contribute much to the economy, however collectively; their contribution forms a significant portion of mineral output. For example the Minerals Commission reported a 34% gold output from artisanal and small scale miners (including unlicenced miners) in 2013. That notwithstanding the way and manner for these illegal small scale miners to operate that will not have negative impact to farming lands and cocoa farms is where the issue of mass destruction of cocoa farms and it consequent decline on gross cocoa production in the area affecting livelihood and the environment (Mihaye, 2013).

However the contribution of gold to GDP and livelihood to cocoa is incomparable looking at the impact of cocoa production and livelihood since independence. The operations of illegal small scale or artisanal miners (popularly known as galamsey) has been on the rise in the country and it is now almost impossible to distinguish the output of legal small scale miners from that of illegal operators. The rapid exploitation of mineral resources in Ghana is causing alarming scenarios for both the present and the future generations of the country. Efforts made by the government of Ghana to address these and other related challenges have led to the enactment of the Small-Scale Gold Mining Law, PNDC law 218; in 1989 as revised in 2006 (Mahiye, 2013). Contrary to one of its objectives of monitoring and supervising the activities of

small-scale miners by ensuring acceptable mining practices with minimum damage to the environment (Amankwa and Anim-Sackye, 2003) as sited in (Mahiye, 2013), the environmental challenges of small-scale mining still continues unabated.

The rivers and streams are potential resource base for fishing and small scale irrigation schemes. However considerable area of these water bodies have been used up or destroyed as results of galamsey activities. Again the activity of small scale mining has ill driven the wish and desire of the youth in the area to fully engage in instead schooling or engaging directly in cocoa production that has better future prospects for them. This has caused a steady decline in cocoa production in the area affecting lives and the environment at large.

Again the rationale for choosing this topic is the fact that small-scale gold mining practices are still a central source of income for millions in the developing world and as much as 13 million in Sub-Saharan Africa alone. However, the backside of such a significant amount of people being involved in small-scale gold mining is its major environmental damage and health effects, which contribute to what is allegedly called a poverty trap (Hilson & Pardie, 2006). The problems related to such extraction, both large-scale and small-scale, is now increasing due to population growth in the developing world as well as increased demand for precious metals, and potentially also by the vast influx of Chinese into the African continent trying to secure natural resources (Bach, 2014). It is for the above reasons the researcher intends to find out the impact of illegal mining (Galamsey) on cocoa production and livelihood.

1.3 Purpose of the Study

The purpose of the study is to assess the impact of illegal mining (Galamsey) on cocoa production and livelihood, a case study of Amansie West District. The study was guided by the following specific objectives.

1. Assess the effects of illegal small scale mining activities on cocoa production.
2. Ascertain the main source of livelihood and how it boosts economic activity in the area.
3. Identify the trend in the decline of cocoa production
4. Determine the effects of the illegal small scale mining activities on the livelihoods of the communities in the district.

1.4 Research Questions

The following research questions guided the study

1. To what extent do small scale mining activities affect cocoa production?
2. What are the main source of livelihood and how does it boosts economic activity in the area?
3. What is the trend in the decline of cocoa production?
4. How do small scale mining activities affect livelihoods of the communities in the district?

1.5 Significance of the Study

Cocoa production has the potential to boost Ghana's economy, both internal and external, through the benefits that are made available to countries that are involved in the production of cocoa. Internally, Mahiye (2013) posits that there is the creation of employment and revenue generation which has the potential to alleviate

poverty. Besides, there is substantial amount of foreign exchange to countries producing agricultural resources externally.

Despite the major contributions of cocoa to the economy of many countries, its beneficial roles are often overlooked. As a result, few studies and scholarly publications of the sector can be found. This study intends to establish a through picture of the overall effects of small-scale mining, on cocoa production and livelihood in the Amansie West District. The findings of this thesis will contribute to knowledge on small-scale mining and its effect on cocoa production and livelihood as a whole. This is confirmed by Kitchen and Tate (2005) that in addition to contributing to policy issues, a piece of research contributes to knowledge. Thus, the knowledge acquired from the research could be used to explain the meaning, nature, and challenges of facing our cocoa industry in recent times and also assist coco-bod and other stakeholders to effect better changes in the industry

It is believed that the report of this study will also become a very useful document that will be used to address major challenges relating to small-scale mining, cocoa production and livelihoods issues in the Amansie West District. It will serve as a source of data for policy makers and researcher who will be interested in this area and related issues to help improve the efficiency of cocoa production in the country as a whole. This will help reduce the increasing rate of youth unemployment, environmental, health and socio-economic effects of illegal mining in the country.

1.6 Limitations of the Study

Although the impact of the study in social economic development cannot be underestimated yet it was not devoid of certain inherent setbacks which could affect the generallisation of the findings. The biggest challenge when in field was the language barrier. Although the official language for Ghana is English, most miners have no or limited English proficiency, and Twi was thus mostly spoken. These limitations were partly solved by using a research assistant serving as an interpreter. However, due to limited time in the field, and not wanting to take much of the miners' time, the assistant did not translate during the interview. Everything was recorded for later translation and transcription. This generated incidents where clarifying follow-up questions were not asked, which could have served to enrich the data. In addition, when transcribing, the researcher experienced how the interpreter initially tended towards summarizing, rather than translate word for word. This did improve gradually, but the risk of having some data losing its level of detail is present. Time factor was one of the setbacks of this study, owning to combination of academic work and office duties as well as distance to cover each weekend to gather information for the study. Availability of respondents to respond quickly and adequately to the interview and questionnaire posted a major challenge. The limitation of validity cannot be totally eliminated. Notwithstanding, the generalizations truly reflect what exist in many cocoa plantation sectors where there exist such illegal mining operations, that is other cocoa growing arears. Despite these limitations, even though may have influenced the quality of the study; they were however not to a greater extent, able to significantly degrade the quality of the study.

1.7 Delimitations of the Study

The study examined the increasing pace of illegal small-scale mining activities and the damning effects of such activities on cocoa production and livelihood within the catchment area of the Amensie West District of the Ashanti Region of Ghana namely; Mim, Ankam, Mpatasie, Agroyesum and Yawkrom. As many literature look at the environmental effects hence creating major gap in research this study attempts to investigate the effect on cocoa production and livelihood of the populace in the District.

1.8 Organization of the Study

This study is organized into five major chapters with sub-titles. The first chapter deals with the introduction of the study and covers the research background, problem statement, objectives, and research questions, and significance of the study, limitations and delimitations of the study and the organization of the study. The second chapter provides information on literature review and conceptual framework that was applied in the study.

The third chapter of the study dwells on the background information of the study areas such as location, drainage and topography, climate and vegetation, demography, economic activities, education and health related issues. In addition to this is the research methodology which focused on methods and techniques for data collection, sources of data, sampling techniques and instruments that were used for data collection. This chapter concluded with the procedures of data analysis.

Chapter four of the study covers presentations and analysis of data based on the objectives of the study. These include the mode of operations of small-scale miners

and the contributions of mining on livelihoods among others. The final Chapter which is chapter Five will be the conclusion. This chapter contains summary of findings, conclusions and recommendations giving for the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews related literature on the issues of illegal small scale mining (galamsey), and its effects on cocoa production and livelihood. It is to address the issue of illegal nature and consequences of such illegal mining activities on the environment and cocoa production. In this study, empirical studies on illegal small-scale mining globally, as well as studies in the developing regions of the world including Ghana were reviewed. It covers secondary materials related to the legal framework and practice of small scale mining as well as definitional matters.

2.1 Overview of the Mining Sector/Industry in Ghana

Arah, (2015) posits that, the Ghanaian mining industry can be traced back to the pre-colonial era with some studies believing that the industry has contributed greatly towards the socio-economic development of the country in terms of employment and social infrastructure (Amponsh-Tawiah *et al.* 2011; Ghana Chamber of Mines 2010; Yirenkyi 2008). However, others believe that the negative impacts of mining such as cocoa production, water, air and noise pollution and the general deprivation of fertile lands for agriculture purposes leave the people much poorer in relative terms than they were before (Hammond *et al*. 2013; Hilson *et al*. 2006 and Hilson 2002). This generally affects the gross cocoa production and livelihood of inhabitants of cocoa growing galamsey areas.

It is therefore unclear whether the mining industry in Ghana has actually contributed positively towards the development of the nation. Consequently, it is important to ascertain the sustainability of the mining industry of Ghana by weighing the socio-

economic benefits with the negative impacts particularly on cocoa production and livelihood by examining the ecological, social and economic features of small-scale gold mining with its impacts on mining communities (Amansie West District) and suggest possible remedies to arrest the situation.

2.1.1 Small-Scale Mining in Ghana

Funoh (2014) posits that artisanal and small-scale mining, as the term is used in most parts of the world, has also been defined differently and so has no standard definition. According to the Cameroonian Mining Code of 2001, Article 2, artisanal mining involves all exploitations aimed at extracting and concentrating minerals using manual methods and procedures with the use of little or no mechanization. According to the United Nations, "small-scale mining is any single mining unit operation having an annual unit of unprocessed materials of 50,000 tonnes or less as measured at the entrance of the mine." In Ghana, small-scale (gold) mining is defined as, "Mining by any method not involving substantial expenditure by an individual or group of persons not exceeding nine in number or by co-operatives society made up to ten persons or more" (Funoh, 2014). In this study the term artisanal mining is defined as mining with the use of manual methods and procedures with little or no mechanization, as stipulated by the mining code and it is the main approach for illegal small scale minners. This section will discuss literature concerning illegal small-scale gold mining in Ghana as well as the environmental impact.

2.1.2 Illegal Small-Scale Mining (Galamsey)

According to Bach (2014) artisanal small-scale gold mining have been practiced in Ghana since around the 4th century (Donkor et al., 2006). In the beginning it was done

in very primitive ways which can be divided into three categories: shallow pit, deep shaft and alluvial. The latter was the most extensively used, and is a process which entails retrieving sediments from rivers containing gold particles, which was then washed multiple times before using mercury to creating an amalgam consisting of mercury and gold, which is then burned in order to leave pure gold behind (Botchway, 1995). Today, the so called galamsey is conducted in very similar manners, both because it does not require much equipment but also due to the activity being closely connected to the land and the people's ancestors (Bach, 2014).

However, in addition to working in rivers, it is now also normal to use the same method on land, in so-called surface mining operations (Hilson, 2002). Bach (2014) established that even though it used to be rather difficult to get hold of, mercury has been used by many galamsey since the advent of Ghanaian gold mining. In 1932 the colonial rule made the use of mercury illegal, as its widespread use made Ghanaians prefer working in their own mines rather than for the Europeans (Armah et al., 2013). Thus, practically the whole small-scale mining sector was made illicit. It was not until the implementation of the mercury act of 1989, that the buying and usage of mercury for mining was legalized, thus formalizing the sector causing a new gold rush (Donkor et al., 2006).

Around ten years ago, the small-scale mining sector accounted for around 20% of Ghana's total gold output (Hilson, 2003). Currently, Ghana, as well as many other Sub-Saharan countries has liberalized their mining investment codes to attract more capital (Campbell, 2003; Pegg, 2006). This in turn has had devastating implications for rural communities. Examples of such are displacement (often implying loss of

farmland), leading to increased unemployment, which again leads many into being galamsey miners (Banchirigah, 2008, p.30, 31). Today, a large part of those working in the small-scale mining sector operate illegally. By Hilson it is estimated to be around 30,000 legal small-scale miners, and as much as 170 000, or more, illegal (2001). By a more recent source, it is estimated that around 265 000, or 85% of small-scale miners were unlicensed (Carson et al., 2006). Another source stated that as much as 1 million operate illegally (Banchirigah, 2008). Thus, the number can be seen to rapidly increase.

In Ghana, the mining policy processes themselves are characterized as having a very low degree of public participation, as well as parliamentarians lacking resources and skills to understand the complex issues regarding mining. This further combines with a situation where politicians very seldom are replaced when responding inadequately to the needs of the country's development, making improvements in governance difficult (Ayee et al., 2011). This has accounted for a massive reduction in terms cocoa produce in Ghana.

2.1.3 Marginalization of Galamsey

The discourse of illegal small-scale miners in Ghana can be portrayed as generally highly negative, focusing on the galamseys' role as irresponsibly using mercury in their extraction of gold with no concern for the communities' health and environment. This is paired with a situation where many officials tend to view small-scale miners, and particularly galamsey, as an obstacle to development. The sentiments are often that the small-scale miners spoil the investment potential the country can realise from the large-scale mining companies. In 1989, when small-scale mining was formalized,

those practicing traditional small-scale mining without a licence, as had been done in several centuries, suddenly turned into illegal workers. With few alternative sources of income, low ability to register due to bureaucratic delays, and no access to education regarding how to mine more efficiently and environmentally sound; these miners are now characterized as a highly marginalized group. Another main source of inability to register is that most land set off for mining is already assigned to large-scale mining companies, forcing locals to pursue illegal mining. By making miners' operations illicit, it also undermines awareness rising of mining's environmental- and health effects. Thus, it is argued that criminalizing miners in this way, without offering proper alternatives is not a viable solution to the issue (Tschkert & Singha, 2007).

The general illegal mining operations, can be said to have a bad influence on the investment environment for legal and bigger mining companies. To mitigate this, corporations have invested in organizations working to promote alternative activities to the mining. Examples of such are cassava harvesting, farming and poultry rearing, which have been done with limited success (Banchirigah, 2008).

Further, according to Hilson, most locals are reluctant to undergo training to become registered legal miners (2001). This is hypothesized as rooted in the fact that governmental policy processes have not been done with sufficient stakeholder participation. It is even reported that many managers and mine engineers state that efforts taken with regards to policymaking and implementation in the mining sector has been done very poorly (Hilson, 2001).

However, in the academic sphere one is starting to realize that what is needed to deal with the galamsey sector is "an integrated approach that provides space and support for active community participation" (Tschakert & Singha, 2007).

2.2 Theoretical Framework on Human Needs as a Means of Livelihood

A need has been defined as a hunger that compels action for its satisfaction. They range from basic survival needs that are common to all human beings and are satisfied by necessities, to cultural, intellectual, and social needs that depend on situations. Needs are said to be the drivers of human action. People have needs depending on their circumstance and there have been various attempts at explaining human needs in several settings and in various communities.

The word "need" is used in a variety of different idiomatic usages, both as a noun and as a verb (Jackson, Jager, & Stagl, 2004). As a noun, need comes with three generic meanings: namely needs as an internal force that drives or guides action, then needs as an (external) environmental requirement for achieving an end, and then needs as justified requirements for performing behavior (Gasper, 1996; cited in Jackson et al., 2004). Jack- son et al. (2004) write that most modern needs theoretical frameworks such as Maslow's hierarchical ordering of needs and Alderfer's Existence Relatedness and Growth theory draw on the first meaning of needs. The usage of needs in these theories is basically concerned with illuminating the links between motivation, values, and behavior. Such a usage of needs is located within various branches of psychology, which differs from the conventional economic approach that regards needs as subjective desires and preferences that can be satisfied

through consumer choices. For this particular study, Maslow's hierarchy of needs theory and Alderfer's ERG theory will provide the theoretical framework.

Maslow's hierarchy of needs theory has categorized individual needs into five categories (Maslow, 1943). These are: Physiological, Safety, Love/Belonging, Self-esteem, and Self-actualization. These needs are hierarchical and begin with the physiological through self-actualization. Physiological needs refer to the lower level needs like food, shelter, breathing, water, excretion, etc. These needs as the name implies are needs that the human physical body demands so that it functions normally. Safety needs are those that provide security for the individual in terms of body, health, employment, and crime. The individual tries to ensure that the things that he or she has inherited or worked for to make life comfortable are secured and not compromised in any way. Love or belonging needs are those needs that the individual has to have to feel that they are part of a group, family, community, or fraternity. These needs include friendship, sexual intimacy, and family. Self-esteem needs are those that give the individual confidence, respect for others, and respect from others. Self-actualization is the need that the individual has with regards to morality, creativity, spontaneity, etc. (Maslow, 1943).

Maslow's hierarchy of needs theory has been criticized based on the fact that individuals can have affection even if their physiological needs are not fully satisfied. For authors such as Jackson et al. (2004), Maslow's theory over-emphasizes the individualistic nature of needs-satisfaction and understates the importance of society, culture, and the natural environment by treating these as secondary in importance to individual motivation. Furthermore, the claim that only sufficiently

well-off people can achieve self- actualization is often seen as problematic because poor people in reality may also be able to develop well their individual potential. Alongside some of these criticisms is the argument that individuals can pursue multiple needs at the same time (Max-Neef, 1991).

In response to the limitations of Maslow's hierarchy of needs theory, Alderfer (1969) proposed a modification of the theory by first proposing three levels of needs instead of five. For Alderfer, the three levels are the Existence, Relatedness, and Growth levels (ERG). The physiological and safety needs are categorised as existence needs, the love or belonging and esteem needs are classified as relatedness needs, and self-actualization as growth needs.

Maslow stated that when a lower need is satisfied, the individual then moves on to trying to satisfy the next higher need and that when an individual at a higher need level is faced with a situation that results in a deficiency in a lower need, the individual will suspend pursuing the higher need and pursue the lower need. If the lower need is satisfied, then the individual prioritises the next higher need. In other words, it was not possible for an individual to pursue more than one need concurrently. Alderfer (1969) maintains a different position and argues that an individual can pursue more than one level of need simultaneously.

Alderfer's ERG theory further proposed a frustration-regression component. This component suggests that an already satisfied need can become activated when a higher need remains unfulfilled. Thus, if a person is continually frustrated in his or her attempts to satisfy growth needs for instance, relatedness needs can again surface as key motivators.

Alongside the theory on needs, this study also uses the concept of sustainable livelihoods to discuss how people draw on different assets and undertake different activities to respond to variations in their livelihoods due to the incidence of mining. Chambers and Conway (1992) define a livelihood system as comprising the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood strategy connotes a combination of assets and activities to make a living. A livelihood system or strategy encompasses not only activities that generate income but many other kinds of elements, including cultural and social choices (Ellis, 2000). For Carney (1998), sustainability is achieved when a livelihood "can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." In the context of mining, the stresses and shocks refer to the changes that occur at a setting as a result of mining related activities. Most often mining communities encounter displacements from farm lands and this has consequences for livelihoods and level of vulnerability, especially those who are unable to cope or adapt to the changes brought in by mining. The outcomes in terms of vulnerability will have consequences for the level of needs and development.

2.2.1 General Impact of Mining Activities in Ghana

Although the contribution of mining and quarrying sub-sector to real GDP in Ghana for 2011 was 8% with the agriculture sector contributing 24.7% to real GDP (Ministry of Finance, Ghana, 2012). The Ghana Statistical Service (2012) states that skilled agricultural, forestry, and fishery work remains the dominant occupation for both males (44.9%) and females (37.7%). Specifically, the agricultural sector employs about 41.5% with the mining and quarrying sector employing 1.1% of the

economically active population. Even though mining contributes a significant proportion to both total export earnings and government revenue, its contribution to real GDP is still less than agriculture.

Notwithstanding the positive contribution of mining to the economy, there are negative impacts on the economy especially at the micro-level. A consequence of the location of mining in communities is the influx of people into these areas in search of jobs with the mining companies or with allied services or to engage in other occupations, which are sometimes criminal. Some of the effects of this situation are that there is pressure on the available facilities in the communities which gives them low quality service and finally breakdown; increases in the competition for jobs, accommodation, and food lead to price hikes and increases in crime and social vices leading to HIV/AIDS. Mining activities are usually said to be destructive to the environment and livelihoods (Akabzaa & Darimani, 2001).

The inability of mining to provide the local people with alternative livelihood makes them vulnerable and reduces their livelihood security thereby increasing poverty (Adjei, 2007). In mining affected communities, vulnerability is a major obstacle to social and economic development especially in areas where majority of the people have few buffers or resources to cope with hazards or shocks, especially when lands on which people undertake their faming activities are taken over as concessions by these mining firms. Mining firms have a poor understanding of the vulnerability of local communities and fail to conceptualize vulnerability as a combination of limited economic and social assets (Hickey & du-Toit, 2007).

Furthermore, the range of different assets and activities that local people seek to sustain and improve their well-being after mining operations have started is rarely considered by the mostly multinational mining companies that come on board to acquire large tracts of farming lands as concessions and mine in these communities. Mining communities are also significantly more likely to be affected by health problems, unemployment, trade shocks, famine, or conflict. Thus, the vulnerability of the households in these communities connotes the extent to which the households can adequately resist or withstand shocks. The households' vulnerability is usually influenced by several factors including: (i) Loss of own land or food production or livestock; (ii) Loss of income and/or tradable assets; (iii) More difficult economic access to food (e.g., due to price increases), and (iv) Breakdown of traditional support systems (FAO/WFP, 2005). For these affected communities to be able to develop on their own, they need encouragement and support to strengthen their innovative capacity.

The dominant approach in ameliorating the effects of mining on communities as well as individuals is through monetary compensation, yet this approach has not addressed vulnerabilities of mining communities (Sweeting & Clark, 2000) and mining activities have often led to the alienation of local communities because they lose access to their farmlands and sometimes they are relocated (Aubynn, 2003). The extent to which the amount of compensation equals the value of a loss, both short-term and long-term, is not the focus of most mining firms and other government agencies. Compensation payments are often not based on what the "sufferer" of impact is losing, but most often than not, the estimation of compensation is shaped by what the mining firms can potentially offer. Objectively quantifying communal and

individual assets and converting them into direct cash payments is often problematic and leads to unintended negative consequences on the community and its members.

Furthermore, indigenous knowledge is often insufficient to support the sustained development of effective livelihood systems and for these to be sustained, various interest groups in the communities have to co-operate for the realization of sustained development. But to be helping these people out of their vulnerability, an understanding of the state of vulnerability is imperative. Once the vulnerability is understood and estimated, the next step is to determine and assess the needs of the people affected by surface mining. However, people whose livelihoods depend on local resources assess them in a way that allows them to use or manage them for their activities and not those introduced through mining. Local people's livelihood priorities and assessments have rarely been incorporated into policy decisions affecting the relevant resources, and this can have serious implications for the relationship between land use patterns and local people, especially if management and land use decisions are based on conventional monetary assessments only (Lawrence & Ambrose-Oji, 2001). Participatory methods of assessing must ensure that those with the perceived needs have an opportunity to express them so that policies on surface mining have a beneficial impact on local communities.

One major need that every society has is to secure jobs for people who can work. For one to be able to work in any enterprise, one has to have appropriate skills for particular activities. In the mining areas, one of the promises given by the mining companies is that they would create jobs for the youth. On the contrary, most of the jobs that are later on made available to these youth are low-paying menial jobs. This

is because the youth in these areas often are not well educated. They can therefore not be employed to do any well-paying jobs. Apart from job losses, mining is associated with other social impacts such as the displacement of indigenous communities and (subsequent) loss of livelihoods, and the adulteration of local cultures. This also aids the build-up of social tension in these places.

2.3 Ecological Impact of Small Scale Mining Activities

Small-scale mining poses not only serious health and safety consequences for workers involved but also has a significant environmental impact on the surrounding communities (Armah *et al.* 2013). Virgin forest and fertile farm lands located in the middle belt of the country (which includes part of Brong Ahafo region, Ashanti Region, Western Region and some parts of Eastern Region) are disappearing as gold mining has become the dominant activity in these areas. The majority of the challenges posed by small-scale surface mining in Ghana are experienced in environmental degradation and its effects on several ecological systems. Land degradation, mercury pollution (Hilson 2001) and pollution of water bodies are some of the major challenges posed by small-scale surface mining.

Land Degradation: Tetteh (2010) considered small scale surface mining as one of the greatest agents of land degradation and destruction, destroying about 13% of the total forested land in Ghana. A study by Schueler *et al.* (2011) revealed that surface mining resulted in about 58% deforestation and a substantial 45% loss of farmland within mining concessions in the western region of Ghana (Arah, 2014). Land destruction in the form of excavations are common (Aryee 2003; Yelpaala 2004) and in some places river banks mined to a depth of 35m expanding about 60m wide

(Hilson 2002). Land degradation results in a significant threat to biodiversity conservation with devastating effects on soil ecosystems leading to increased soil temperatures, loss and depletion of soil nutrients, erosion, changes in topography (Tetteh, 2010) destroying ecosystems with its unique habitats, fauna and flora and making the land less productive (Asiedu 2013). Arah (2014) added that majority of the mining concessions are found in and around forests, agricultural lands and human settlements resulting in competition for land and depriving farmers of access to farming land (Tetteh 2010). This has contributed significant in cocoa production in Ghana. Figure 2.1 in appendix A shows typical small-scale surface miners at work resulting in destruction of productive farm or cocoa land.

Ghana's cocoa sector has staged an impressive recovery in recent years. Ghana can boast of 1,000,000 metric tons of cocoa in the 2010/2011 crop year. However, a study by Boateng et al. (2014) concluded that Galamsey have had great impact on cocoa production said; it causes crop loss and also affects their crop yield and income. Crop loss happens when the *Galamsey* operations are then done right in the farm. The cocoa crops are destroyed because of large machines like bulldozers which are used to clear the land in *Galamsey* operations. Loss in crop yield and income normally happens when part of the farm lands is forcefully taken over by the *Galamsey* operators from the farmers. Furthermore, when the lands are taken from the farmer, some of the farmers expect allocation of new land in the form of compensation which sometime never happens. All these negatively affect the farmers' output. However, most of the farmers are of the view that they will not abandon cocoa farming and enter into any mining related business like *Galamsey*. This is because they know cocoa has a future for them as well as for the generations unborn (Boateng et al., 2014).

Challenges posed by small scale mining is better appreciated where miners leave in their wake unstable piles of waste, abandoned excavations, vast stretches of barren land and un- reclaimed excavated pits sometimes filled with water which become death traps as well as breeding grounds for mosquitoes (Aryee, 2003; Yelpaala, 2004; Arah, 2014). These challenges compel farmers to abandon their farms and farm lands as they are rendered unhealthy, unsafe and unproductive (Arah, 2014).

Mercury pollution: Mercury is one of the priority toxic elements of global concern (Donkor et al., 2006) and is an important environmental problem in Ghana. Mercury contamination can either be through natural means such as volcano eruption and weathering or through a variety of anthropogenic sources such as burning of fossil fuel or mining (Oduro et al. 2012). The use of liquid mercury, for example, in small-scale mining continues to pose a serious threat to water quality in many parts of the world including Ghana (Anane-Acheampong- Osisiadan et al. 2013). Mercury, when used in the extraction process, forms an amalgam and turns into a stable methyl-mercury a compound which when ingested, inhaled or absorbed by fauna and flora becomes toxic to man and the environment (Hilson, 2001). In Ghana, small-scale miners use mercury in processing their ore. The waste products in most cases are dumped into water bodies which cause bio-accumulation in the bodies of aquatic animals and can enter the food chain of human beings (Donkor et al., 2006). Arah (2014) added that exposure to mercury can cause kidney problems, respiratory, central nervous and cardiovascular systems disorders, loss of memory, psychosis, reproductive problems, and in some cases severe complications in children resulting in death.

Pollution of Water Bodies: In Ghana, contaminations of surface and ground water bodies have particularly been experienced in gold mining communities (Adetunde et al. 2014). Chemical processing pollution occurs when chemicals such as sulphuric acid (H_2SO_4) or cyanide (CN^-) used in processing the ore leak, spill, or leach from the processing site into nearby water bodies. These chemicals can be harmful to humans, aquatic and wildlife as a whole (Arah, 2014). The majority of small-scale surface miners in Ghana wash the waste products from the ore into rivers and other water bodies that served as sources of clean and portable drinking water to the mining communities (Obiri et al. 2010). Others too release mine tailings directly into rivers and this introduces large amounts of suspended solids and contaminants directly into aquatic habitats (Serfor-Armah et al. 2006). Mine tailings are often toxic and pose serious health threats to human, animal and plant life (Hayford et al. 2009).

A recent research by the Council for Scientific and Industrial Research (CSIR) in Ghana has revealed that many mining communities in the Western Region are at risk of health-related issues from heavily polluted water bodies by small-scale mining activities in the region (Yeboah 2013). This make livelihood so hard to come by hence most farmers have to resettle for greener pasture elsewhere leading to a decline in cocoa production.

Figure 2.2 in Apendix A shows the extent to which illegal small scale mining activities has been destructive to water bodies in the Amansie West District. Thus has deprived many of the rural folks portable drinking water as streams and wells were their main source of water.

2.4 Social/Livelihood impacts of Small-Scale Mining (Galamsey)

The social impact of surface-mining in Ghana is receiving increasing attention in recent years. Even though mining in general is seen as a vital economic propellant for most developing countries like Ghana because of its potential to facilitate industrialisation along with creation of jobs, it can also be a source of social discontent, civil unrest and other high social cost. The social cost of mining interacting with other cultural issues calls for more concerted efforts in addressing them. Displacement of communities, influx of migrant miners with its impact, substance abuse and high cost of living are some of the social challenges associated with small-scale mining in Ghana.

Displacements of communities: In Ghana, many communities have been displaced totally as a result of mineral deposits found in those communities. For instance, according to Antwi- Boasiako (2003), fourteen (14) communities with about 30,000 inhabitants have been displaced totally between the periods of 1990 to 1998 as a result of mining activities and investment in Tarkwa and its environs in the Western Region (Arah, 2014). Some members of the affected communities had to migrate in search of farmlands while others were relocated to different communities by the mining companies. Relocation of communities leads to loss of social ties, psychological problems and disturbance to the communal way of life (Yirenkyi 2008). The mass migration of people from the affected communities to Tarkwa township had a lot of consequences on the town. There was increased pressure for accommodation and an astronomical increase in unemployed youth who as a result engage themselves in illegal mining. A problem of this kind also has the tendency of generating other social problems such as teenage pregnancy, high levels of truancy, drug trafficking,

prostitution, high school dropout rate and disrespect among the youth (Owusu 2012; Antwi-Boasiako 2003; Arah, 2014). Most farmers have been made to relocate as galamsey activities has made them redundant. The medium and long term effects is the consistent decline in cocoa production.

Impacts of migration on mining communities: According to the report from the International Institute for Environment and Development (IIED, 2002), one of the most significant impacts of mining activities on mining communities is the migration of people into the mining communities, especially in the cases of developing countries where the mine is the dominant and viable economic activity in that area. In Ghana towns like Konongo, Obuasi, Tarkwas, Kwaebibrem and Nkawkaw have had a lot of influx of youth from other towns as a result of the mining activities. Meanwhile in Bolgatanga and its environs in the North-Eastern part of Ghana, from where the youth normally migrate to the southern part of the country for greener pastures, the migration phenomenon associated with small-scale surface mining is seen as a blessing (Agyemang 2010).The influx of small scale surface gold miners into Bolgatanga, as well as men and women providing support services resulting in the acquisition of tracts of land for mining and a new value for land has brought about changes at the community and household levels.

Substance abuse: It is very common experience among many residents of mining communities that addictive substance abuse is on the increase in those areas. The use of drugs and alcohol is a growing problem among the small-scale surface miners in particular. The drugs are consumed with the notion that they would stimulate them to work hard. The small-scale mining business which involves excessive physical

exertion, is taxing, energy consuming and risky hence the high substance abuse such as alcohol, marijuana and cocaine (Amponsah-Tawiah 2011). This has also resulted in a lot of health-related problems like mental disorders and skin problems among these workers.

High Cost of living: The cost of living of mining communities in Ghana is relatively high (Antwi 2010) as compared to other communities without mining. Wages or incomes of mine workers are used as a decider for goods and services in those communities neglecting the plight of the non-mine workers (i.e. government workers, farmers etc). For example, according to (Akabzaa et al. 2001) the salaries of the Ghanaian staff in the mine-related jobs are quoted in US dollar terms and as a result they have a higher income levels than those employed in the government sector. In addition, the expatriate staff is paid internationally competitive salaries whilst a small-scale miner's profit exceeds the salary of a government worker ten-fold. Given these disparities of incomes within the same community, pricing practices for goods and services tend to favor those with high incomes.

2.5 Impact of Illegal Small-Scale Mining on Cocoa Production

A study by Boateng, Codjoe and Ofori (2014) in the Atiwa District in the Ashanti region of Ghana found that the most cocoa farm lands are highly degraded with the resultant loss of vegetation cover, fertile top soil and wild fauna species as a result of adverse climatic trends and negative factors influencing environmental degradation such as small scale gold mining (Gyasi, 2006). Desertification and land degradation are two closely interrelated processes. Land degradation refers to the progressive loss of the intrinsic or natural quality of the land and if this process

occurs in arid or semi-arid areas, it is called desertification (Gyasi, 2006). The issue of land sizes comes in when the lands are forcibly taken from farmers and this also has great impact on cocoa yield. Some farmers responded that parts of their lands have been taken. Figure 6 shows percentage of size of farm lands taken by *Galamsey* operators. About 30.4% of the farmers had an average of 1-5 ha of their land by *Galamsey* operators, 18.6% of the farmers also had an average of 6-10 ha taken, 5.9% of the farmers had an average of 11-15 ha taken whiles 3.9% of the farmers had an average of 16-20 ha taken. On the average, about 50 ha of land have been taken from cocoa farmers in the study area by *Galamsey* operators. This affects the outputs which can later translate into loss of income (Livelihood). Economic trees such as *Funtumia elastica* (Ofuntum), *Alstonia boonei* (Nyamedua), *Pycnanthus angolensis* (Otie), *Milicia excelsa* (Odum), *Spathodea campanulata* (Akuakuoninsuo) in the area are also lost through *Galamsey* operations (Bunso Cocoa College,1990).

The legal authority to provide this secondary data is the Ghana cocobod. However, there seem to be little or no impact of Galamsey on Cocoa Production as evidence gathered form existing literature proves otherwise. The cocobod Ghana estimates its 2014/15 cocoa season output will be not more than 700,000 tons, down from an initial target of more than 1 million tons that had already been revised down to 850,000 tons, senior government sources told Reuters. There has been a crop failure and the latest indication is that our best (output) will be around 690,000-700,000 tons, undisclosed sources told Reuters.

Bad seasonal weather, pests and smuggling prompted Ghana's industry regulator, the Cocoa Board (Cocobod), to revise down crop estimates by 15 per cent last month (May 2015). But traders and analysts say that the shortfall could now be closer to a third of the original 1m tons it said that it would produce in 2014-15, as large pre-paid deliveries of the aromatic, dark bean have not showed up. With Ghana's output normally accounting for about 20 per cent of global production, prices for cocoa.

The lack of information from Cocobod and its sales arm, the Cocoa Marketing Company (CMC), has frustrated some industry executives. The International Cocoa Organization (ICCO) has taken the initiative to downgrade Ghana's 2014-2015 projected output by 22 per cent. The estimate for the Ghana crop – the world's second largest was slashed by 114,000 tons, to 696,000 tons. This represents a 22 per cent year on year contraction. However, the public and investor community is still awaiting an official explanation for the poor harvest.

One thing is certain, Ghana's CMC has oversold by 200,000 tons. And it is worth noting that this amount is a lot of cocoa. Analysts forecast that the crop could be the lowest since 2009. In fact, none of the causes of the steady decline in the cocoa production has been attributed to illegal small-scale mining (Galamsey) activities.

Reasons Given for this Production Shortfall

1. **Bad weather:** Heavy rainfall between August and October had prevented cocoa trees from flowering.

2. **Lack of pesticides:** Other farmers complained about the scarcity and expense of fertilizers and pesticides. There was also a lot of reported smuggling of the pesticides to neighboring countries.

3. **Aging farming population:** Majority of the smallholder farmers are old and need younger farmers to take over the operations of their farms.

4. **Disease:** Cocoa husks shriveled by fungal black pod and fat red capsid bugs feeding on cocoa trees.

5. **Weak currency:** The sharp fall in the cedi, Ghana's currency, also meant that it is more lucrative for farmers to smuggle their cocoa rather than sell to Cocobod. Weak cedi inadvertently provided incentives for farmers and extension workers to resell pesticides and cocoa in neighboring countries where they could earn more for their product.

6. **Smuggling:** Increased smuggling by farmers and extension workers of both cocoa and pesticides where prices for their goods are more lucrative due to stronger currencies in those neighboring countries. Cocobod finances Ghanaian buying companies, which act as middlemen, to purchase the cocoa from the farmers.

7. **Untimely/poor resource allocation:** This year, the funding distribution was delayed, leading to more farmers smuggling their cocoa to neighboring Ivory Coast, says one cocoa trader.

8. **Strong Harmattan wind:** The seasonal Harmattan winds from the Sahara dry the cocoa trees and soil and can lower production of the "mid" crop or the annual second crop in West Africa. A strong hot and dry pattern can even affect the next main crop production potential. Some local weather forecasters have tried to cite the Harmattan winds of this season as culprits even though international weather forecasters disagree.

9. **Inadequate rainfall:** It rained but supposedly at the wrong time in the season and very heavily thereby destroying flowering trees.

10. **Late application of fertilizers:** Delayed supply of fertilizers due to late supply from the Cocobod.

11. **Reduction of a government spraying programme:** this agriculture extension service from the Cocobod was also curtailed at the beginning of the season due to funding issues.

2.6 Theoretical Framework

These theories serve as bases upon which the study was conducted. The selection of these theories depended on their appropriateness, ease of application, and their explanatory power of the phenomenon under study (Mihaye, 2013). The study reviewed the sustainable livelihood framework and the entitlement theory to examine the effects of small-scale mining operations on cocoa production and livelihoods of people in the Amansie West District Assembly. Besides, these theories were also reviewed to explain and analyze how various factors and processes constrain or enhance people's ability to make a living in an economically, ecologically, and socially sustainable manner.

2.5.1 Sustainable Livelihood Framework

According to Mihaye (2013) one of the dominant approaches to the implementation of development interventions by major international agencies since the 1990s is the Sustainable Livelihood Approach (SLA). It formed a central concept of the UK's Department for International Development's (DFID) strategy during the early years of the new labour government in the UK (Morse et al., 2009). The idea of

Sustainable Livelihoods (SL) was first introduced by the Brundtl and Commission on Environment and Development (Mihaye, 2013). However, in 1992, United Nations Conference on Environment and Development expanded the concept, as a goal for poverty eradication (Krantz, 2001). It is believed that the sustainable livelihoods framework could serve as an integrating factor that can allow policies to address development, sustainable resource management, and poverty eradication simultaneously.

The Sustainable Livelihood Framework seeks to investigate how a person or communities in a particular environmental situation uses a number of resources with a given institutional rules and social norms and come out with a livelihood strategy towards achieving a sustainable livelihood. In this respect, the livelihood outcomes are not always sustainable or positive. In real world situations, livelihood outcomes are almost invariably negative with rising poverty which the sustainable livelihood framework blames on vulnerability contextual factors, structures and processes (Ludi and Slater, 2008).

Mihaye (2013) again posits that at the centre of the of the Sustainable Livelihood framework are the various assets on which households or individuals employ for their livelihoods. These assets include human capital, physical capital, financial capital, natural capital and social capital (Morse et al. 2009). These are influenced by the vulnerability context, which refers to the external factors that change people's ability to earn a living. The main vulnerability contexts identified in the livelihood framework are seasonality of livelihood activities, trends and shocks that are outside the control of the households. Having access to and use of these assets is influenced

by policies, organizations and relationships between individuals, organizations and authority. These institutional processes and organizational structures link the various elements together. The multiple choices that people make in order to use the available assets are known as livelihood strategies. Three broad groups of livelihood strategies identified by the framework are: livelihood intensification, diversification and migration. The strategies which individuals and households adopt produce outcomes, which could either be positive or negative (Morse et al., 2009). The DFID approach is unique in the sense that it includes environmental sustainability as a consideration of relevance to poverty and also includes power relation as one aspect of transforming processes to be examined (Mihaye, 2013).

According to Mihaye (2013) the SL approach, if applied consistently, might be beyond the practical realities of many local development administrations. It is therefore important to modify the framework to suit local realities. The SL framework has therefore been modified due to the fact that there are evidences of different elements in the livelihoods of the households of the studied communities (Mihaye, 2013). It has been identified that not all the elements found in the livelihood framework of DFID are applicable to the livelihoods of people in the communities studied. It is important to ensure that development initiatives fit with people's livelihood strategies to make them better at responding to the constraints and opportunities affecting their livelihoods. Besides, in the DFID livelihood framework, not enough emphasis is given to the informal structures and processes that affect access to resources within communities. This is very crucial because the way resources and other livelihood opportunities are distributed locally are often influenced by informal structures of social dominance and power within the

communities and individuals.

2.5.2 The Entitlement Theory

The entitlement theory of Nozick (1974) forms the basis for this study and was used to analyze the effects of small-scale mining on people's livelihoods. The theory explores what justice tells us about holdings or what can be said about and done with the property people own when viewed from a principle of justice (Nozick, 1974; cited in; Cust and Cooper, 2004 and Mihaye, 2013). This theory is meant to assess the holdings of any given person at any given time, and determine which of those holdings, if any, are possessed justly by that person. The entitlement theory comprises of three main principles:

1. A principle of justice in acquisition: This principle has to do with the initial acquisition of holdings. It is an account of how people first come to own common property, what types of things can be held, and so forth. Thus, if something is acquired justly, then it is just to own it (Mihaye, 2013).
2. A principle of justice in transfer: This principle explains how one person can acquire holdings from another, including voluntary exchanges and gifts. If someone who justly owns something freely transfers that property to another, then it is just for that other person to own it, provided that it does not leave others worse off (Mihaye, 2013).
3. A principle of rectification of injustice: This involves how to deal with holdings that are unjustly acquired or transferred, whether and how much victims can be compensated, how to deal with long past injustices done by a government, and so on. If someone unjustly owns something, then the situation ought to be rectified, for example by restoring the property to its

rightful owner (Cust and Cooper, 2004).

In view of the entitlement theory a distribution is just if everyone is entitled to the holdings they possess under the distribution. However, this does not apply to everyone in a society as some people steal from others, defraud them, or enslave them, seizing their product and preventing them from living as they choose, or forcibly exclude others from competing in exchanges. In this situation, the third principle of rectification is needed to correct such unfortunate occurrences (Stout and Glymour, 2005; Bruno, 2010).

Historical and End-State Principles: a distinction is made between principles of justice which are historical and those that are non-historical. Historical Principles of Justice are those principles for which, if we were to examine a distribution of wealth, we cannot determine whether it is just or unjust unless we know some of the historical details about how this distribution came about. Non-Historical Principles of Justice are those principles for which, in order to determine whether or not a distribution is just or unjust, we only need to look at the distribution itself, but not any of the historical details regarding how this distribution came about.

Patterned and Non-Patterned Principles: Another distinction marked by Nozick's theory was between patterned and non-patterned principles of justice. Patterned Principles of Justice dictates that we distribute goods according to some specific property, formula, or pattern. For example, goods could be distributed according to moral merit, need and usefulness to society. Non-Patterned Principles of Justice dictates that we distribute goods in a way that does not follow some pattern. Thus,

Nozick's entitlement theory is historical and unpatterned (Bruno, 2010). The use of these theories will help the researcher to place the study within the perspective of other studies in the same discipline. Besides, it sets limits or boundaries for the proposed study by providing direction and put the findings of the study into meaningful and generalized pattern (Mihaye, 2013).

2.6 Effect of illegal Mining on the Sustainable Livelihood of the Community

It is estimated that about 15 million people work in small scale particularly the illegal mining sector and that perhaps over 100 million people across the globe rely on the sector for their livelihood (Spiegel & Viega, 2006). Gold has been mined in Ghana for over 1000 years (Hilson, 2002) and in 2013 gold accounted for 34.4 percent of the country's national export revenue (United Nations International Merchandise Trade Statistics Yearbook, 2013). The proportion of Ghana's gold that is mined through artisanal and small-scale gold mining has increased from 6% in 2000 to 23% in 2010 (Tetteh, 2010).

Nonetheless, illegal mining, like any other extractive enterprises, raises numerous environmental concerns. Emissions of mercury (Hg) into the atmosphere as well as direct releases of mercury to soil and water are of primary concern because of the extensive use of mercury to amalgamate gold by artisanal miners. Recent estimates suggest that the illegal mining sector is the primary source of mercury into the global atmosphere, accounting for approximately 37% (727 tonnes) of all global emissions (United Nations Environment Programme, 2013). Interestingly, the environmental impact of small scale mining activities on biodiversity such as fish (Depew et al., 2012), wildlife (Scheuhammer et al., 2012), and human populations (Mergler et al., 2007) have

been documented worldwide. In fish and wildlife, the activities of small scale miners through their use of mercury have been shown in some cases to impair normal biological function in both individuals and populations with key systems impaired including the reproductive axis and nervous systems. In a recent review, Sandheinrich and Wiener (Sandheinrich & Wiener, 2011) outline that sub-clinical changes such as gene expression alterations, oxidative stress, and effects upon reproductive hormones and behavior, occur in fish with muscle mercury concentrations ranging from 0.5 to 1.2 µg/g (w.w.) and in the whole body from 0.3 to 0.7 µg/g (w.w.). Most of the fish (individuals and species) studied in Ghana have levels below 0.3 µg/g, though a few instances of elevated exposures exist. Despite the potential for high mercury levels in Ghanaian fish, like in other parts of Africa the levels are lower than expected with reasons yet to be determined (Hanna et al., 2014). A review of mercury concentrations in fish in 12 countries in Sub-Saharan Africa found that only fish sampled near ASGM operations had mean mercury concentrations exceeding the FAO/WHO guideline (Hanna et al., 2014). For fish-eating wildlife, we are unaware of any studies in Ghana despite results from many other parts of the world showing these organisms to be sensitive to exposure (Scheuhammer et al., 2012).

Equally, it is not only the domain of fish species who have been heavily affected by the operations of illegal mining. For instance, in a study done by Boateng et al. (2014) it was reported that on the average, about 50 ha of land have been taken from cocoa farmers in the study area by illegal mining activities. This in the long run affects the outputs which can later translate into loss of income (Livelihood). Economic trees such as *Funtumia elastica* (Ofuntum), *Alstonia boonei* (Nyamedua), *Pycnanthus angolensis* (Otie), *Milicia excelsa* (Odum), *Spathodea campanulata* (Akuakuoninsuo)

in the area are also lost through illegal mining activities (Bunso Cocoa College, 1990).

2.7 Conceptual Framework on the Effect of illegal Mining on the Sustainable Livelihood of the Community

Quoting Osei-Bagyina, (2012) "A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living (Haider, 2009). A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term (Krantz, 2001). Livelihoods approaches are a way of thinking about the objectives, scope and priorities for development. They place people and their priorities at the centre of development. They focus poverty reduction interventions on empowering the poor to build on their own opportunities, supporting their access to assets, and developing an enabling policy and institutional environment".

Sustainability issues have always been a central goal of many local, national, and international planning bodies, but it is often not clear exactly what it means or how to achieve it (Chappin *et al.* 2009). The word sustainability has been defined in different contexts by different authors. Gallopin (2003) defined it as "any system that can be represented by a non-decreasing valuation function of the outputs of interest of the system being considered". It is therefore important to find out the output aspect of illegal gold mining in Ghana and whether it is non-decreasing. The United Nations Environment Programme's definition of sustainability also emphasized the use of resources from the environment to meet the needs of the present generation without

compromising the ability of future generations to meet their own needs (WCED, 1987).

There are, however, several arguments about the applicability of these concepts to the Ghanaian mining industry, especially the small-scale/illegal gold mining sector, since mineral resources are non-renewable and are subject to depletion over time. The exhaustible nature of mineral resources places a limit on development of these sectors and hence their sustainability (Amankwah, 2004). There has been an ongoing debate by stakeholders in the mining sector on measures to mitigate the negative impacts of small-scale surface mining and assist the industry to grow in a more sustainable manner (Arah, 2015).

There are also discursions on general concepts of sustainable development and how it can be applied to the small-scale surface mining in Ghana. In sustaining such a sector, it is important to consider in the context processes involved in supply, environmental impact and its assessment, health implications and the socio-economic realities of affected communities particularly Amensie West District.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The purpose of the study is to assess the impact of illegal mining (Galamsey) on cocoa production and livelihood, a case study of Amansie West District. This chapter discusses the various methodology or method used in the gathering of data for the study. It also highlight on the analytical technique used in analysing the data.

3.1 Research Design

A research design is to say something about how the research project is structured as well as its intended methods for data retrieval and analysis. It is believed that a good and careful design ensures that the research is valid and could yield consistent results every time (Berg, 2010). In general, there are several established research designs that the researcher could choose from; comparative design, cross-sectional design, longitudinal design, case study design or the traditional experimental design (Bryman, 2012). However, social phenomena have to do with extremely varying human conditions in different environments that make it difficult for social science researcher to choose appropriate research approach and methods to investigate the specific problem concerned. However, this study will adopt a case study approach for investigating the phenomenon. The purpose of assessment is that of a fact-finding and it describes conditions that exist at a particular point in time. The study again adopts both qualitative and quantitative research approaches. Quantitative, broadly defined, means 'a research that produces discreet numerical or quantifiable data (Simons, 2007). Descriptive survey design was adopted in conducting this study. This is because descriptive studies are not only restricted to fact findings, but often

result in the formulation of important principles of knowledge and solution to significant problems (Orodho, 2003). The researcher used descriptive approach which was appropriate for this study because it involved fact-finding and enquiries to determine the conflict resolution as it existed in secondary school organisations. It was more than just a collection of data because the researcher was involved in measurement, classification, analysis, comparison and interpretation of data. Kombo and Tromp, (2007) further observe that descriptive approach is designed to obtain information concerning the current phenomenon and wherever possible to draw valid general conclusions from facts discussed. To effectively achieve this objective, the researcher administered a questionnaire to a sample of respondents in the district. The researcher did carry out survey on these individuals to find out approaches, effects, challenges and attitudes they are facing as a results illegal small-scale mining activities. In this study independent variables were identified as galamsey activities.

3.2 Population of the Study

The target population is the group of individual that possess the information required by the researcher and bout which inference are to be made (Malhorta & Birks, 2007). The most important thing in defining the target population is the precise specification of who should and who should not be included in the sample (Churchill & locubucci, 2002; Malhorta & Birks, 2007). According to the Ghana Statistical Service (2014) report, the population of Amansie West District, according to the 2010 Population and Housing Census, is 134,331 representing 2.8 percent of the region's total population. Males constitute 50.2 percent and females represent 49.8 percent. More than ninety percent (95.6%) of the population is rural. The district

has a sex ratio of 101.0. The population of the district is youthful (41.2%) depicting a broad base population pyramid which tapers off with a small number of elderly persons (4.6%). The total age dependency ratio for the District is 84.9, the age dependency ratio for males is higher (85.0) than that of females (84.8).

3.3 Sample and Sampling Technique

Due to the character of the study, mostly semi-structured interviews have been used. As the research project is first and foremost an in-depth case study research project, generalization is not a priority, but comes second to the deeper understanding, which will reflect the chosen methods of sampling. Proper sampling is however still an important aspect, as it does affect the finding's external validity as well as credibility (Bryman, 2012). A sample is a small subset of population said to be representative of a given population (Quinlan, 2011). Sampling can be a vital procedure when analyzing data as it is a valid way of collecting data without using the entire population, in particular when both time and budget constraints exist for the researcher.

However, taking the different classes of respondents into consideration as well as the different kinds of questions needed to be answered, systematic sampling technique was the most appropriate technique that was applied in this study. Johnnie (2012) describe it as a probability sampling procedure in which a random selection is made of the first element for the sample, and then subsequent elements are selected using a systematic interval until the desired sample size is reached. The study was conducted in the Amansie West District Assembly in communities like Mim, Ankam, Mpatasie, Adubia, Kumpese, Odaho, Agroyesum and Yawkrom where illegal

small scale mining is predominant. The projected sample size for the study were 350 respondents of which 137 were selected using the systematic sampling technique.

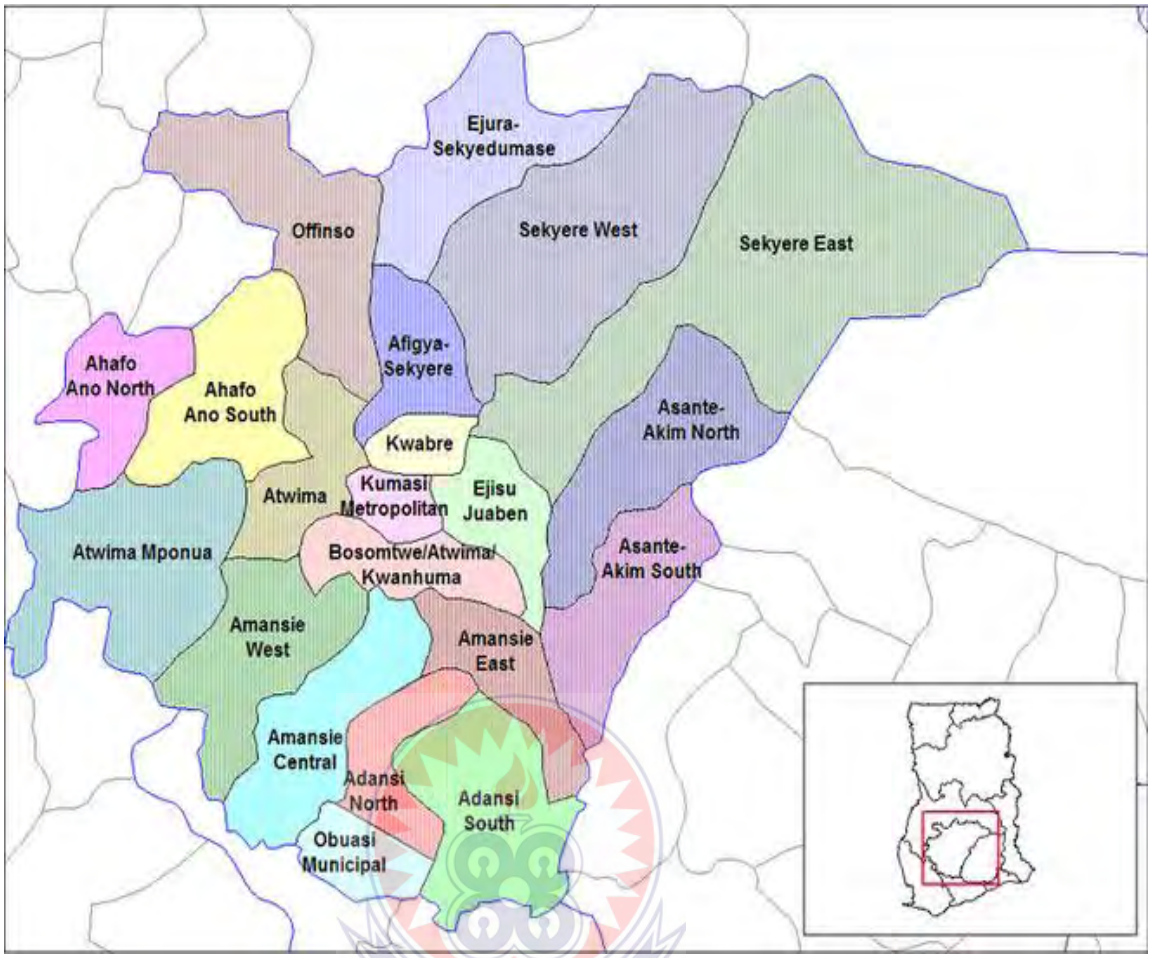
In selecting the respondents, the researcher used a modified systematic random sampling technique where he first identified the needed sample sizes for each of the communities. The researcher therefore divided the total population of each community with the sample sizes to obtain the sampling fraction or sampling interval. The sampling fraction was then used as the constant difference between subjects upon which respondents were selected. However due to the relatively equal size of the populace in these communities the researcher decided to give equal proportion to each community in other for them to have equal representation.

Taking the 2010 population projections of the Amansie West District Assembly on the 2000 Population and Housing Census (PHC), the researcher calculated the sampling interval for the study. In this regard, the population of the various communities were used and 24 respondents each were selected from each of the five communities. This was done by dividing the total population of each community by the proposed sample size to obtain the sample interval upon which the respondents were selected. As a result, a total of 120 respondents were selected from the five communities. The systematic sampling technique is justified because it is easier, simpler, and more economical to apply. It also gives an assurance that the population is evenly sampled (Castillo, 2009).

Again Purposive sampling is yet another sampling technique that was applied in the study. According to Tongco (2007), "purposive sampling technique, also called

judgment sampling, is the deliberate choice of an informant due to the qualities the informant possesses". Bernard (2002) describes it as a technique that the researcher decides what needs to be known and sets out to find people who are willing to provide the information by virtue of their knowledge or experience about the subject matter under consideration. This was done to select 17 galamsey operators for the study. This include 3 respondents each from Mim, Ankam, Mpatasie, Agroyesum and five (5) from Yawkrom. Amensie West is located in the Ashanti region with the capital being Kumasi. This is shown in the figure below

Figure 3.1: Map of Ashanti Region Displaying the Location Amansie West District



Source: Ghana Statistical Service, (2016)

3.4 Data Collection Techniques

The study employed both primary and secondary data as follows:

3.4.1 Primary Data

This is data originated by the researcher especially to address the research problem (Malhatra and birks 2007). Barnes 2000 as cited in Amissah et al 2008 argued that primary data are first-hand information gotten from the research. Primary data for the study was collected through the administration of structured questionnaires as well as interviewing some farmers and key informants in the study area. In order to get

the relevant respondents (cocoa farmers) for all the stated objectives, purposive sampling techniques were used to select cocoa-growing communities in the district. This is because apart from these communities being cocoa growing ones, Galamsey activities are prevalent in them.. Specifically the data for this study were gathered through the administration of a questionnaire to a cross - section of respondents drawn from various courts as sellected.

3.4.2 Secondary Data

Sources of secondary data were from various textbooks, journals, media and internet reports (both print and electronic). The research site was Amansie West District Assembly. The data gathered were subjected to both qualitative and quantitative analysis. These are documentation, archival records, interviews, direct observation, practical observation, physical artifacts, Yin (2003) as cited in Khiabani (2006). For the purpose of this research the researcher employed questionnaires and interviews.

3.5 Data Collection Procedure

3.5.1 Questionnaires, Interview and letter Administration

The questionnaires were administered to respondents who were able to read and write. However, interview was used as majority of the respondents were comfortable with it and it was the main means that could help the researcher gather the requisite data. This was due to the fact that most of the respondents could not read and write. The respondents were briefed first about the purpose of the study and the instructions were explained. A written instruction was also available at the beginning of the questionnaire. The respondents were also informed that they are free to ask any

questions if they do not understand something in the questionnaire or the interview process. Questionnaire was completed within 14 to 20 days. The interview was scheduled for only was recorded and later played back. Again a letter was sent to the Ghana Cocobod on their release on cocoa production and sale

3.5.2 Validity of Research Instruments

The study instrument was content-validated. Donald and Pamela (2001) posit that content validity is determined by expert judgment. The university supervisors scrutinized the instrument to find out whether it addressed all the possible areas that were intended to measure, ensured its appropriateness, completeness and accuracy. They were relied upon to determine whether items in the instrument were adequate representation of all the areas that were under investigation.

3.5.3 Reliability of Research Instruments

The researcher piloted the instrument to 10 galamsey operators who were drawn from the sample of 17 small scale illegal miners. Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials. Kothari (2009) reliability refers to consistency of measurement; the more reliable an instrument is, the more consistent the measure. The researcher used split-half procedure to test the reliability of the principals' questionnaire through piloting. This procedure was chosen over the other methods such as the Kuder-Richardson approaches for its simplicity yet accurate (Fraenkel and Warren, 2000). The instrument was piloted. It tested the basic emerging variables of this study described in the conceptual framework.

The open-ended questions scored by giving a mark for a relevant response and a zero for irrelevant and blank responses. The questionnaires selected were divided into two equal halves taking odd numbered items against the even numbered items. The scores of the halves were then correlated using the split – half measure of reliability. This yielded a half test coefficient. The Spearmanm - Brown Prophecy formula for the full test was employed to obtain a total test coefficient of the instruments. They were considered reliable since the reliability fell between 0.7 - 1.0, which are considered adequate (Fraenkel and Warren, 2000).

3.5.4 Ethical consideration

A central ethical implication when doing qualitative research is the issue of anonymity. Since the use of voice recording has been applied, this further increases the issue. In order to mitigate this as much as possible, the recordings were deleted as soon as they were properly transcribed, to increase the degree of privacy. Informed consent entails the readily informing of participants and informants regarding the research project and its purpose, as well as making it clear that participation is fully voluntary (Bryman, 2012). However, the concept is a debated topic when it comes to research ethics, and although the norm is that it is to be retrieved from all participants this proves difficult in many situations (Bryman, 2012). Further, the definition of "informed" fuses more questions, as research projects often are highly complex and it could be too time-consuming giving every participant the full information about it. In fact, giving all information that exists on the research project could also bore the participants and limit their patience and willingness to be active participants (Bryman, 2012). However, the researcher did strive to readily inform all participants about the research project, their anonymity and that participation was voluntary.

3.6 Data Analyses

Based on the nature of the research and data collected, descriptive analysis was used to pursue the objectives of this research. Statistical tools such as frequency distribution, percentages and means were also used to analyze and describe the perception of cocoa farmers. The results were presented in tables, graphs and pictures. Statistical Package for Social Sciences (SPSS) version 20 was the statistical tool used to arrive at the results of this study. The final output was presented in the form of texts and direct quotes from key informants, community leaders and local community members. The application of this method of analysis by the researcher is based on the fact that, the original views of respondents will be demonstrated without any biased interferences with the view of the researcher. In view of this, data for the analysis were presented, explained and discussed using descriptive statistics such as frequencies, tables, graphs and percentages. In addition, a chi-square test was employed to test the proposed hypotheses. The application of quantitative analysis enabled the researcher to generalize the findings and also made comparisons between two variables. Finally, quantitative analytical approaches also allowed the researcher to report the summary of results of the study in numerical terms.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

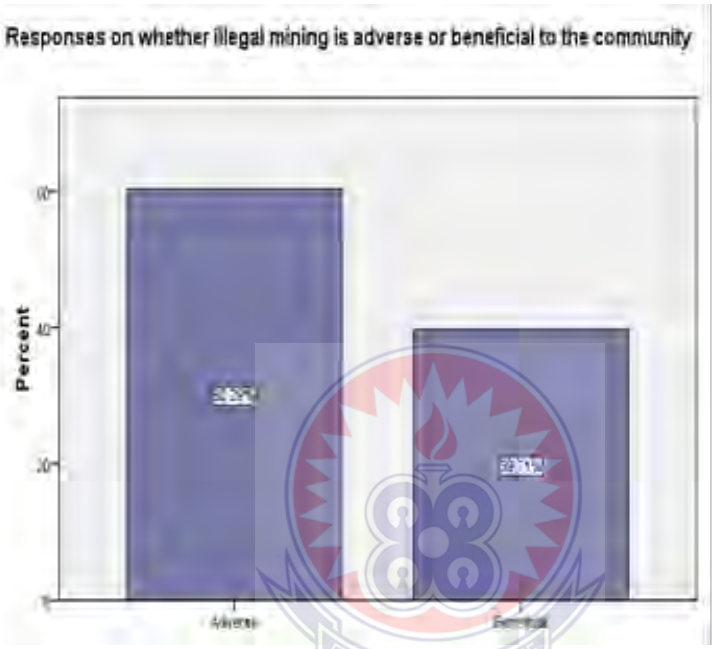
The purpose of the study was to assess the effects of illegal small scale mining (galamsey), and its effects on cocoa production and livelihood. This chapter reviews, presents and analyses the results of the data collected during the survey.

4.1 The Driving Forces of Illegal Small Scale Mining

The discovery and subsequent mining of mineral deposits in Ghana have recorded a massive absorption of the working population of most mineral laden communities and a good percentage of job seeking immigrants. Apart from the formal large scale commercial mining sector, Ghana's mining sector is also characterized by a rudimentary labour intensive small scale mining. Whereas about 200,000 Ghanaians are directly engaged in the extraction of gold and diamond within the small scale mining sector, the majority are illegal operators who resort to small scale mining to earn a living. Data gathered by the researcher through informal interviews indicates that small scale mining and for that matter illegal mining in the Amansie West district traces its history as far back as 1839 and have been a source of livelihood for the majority of the youth in the district. For the majority (60.29%) of respondents from all five communities sampled and presented in figure 5, whiles they think illegal small scale mining is adverse to the community, a high percentage of the respondents (39.71%) were of the view that the activity is beneficial to the community, attributing such responses to no alternative sources of livelihoods, non-availability of jobs, decline in agricultural productivity as well as rural

poverty. In effect, illegal mining activities remain fuelled by the aforementioned factors, and more importantly, exacerbated by the easily, unregulated and cheap disposal of land by land owners for quick cash.

Figure 4.1: A bar chart showing respondents views on whether illegal mining is beneficial or adverse impact to the community



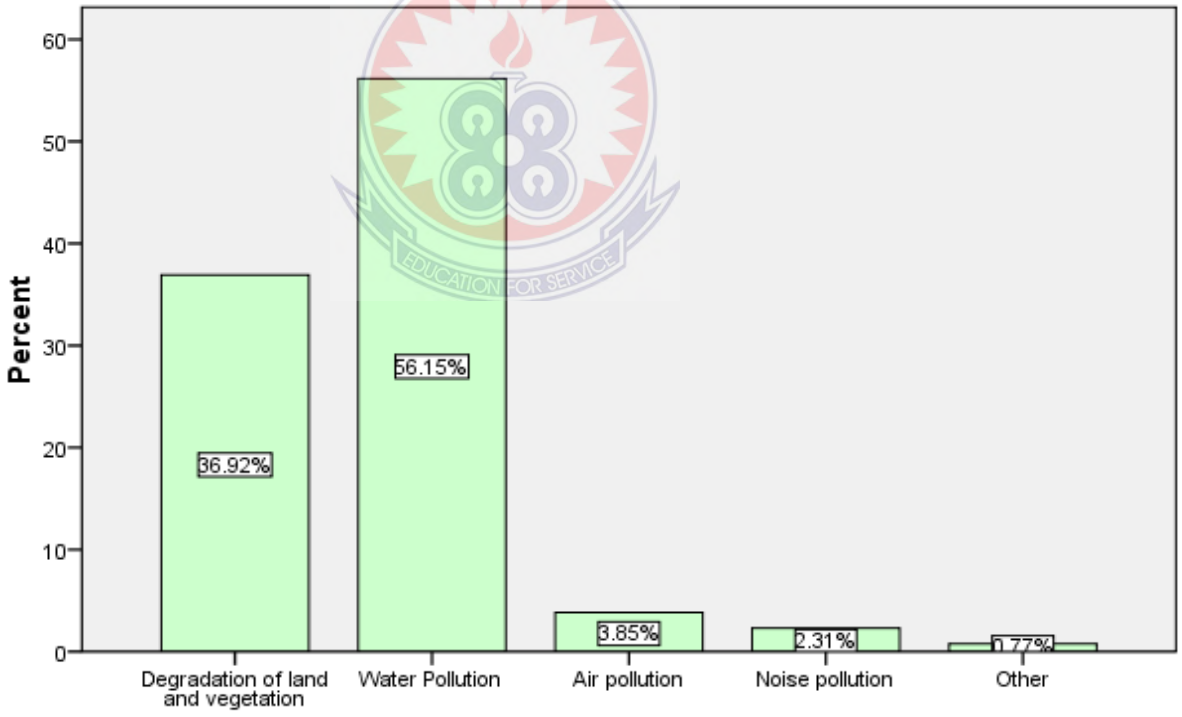
Source: Field Survey, 2017

4.2 Effects of Illegal Mining Activities on the Environment and Cocoa Production

The effects of illegal mining activities in the Amansie West District were obvious as per researcher' observation; ranging from environmental to social. Consequently, for the purpose of this study, data gathered from the field via questionnaires also suggested that the activities of illegal small scale miners affect almost all components (land, vegetation, water and air) that make up the environment either through direct activities of the miners on these components or remote activities but which are attributable to illegal mining operations. Thus, assessing the general environmental effects in all the five communities surveyed, data suggested that the mining activities

have led to excessive water pollution, degradation of land and vegetation, air pollution, noise and other forms of environmental pollution such as greenhouse effects and global warming. Whereas 56.15% of the respondents stated water pollution as the effect of the illegal mining activities on the environment, 36.92%, 3.85%, 2.31% and 0.77% of the respondents indicated degradation of land and vegetation, air pollution, noise pollution and others indicated global warming respectively. Impliedly the two main issues plaguing the communities studied were first of all, water pollution and secondly, degradation of land and vegetation. The diagram below shows the effects of illegal small scale mining on the environment.

Figure 4.2 A bar chart displaying the effects of illegal small scale mining on the environment



Source: Field survey, 2017

To further ascertain the effects of the illegal mining activities on the environment in line with the objectives of the study, the researcher considered three components of the environment (water bodies, landscape and vegetation); assessing how each

component was affected by the mining activities as well as the level of effect on each component.

4.2.1 Effects of illegal small scale mining on cocoa production and vegetation cover.

It is very common for prospective mineral to be stripped off their vegetation to make way for mining. The processes engaged by illegal miners involve clearing of large tracts of forest covers as well as overturning of the vegetation, making the land susceptible to agents of erosion. The scenario above was not different in the five communities surveyed for the purpose of this study. Activities of these illegal miners within the communities have led to loss of the hitherto rich dense vegetation cover of the communities and left behind scars of excessive deforestation. Apart from the loss of some plant species, there was also a trade-off between insignificant quantum of mineral deposits and a significant number of animal species which initially found habitat in the forest and vegetation cover. Data presented in table 4.1 indicates a change from dense to light vegetation as a result of the activities of illegal miners. With 94.9% of total respondents attesting yes to the fact, as low as 5.1% said there was no such change. Again, evidenced by responses in table 4.2, 79.3% of respondents stated there was massive destruction of cocoa lands hence affecting cocoa production in the community by the illegal miners, whiles only 20.7% thought otherwise. Loss of plant and animal species were also affirmed by 86.7% and 80.7% respectively in the positive, whiles 13.3% and 19.3% respectively responded in the negative.

Table 4.1 Responses on the effects of illegal mining activities on some aspects of the environment and cocoa production

Gradual e x t i n c t i o n of plant Species			**Change from dense to light vegetation cover**		
	Frequency	**Percentage**		**Frequency**	**Percentage**
Yes	117	85.40	Yes	129	94.2
No	20	14.60	No	8	5.8
Total	**137**	**100**	**Total**	**137**	**100**
Extinction of plant species (cocoa)			**Drying up of water bodies**		
	Frequency	**Percentage**		**Frequency**	**Percentage**
Yes	109	79.6	Yes	115	83.9
No	28	20.4	No	22	16.1
Tot	**137**	**100**	**Tota**	**137**	**100**
Dusty					
	Frequency	**Percentage**		**Frequency**	**Percentage**
Yes	80	58.4	Yes	107	78.1
No	57	41.6	No	30	21.9
Tota	136	100	Total	137	100

Source: Field Survey, 2017

Respondents' view of *Galamsey* impact on cocoa crop

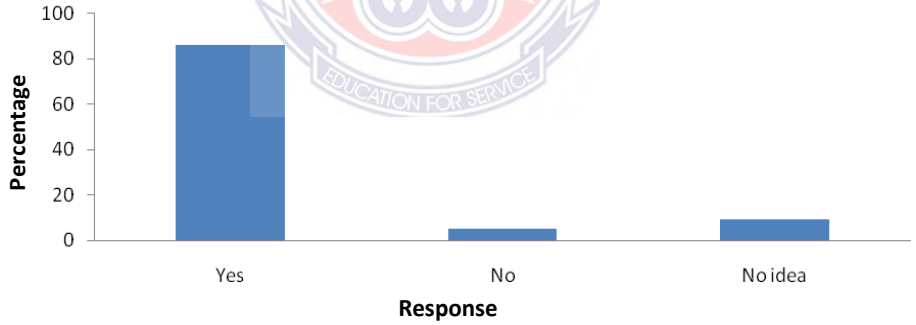


Figure 4.3: View of farmers on the *Galamsey* having impact on cocoa production.

Source: Field survey, 2017

Figure 4.3 shows the view of cocoa farmers in the study area about impact of Galamsey on cocoa production. Many of the farmers' assert that the local Chiefs give the land out for *Galamsey operation*. From Figure 2, 48.1% of the farmers said "YES" to that question, 12.7 % of the farmers said "NO" and 39.2% said they have "No Idea" about the impact of cocoa *Galamsey* on cocoa production and same

reaction on the chief giving the lands out for illegal small scale mining. From the results, most of the cocoa farmers are of the view that chief's or local authorities are mainly part of illegal small scale mining in the study area know that the adverse effect of *Galamsey* is tremendously disastrous the benefits.

4.3 Trend in the Decline of Cocoa production

Cocoa production in Ghana was hitherto high in the Ashanti region and this phenomenon had existed from 1947/48 cocoa season to 1984/85 cocoa season before the western region of Ghana took over as the leading cocoa producer in the country. This is partly due to early influx of galamsey activities in the Ashanti region comparative to other regions. Table 4.2 below demonstrates the decline. This trend has gradually deepened in the Western part of Ghana and hence the steady decline in cocoa output as shown in table 4.2 below.

Table 4.2: A table displaying the trend in the decline of cocoa production and purchase schedule on regional basis

Crop Year	Ashanti	Brong Ahafo	Eastern	Central	Western	Volta	Total	Leading Producer
1947/48	107630		56000		27970	20279	211879	Ashanti
1948/49	127880		81003		47062	26881	282826	Ashanti
1949/50	117875		68161		41146	24617	251799	Ashanti
1950/51	124630		70643		46116	25029	266418	Ashanti
1951/52	99231		60679		31194	23945	215049	Ashanti
1952/53	120190		62526		39863	28356	279291	Ashanti
1953/54	103322		52036		35676	22206	213240	Ashanti
1954/55	111063		53641		33727	22388	220819	Ashanti
1955/56	120940		50743		32666	28100	232449	Ashanti
1956/57	134929		55893		44804	32288	267914	Ashanti
1957/58	106597		42637		38942	21575	209751	Ashanti
1958/59	146247		37807		40322	25039	249415	Ashanti
1959/60	182775		58820		57285	23342	322222	Ashanti
1960/61	152754	92552	75082	46821	39318	30777	437304	Ashanti
1961/62	151646	71245	81112	61748	21176	29034	415961	Ashanti
1962/63	150200	83156	85907	64889	23278	21054	428484	Ashanti
1963/64	156586	90379	76911	57421	21871	24614	427782	Ashanti
1964/65	204427	130245	107820	75697	34935	27745	580869	Ashanti
1965/66	155816	101790	72149	41587	23800	20620	415762	Ashanti
1966/67	130220	87698	69511	50125	25040	18759	381353	Ashanti

Crop Year	Ashanti	Brong Ahafo	Eastern	Central	Western	Volta	Total	Leading Producer
1967/68	140844	109060	71323	52790	32329	24319	430665	Ashanti
1968/69	124903	85336	58733	43845	23282	19489	355588	Ashanti
1969/70	125406	115393	69431	55236	31113	20878	417457	Ashanti
1970/71	130434	112076	73805	59813	36153	15348	427629	Ashanti
1971/72	148935	116916	76224	62762	47516	10107	462460	Ashanti
1972/73	125649	112754	74578	43469	43129	22118	421697	Ashanti
1973/74	106977	78502	65617	47707	41338	14489	354630	Ashanti
1974/75	109802	81533	73393	50766	52106	14009	381609	Ashanti
1975/76	124334	88480	69201	38547	40343	9228	370133	Ashanti
1977/78	89619	69541	41289	21553	41968	7369	271339	Ashanti
1978/79	86913	50408	50200	25700	45873	5980	265074	Ashanti
1979/80	100363	74894	45051	19034	52301	4776	296419	Ashanti
1980/81	91537	47598	46632	25563	45148	1496	257974	Ashanti
1981/82	70790	49747	36890	22069	43703	1683	224882	Ashanti
1982/83	55310	35174	31254	17604	35109	3776	178227	Ashanti
1983/84	47059	29685	25504	13818	40161	2659	158886	Ashanti
1984/85	44692	28629	28009	18754	51412	1018	172514	Western
1985/86	54466	36474	34612	27636	64731	1115	219034	Western
1986/87	56870	32643	33399	26912	76038	1903	227765	Western
1987/88	49766	28796	29951	19115	58738	1805	188171	Western
1988/89	76268	48647	39193	28423	105894	1676	300101	Western
1989/90	72124	45126	33296	31208	111513	1785	295052	Western
1990/91	60958	42016	32261	26517	128955	2645	293352	Western
1991/92	52467	33734	26196	19356	109469	1595	242817	Western
1992/93	65353	37014	34608	29587	143288	2273	312123	Western
1993/94	47172	30927	25372	21936	128323	924	254654	Western
1994/95	64026	37014	33667	20518	153162	1068	309455	Western
1995/96	81977	39048	38932	36410	206570	906	403843	Western
1996/97	64534	34195	34306	22415	165361	1678	322489	Western
1997/98	78909	39898	29468	29468	216955	976	395674	Western
1998/99	74390	40212	40503	29653	210545	2060	397363	Western
1999/00	82068	39310	41526	31360	240331	2351	436946	Western
2000/01	72993	33110	46226	32136	203626	1681	389772	Western
2007/08	56983	31354	39348	29992	181865	1021	340563	Western
2008/09	82445	45308	51604	39989	276587	913	496846	Western
2009/10	121269	69695	68634	55819	419650	1909	736976	Western
2010/11	90535	55025	48868	59308	344246	1336	599318	Western
2011/12	133026	72766	55871	55497	422223	1075	740458	Western
2012/13	95427	65629	51132	43757	357827	761	614533	Western
2013/14	125270	66921	55916	62378	369458	838	680781	Western
2014/15	110643	61562	63405	60686	413395	951	710642	Western
2016/17	116538	60600	55736	57562	359910	595	650941	Western

It is clear from the table that the decline in cocoa production in both Ashanti region and Western region continues as the years' progress. This could be partly due to the

interest of the youth in in illegal small scale mining and mass destruction of cocoa lands in the cocoa growing areas.

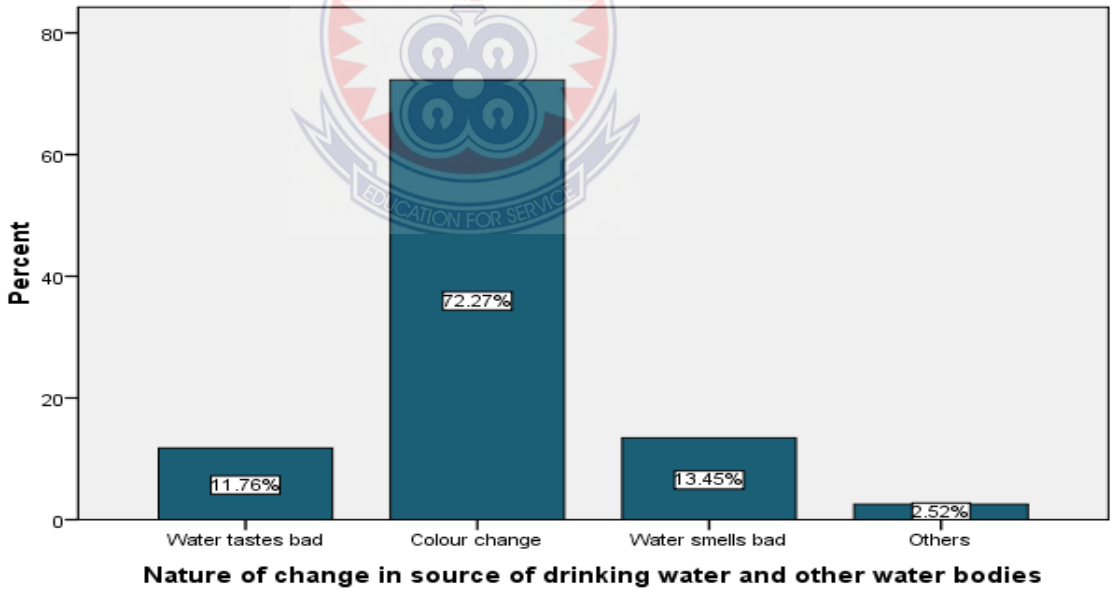
4.4 Effects of Illegal Mining Activities on Livelihood and the Community

Hitherto the advent of small scale mining in the Amansie West District, communities depended largely on water from streams and rivers and to a lesser extent, water from boreholes for domestic purposes such as cooking, brewing and drinking. However, data from questionnaires administered and unbiased observations of the researcher indicated that such water sources can no longer be relied on following the influx of illegal small scale miners into the communities. Whiles the majority of respondents (72.27%) said the colour of water has changed, 11.76%, 13.45% and 2.52% of the 136 respondents said the water tasted bad, smells bad and others respectively, with the others being that the water was muddy and most water bodies have dried up. Again responses on whether the illegal mining activities have led to drying up of water bodies, attracted an 83.9% positive response as against a 16.1% negative response (See table 4.1). Apart from the above, the study also revealed that there is a drastic change in drainage patterns within the mining communities together with flooding problems. Erosion is on the high, leading to siltation and increased sediment loads in rivers as well as release of poisonous materials into water bodies. The study also brought to light the contamination of surface water by liquid effluent from processing plants as well as washing of mineral laden soil in water bodies. The phenomenon has caused destruction of aquatic organisms as water bodies have become inhabitable to such organisms.

Plate 4.1 below illustrates the nature of change in drinking water and other water bodies.

Source: Field Survey, 2017

Figure 4.4: Showing responses on the change in drinking water and other water bodies.



Source: Field survey, 2017

4.4.1 Effects of illegal mining activities on the landscape

Surface mining which mostly characterizes small scale mining results in intensive stripping of topsoil and the creation of pits, waste dumps and ore stockpiles. Similar activities dominated all the five mining communities that were surveyed. Open pits

did not only serve as death traps, but were also sources of stagnant waters which breaded malaria infested mosquitoes. It was observed that there were changes in the topography of the mining communities, causing visual intrusion. Pits and piles of excavated soil distorted the physical terrain of the landscape of the area. This has made those places both unsafe for housing construction and unprofitable for agricultural purposes. There was accordingly a change in the land use pattern owing to land-use conflicts. Open pits and dumping of overburden rock mass in the form of heaps were the common scenes one would encounter driving through the mining communities. See pictures below.

Plate 4.3: A Group illegal miners spotted on a degraded mining site.

Source: Field Survey, 2017

Plate 4.3: Polluted Water Bodies at Yawkrom by illegal miners

Source: Field Survey, 2017

Plate 4.4 Water Collected in an Excavated Pit

Source: Field Survey, 2017

Plate 4.5 Degraded Land Surface

Source: Field Survey, 2017.

4.4.2 Comparative levels of effect of illegal mining on water, land and vegetation.

To assess the extent to which vegetation, land and water were affected by the activities of illegal mining, respondents were asked on a scale of 1 to 5 (1 being the least grade) to grade the effects of the illegal mining on the three components stated above. From the survey, it came out that water bodies were the most affected by illegal mining activities; the second most affected component was the landscape and the least was the vegetation. Notwithstanding such grading, the closeness of final grades scored by each component suggested the illegal mining activities affected all the three components substantially with marginal differences between them. The table below illustrates the levels by which the vegetation, landscape and water bodies have been affected by illegal mining activities.

Table 4.3. Showing the levels of effect of illegal mining activities on vegetation, land and water bodies

Grade	1	2	3	4	5	Total Grade
Vegetation	3	9	25	23	76	568
Landscape	6	10	12	19	89	573
Water bodies	3	3	4	4	122	647

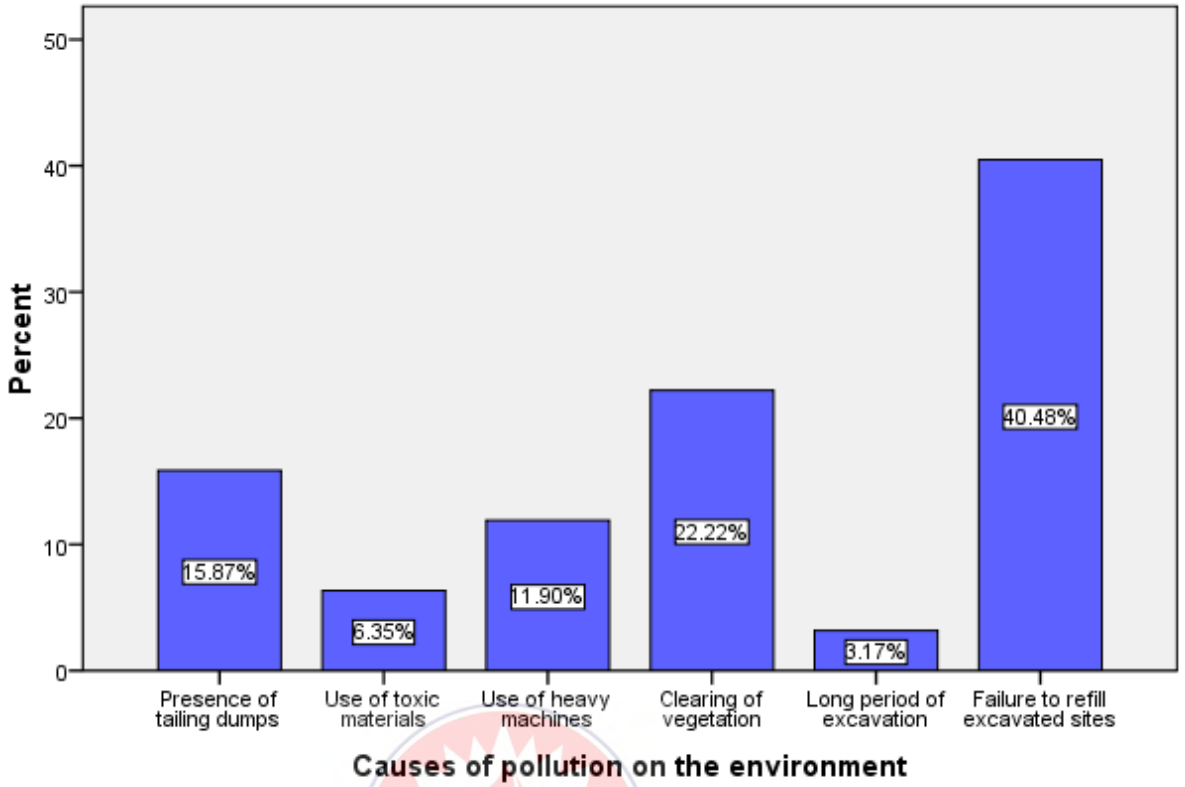
Source: Field survey, 2017.

From Table 4.3, the frequency of each grade under each component was multiplied by the grade to obtain the actual value for each grade. The actual values for each grade for a particular component were then summed up to arrive at the total grade for that component, which represented the extent to which that component had been affected be illegal mining activities. The lower the total grade for a component, the lesser the extent of damage and the higher the total grade, the greater the extent of damage. From table 4.3 therefore, whiles the most affected environmental component (water bodies) attracted a total grade of 647, the landscape attracted a total grade of 573 and 568 for that of vegetation cover.

4.5. Illegal Mining Activities that Cause Environmental Pollution

To the extent that the study established the environmental effects of illegal mining in mining communities, the researcher also sought to identify those activities of illegal mining that actually caused environmental pollution. This the researcher did by sampling the views of respondents on the causes of environmental pollution of any sort. The figure below illustrates the underlying causes of various environmental effects posed by illegal small scale mining.

Figure 4.5: Displaying results on mining activities that cause environmental pollution



Source: Field survey, 2017

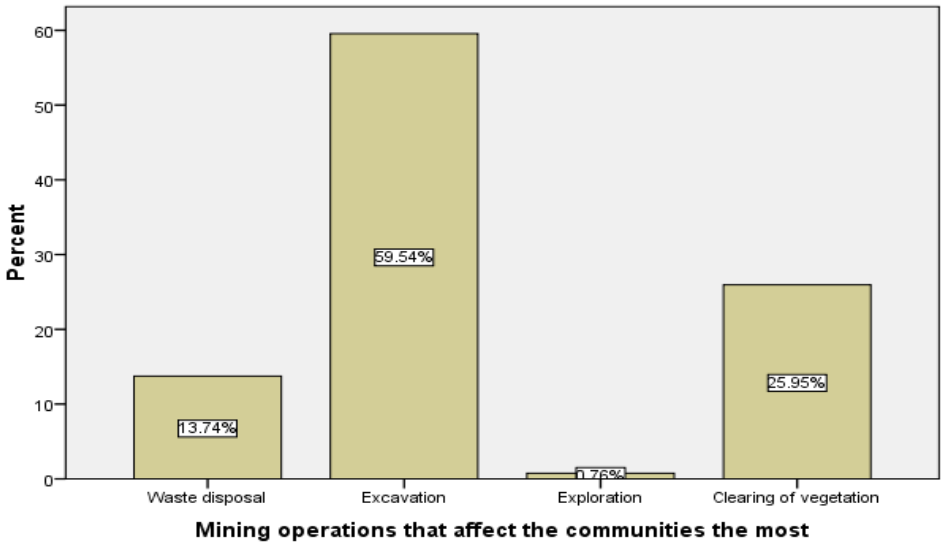
Activities of illegal mining operators including creation of tailing dumps, use of toxic materials in extraction of gold, clearing of vegetation cover and excavation were all implicated by respondents as causing various effects on the environment within the mining communities, though at varying levels. From figure 4.5 above, it can safely be concluded the single most dangerous activity of illegal miners that causes degradation of the environment is the failure by miners to refill excavated sites once they are done with extraction. Whiles this has been a problem in most mining communities, the problem has been exacerbated by illegal mining operators as they do not fall under any regulatory framework to put them on check. Information from the mining desk at the Amansie West District Assembly indicated 60% reclamation of mined lands by licensed small scale miners. The problem however remains with the illegal miners who constitute the greater percentage of mining activities in the district.

From the survey, 40.48% of respondents attributed environmental effects of illegal mining to failure to refill excavated sites, 22.22% to clearing of vegetation, 15.87% to presence of tailing dumps, 11.90% to the use of heavy machines, 6.35% to the use of toxic materials and 3.17% to long periods of excavation.

4.6 Illegal Mining Activity that Affects Communities the Most

Some activities of illegal miners were considered to ascertain which of them posed more problems to the communities surveyed. These included waste disposal, excavation, and exploration, blasting and clearing of vegetation. As per data gathered, excavation activities posed the most threat to mining communities as same attracted the majority of respondents views. Whiles merely excavating according to the respondents was not the problem, not reclaiming the destroyed land was what concerned inhabitants of these communities. Following excavation activities was the issue of clearing of vegetation, then waste disposal, and exploration. The figure below displays responses on mining operations that affect the community the most.

Figure 4.6: Showing responses on mining operations that affect mining communities the most.



Source: Field survey, 2017.

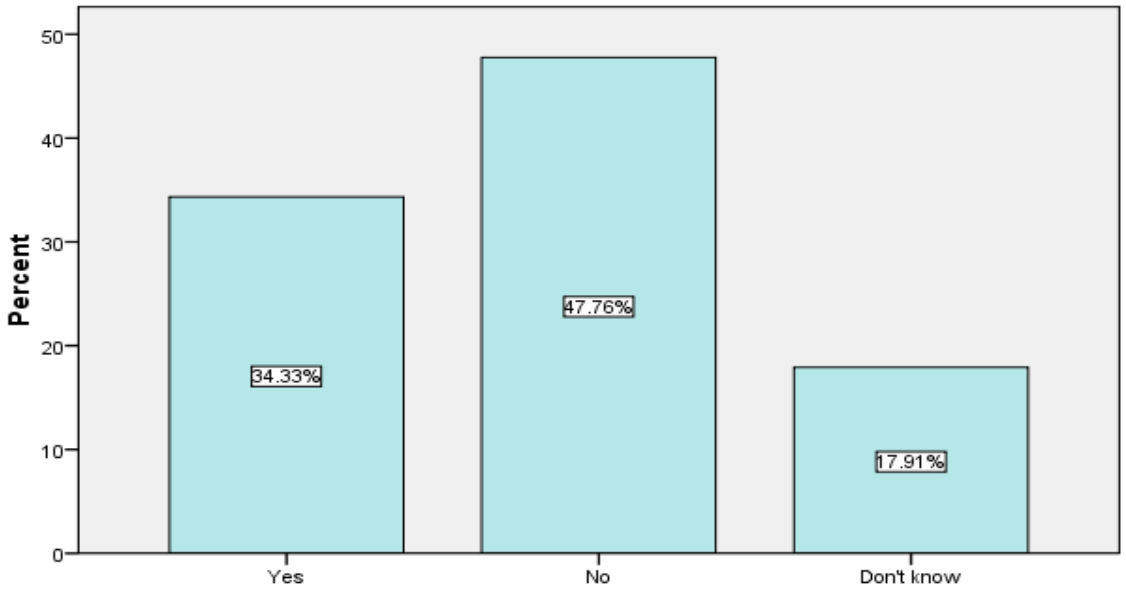
From the figure above, 59.54% 0f the respondents expressed worry about excavation activities of illegal miners, 25.95% indicated clearing of vegetation as affecting the community most, whiles 13.74% and 0.76% indicated waste disposal and exploration activities respectively as affecting the community the most.

4.7. Community Initiatives on Mitigating Illegal Mining and Its Associated Environmental Effects

Confronted with the menace of illegal mining activities, the researcher sought to ascertain communities 'efforts to combat illegal mining activities. Questions were tailored to that effect, in a bid to know if the communities had taken any steps to curtail illegal mining and its effects. Unfortunately, the majority responses were in the negative.

Whereas only 34.33% stated that the community had taken steps to curtail illegal mining and its effects, 17.91% of the respondents did not know if such steps were taken, with the remaining 47.76% of the respondents saying that the community had not taken any steps in that regard. Even with the 34.33% responding that steps were taken by the community, further questioning and interviews revealed that such steps were just limited to warning by chiefs to illegal miners to either stop or reclaim degraded lands afterwards. In fact, such warnings according to inhabitants have not yielded any results as the mining activities and effects continue to increase. Conversely, land owners within mining communities are not helping community efforts to combat illegal mining as they easily give out valuable lands for immediate cash from these illegal miners without control measures. Figure 4.7 below illustrates responses on whether communities have taken steps to curtail illegal mining.

Figure 4.7 Response on whether communities have taken steps to curtail illegal mining



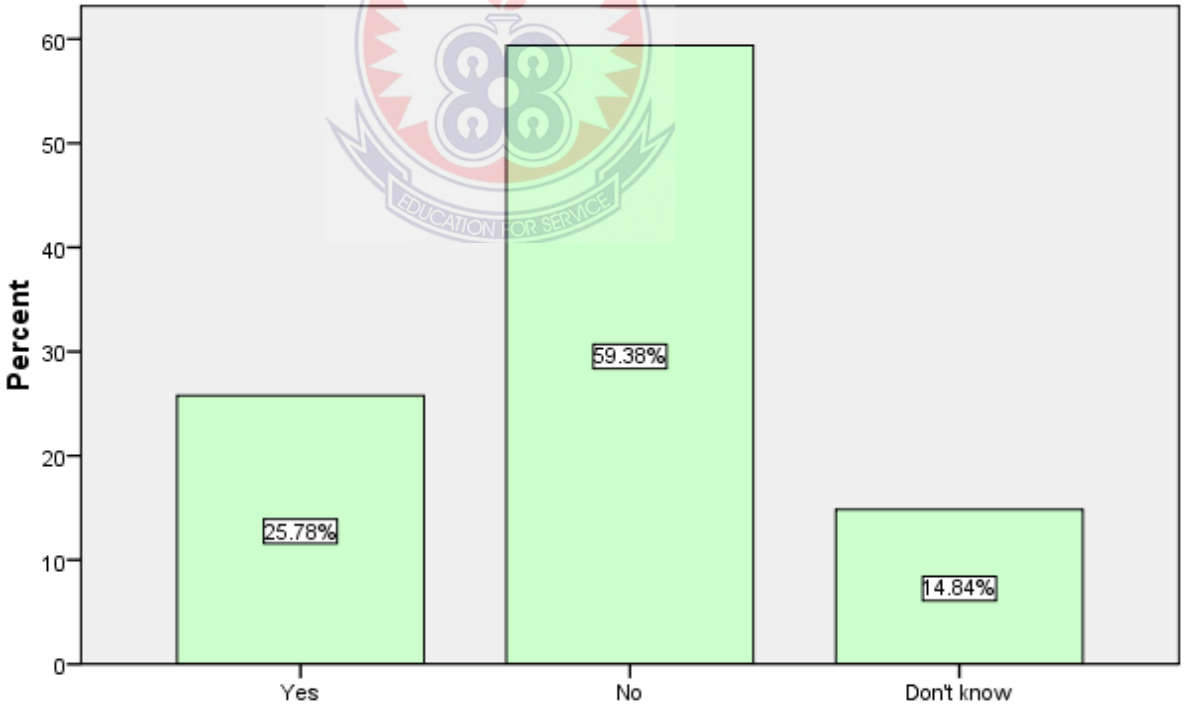
Source: Field survey, 2017.

4.8. Monitoring of Mining Activities by Government Regulatory Bodies

In Ghana, various enactments on management of natural resources have given supervisory and regulatory authority to various institutions to oversee policy formulation and regulation the use and management of mineral and other mineral resources. Institutionally, the Minerals Commission is the main body in charge of regulating mining activities in Ghana. Together with it, the Ghana Chamber of Mines, the Forestry Commission, the Environmental Protection Agency and other Non-Governmental Organizations hold stake in monitoring and regulating mining activities in Ghana. The study sought to determine the presence of these institutions in the communities and assess how they were up to their task. On the contrary, the researcher survey was met with a negative response that regulatory bodies were not doing their work. From figure 4.8, asked if regulatory bodies were monitoring illegal mining activities, 59.38% of respondents said no. Whiles 14.84% said they do not know, only 25.78% actually responded positively indicating that regulatory

bodies were monitoring illegal mining activities. Inhabitants complained that they do not even see such regulatory bodies in the communities in an attempt to regulate mining activities. The few that say monitoring was actually done indicated that it was only police men who sometimes come to chase away illegal miners. However, this was not sustainable according to inhabitants, as in most cases the policemen collected money from illegal miners and allowed them to continue. In fact, the only feel of the presence of a regulatory body in the district was the Mining Desk at the Assembly, whose work according to the Desk officer was frustrated by lack of logistics as well as security threats. The figure below represents the responses on whether regulatory bodies were monitoring illegal mining activities.

Figure 4.8: Showing responses on monitoring of illegal mining activities by regulatory bodies.



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The purpose of the study was to assess the impact of illegal small scale mining (galamsey), and its effects on cocoa production and livelihood. Informed by the data presented and analyzed in the foregoing chapter, this chapter consists of a summary of the key findings of the study. It also comprises the conclusion and recommendations based on the data analyzed on effects of illegal mining on the environment.

5.1 Summary of Findings

The following were the main findings of the study;

5.1.1 The extent to which small scale mining/galamsey affect cocoa

The Amansie West District is highly degraded with the resultant loss of vegetation cover, fertile top soil and wild fauna species as a result of adverse climatic trends and negative factors influencing environmental degradation such as small scale gold mining (Boateng et al, 2014). Desertification and land degradation are two closely interrelated processes. Land degradation refers to the progressive loss of the intrinsic or natural quality of the land and if this process occurs in arid or semi-arid areas, it is called desertification (Boateng et al., 2014). The issue of land sizes comes in when the lands are forcibly taken from farmers and this also has great impact on cocoa yield. Some farmers responded that parts of their lands have been taken. About 30.4% of the farmers had an average of 1-5 ha of their land by *Galamsey* operators, 18.6% of

the farmers also had an average of 6-10 ha taken, 5.9% of the farmers had an average of 11-15 ha taken whiles 3.9% of the farmers had an average of 16-20 ha taken. On the average, about 50 ha of land have been taken from cocoa farmers in the study area by Galamsey *operators*. This affects the outputs which can later translate into loss of income (Livelihood). Economic trees such as *Funtumia elastica* (Ofuntum), *Alstonia boonei* (Nyamedua), *Pycnanthus angolensis* (Otie), *Milicia excelsa* (Odum), *Spathodea campanulata* (Akuakuoninsuo) in the area are also lost through Galamsey (Boateng et al., 2014)

5.1.2 Driving forces of illegal mining

The study identified unemployment as one of the major driving forces of illegal mining. This came to light, upon informal interviews with some miners on site. The activity (illegal mining) is predominantly practiced by job seeking youth who are displaced of their source of livelihood. Mining and mineral exploration activities have displaced hundreds of thousands of rural dwellers; farmlands and rangelands on which they have long subsisted have been demarcated mining concessionaires. Unable to find employment elsewhere, many of the displaced have taken up employment as small scale miners (ILO, 1999; Andrew, 2003).

Poverty was yet another factor identified as contributing to increasing participation in illegal mining as people resort to the activity to earn a living. As observed by Hentschel et al, (2002) small scale mining is a poverty driven activity, practiced in rural areas of a country by low income, unskilled, poorly educated populace with few employment alternatives.

5.1.3 Decline in the source of livelihood in mining communities

For many rural communities, life turns around the major economic activity of agriculture. The study area was predominantly an agricultural community as shown by data on occupation of respondents. Inhabitants hitherto engaged in farming on both subsistence scale and commercial large scales. Interactions with inhabitants showed that agriculture is now a sidelined activity. It was common practice in the five communities surveyed to clear acres of cocoa farms and oil palm plantations to make way for mining. Apart from scarcity of land for agricultural purposes, lands available for such purposes have been ripped off their fertility. Hitherto mining activities, the Amansie West District served as an agricultural hub, supplying the regional capital, Kumasi with food stuff. With the advent of illegal mining activities, the reverse was the situation the researcher found out in the five communities surveyed, where inhabitants now buy food stuffs from Kumasi.

5.1.5 Effects of illegal mining on the environment

Mining irrespective of scale of operation has some degree of impact on the environment depending on the mining and processing methods used. Though small scale mining generally impacts on the environment, the effects are much more exacerbated by illegal small scale mining which accounts for the most significant share of environmental damage in the mining sector (Aryee et al, 2003). The study established the environmental effects of illegal mining in the following dimensions;

i. *Land degradation:* this according to Gyasi et al (2006) is the progressive loss of the intrinsic or natural quality of land. The activities of illegal small scale mining in the Amansie West District with evidence from five selected communities, have resulted in land degradation through loss of vegetation and

soil erosion; rendering affected lands less valuable in terms of their economic value. The Amansie West district was found to be highly degraded with resultant loss of fertile topsoil, changes in topography, visual obstruction and pits and piles of excavated soil.

ii. *Deforestation and desertification:* unregulated activities by illegal small scale miners in the Amansie West district has led to clearing of large tracts of forest cover, overturning of the vegetation leading to a change from dense to light vegetation cover. Consequently, mining communities in the Amansie West district are characterized by excessive deforestation and desertification.

Water pollution: findings from the study suggest that rivers and streams which hitherto served as source of water for drinking and other domestic purposes can no longer be used for such purposes owing to the activities of illegal mining. Resultant effects of illegal small scale mining activities on water bodies include;

- Bad taste of water
- Discoloration of water i.e. water in most water bodies including streams and rivers are now milky brown in colour.
- Drying up of water bodies
- Changes in drainage patterns including narrowing river courses
- Siltation and increased sediment loads in rivers.
- Contamination of water and reduction in fresh water quality by direct release or surface run off of poisonous chemicals into water bodies such as cyanide and mercury.

5.2 Conclusion

This study considered the perception of cocoa farmers on the impact of illegal small scale mining on cocoa production in the Amansie West District. The study established that most cocoa farmers are aware of *Galamsey* and its multiple effects on their farming activities. Despite, efforts made by government and stakeholders have been very minimal in sensitizing and educating the youth and the farmers on the risk involved in *Galamsey*. It is noted that illegal small scale mining (*Galamsey*) has really been the major factor which has affected the production of cocoa due to land degradation, water and air pollution, diversion of water bodies, damages to farm and farm houses etc.

After a careful assessment of illegal mining activities in the Amansie West District, the researcher came to the conclusion that small scale mining is a major contributor to GDP in Ghana as well as a source of livelihood for many mining community dwellers. However, the unregulated activities of illegal small scale mining operations are unsustainable, environmentally unfriendly and have left several traces of environmental pollution in mining communities for them to battle with. Thus while mining generally is not bad, from the sustainability school of thought, the question to ask is if an ounce of gold is worth the thousands of lives and hectors of forest, vegetation and land that are lost in lieu of gold. The answer lies in streamlining of operations, training, and application of technology and policy development by the government of Ghana to reduce the negative environmental impact of galamsey so as to boost investment, create jobs and also support initiatives at sustained community and environmental development. The truth being that galamsey cannot be banned or

discarded unless government take strict measures against the perpetrators of such act which is inimical to the livelihood of the people in the district.

5.3 Recommendations

The study therefore concludes with some recommendations which are directed at helping reduce illegal mining and its associated environmental effects. It is the researcher hope that these recommendations, if implemented, will contribute significantly to handling the menace created by illegal small scale mining.

Making cocoa farming very attractive to the youth and existing farmers

Research has confirmed that most cocoa farmers are aging; with an average cocoa farmer attaining 55 years, the situation has implications for sustaining cocoa production since they cannot channel sufficient energies and resources into production (Essabra-Mensah, 2016). This has generated emergency drastic interventions aimed at encouraging more youth to venture into cocoa farming and become the next generation of farmers to sustain cocoa production. It is as well to encourage more rural folk, unemployed graduates and corporate youth into the cocoa business and become the next generation of cocoa farmers in the country. These recommendations are;

Increased effort by government and all stakeholders

The worrying issue is that statements on the adverse effects of illegal mining have not yielded the results we expect as the 'galamsey' menace continues to plague many communities. The time has come for more decisive action to be taken by all to confront the 'galamsey' issue head-on. This is particularly important if the country is to achieve some of the goals outlined in the Sustainable Development Goals (SDGs)

which replaced the MDGs in September 2015. The SDG framework outlines 17 goals which the UN hopes nations of the world can achieve by 2030. For instance, goals 6, 11 and 13 focus on clean water and sanitation, sustainable cities and communities, and climate action respectively but how can these goals be achieved by 2030 if the wanton destruction of the environment is allowed to continue through the activities of 'galamsey' operators?

Regularization of illegal small scale mining operators

Data points to the fact that the environmental effects of formal small scale mining can be minimized through environmental permitting and monitoring. On the contrary, illegal small scale mining poses the most threat to the environment since people engaged in illegal mining operate without license and are not subject to regulation under any legal framework. The researcher suggests that conscious efforts be made to identify and regularize small scale miners who operate without license. By so doing, such small scale miners are brought under a regulatory framework by which they are bound by the laws and regulations of mining, based on which the state can expedite legal action on flouters of such laws and regulations.

1. *Subsidies on and simplification of the process of obtaining small scale mining license:* The inability of mining laws and regulations to bite has been attributed to several factors. One of such reasons is that the process of obtaining small-scale mining licenses is tedious. It involves several trips to and from various state agencies like the Minerals Commission, Environmental Protection Agency etc. It also requires the completion of several forms and final approval from governmental authorities. Applicants must also meet a number of criteria and be subjected to some restrictions. The process, overall, is largely cumbersome and cost

intensive, which is why most of the countries peasant small-scale miners who this law was supposed to aid, tend to operate outside the law as Galamsey operators. In the researcher view, whiles regularization will minimize miners who are already operating illegally, simplifying the bureaucracies in obtaining a mining license as well as subsidizing the cost will serve as an incentive for prospective mining operators to legalize their operations. Again, whiles the state may not want to lose substantial revenue by granting subsidies, the state could make use of agglomeration economics by which licenses are granted to groups of small scale miners. This approach is relatively cheaper compared to granting mining license to individuals.

2. Land reclamation: Together with professionals in land reclamation, the District Assembly can embark on land reclamation exercises which have the potential of putting degraded lands back to a state in which they can once more be used for agricultural and construction purposes. This would involve the refilling of the exposed mined pits and trenches as well as the application of organic and inorganic fertilizers to regain the soil fertility. Furthermore, tree planting exercise could be adopted after refilling to give cover to the exposed land. In order to get the resources to finance the project, the Assembly can collaborate with the various affected communities and if possible to levy them in order to get some financial assistance. This can be done in the short term to mobilize funds. In the long term, it is suggested that, it should be considered in the registration of the small scale miners that an amount would be paid by the miners towards land reclamation exercise.

3. Bottom-up approach in mining policy formulation, monitoring and regulation: non-involvement of the people who are to be affected by a policy has often led to best laws and policies failing to achieve their objective. It is the case in the mining sector that, most policies are made at top level for implementation without

involvement of the local people. Such policies often fail as indigenes see them as an imposition and are not committed to supporting the course of such policies. As a move away from top-down approach to bottom-up approach, the researcher suggests a representation of chiefs and elders in the mining licensing process rather than as it is the case now, merely serving them with notice of grant of concession or mining license. Government should engage in dialogues with illegal small scale miners and community leaders on the way forward rather than unsustainable approach of using military and police to ban illegal mining.

4. Staffing and provision of logistics to mining regulatory agencies: data for the purpose of this study equally points to the fact that agencies that are charged with the responsibility of monitoring and regulating mining activities have failed in their supervisory and monitoring roles apparently due to lack of staff and logistics. Such agencies, including the Environmental Protection Agency and the Minerals Commission, the researcher suggests be equipped with the necessary logistics and staff to support the execution of their supervisory mandate. Again, efforts should be made at decentralizing such agencies to the district level where they will be closer to the people affected by illegal mining activities.

5. *Community sensitization on the environmental implications of illegal small scale mining:* knowledge of small scale mining in most rural communities where the activity is dominant is only limited to the economic gains that comes with it without recourse to the associated environmental effects. Illegal mining operators as well as communities in which these operations take place are ignorant about the effects of illegal mining activities on the environment and hence do not take any sustainable measures to protect the environment. It is the researcher view that if the public is educated on the effects of illegal mining on the environment, concepts of

sustainability and green practices; it will help minimize the effects that come with illegal mining.

6. *Job creation and training:* unemployment stands out as one of the driving forces of increasing participation in illegal small scale mining. Thus many rely on illegal mining to earn a living. Policy directives by the state towards job creation, alternative livelihood projects and entrepreneurial training including snail farming, fish farming, livestock rearing, soap making, gari processing and bread baking could help reduce the number participants in illegal small scale mining.

7. *Provision of additional boreholes and wells:* From the survey, it was realized that a lot of the communities used to rely on the rivers and streams for their water supply. It is these water bodies that have been contaminated. It is suggested that, more bore holes and wells should be constructed as a sigh of relief to affected communities as what they have are inadequate and some are have even broken down.

5.4 Suggestions for Further Studies

The study assessed the impact of illegal mining (Galamsey) on cocoa production and livelihood, a case study of Amansie West District. Future studies could be conducted in abroader area other a single district to give a general overview on the menace of *Galamsey* activities in Ghana.

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APPENDIX A

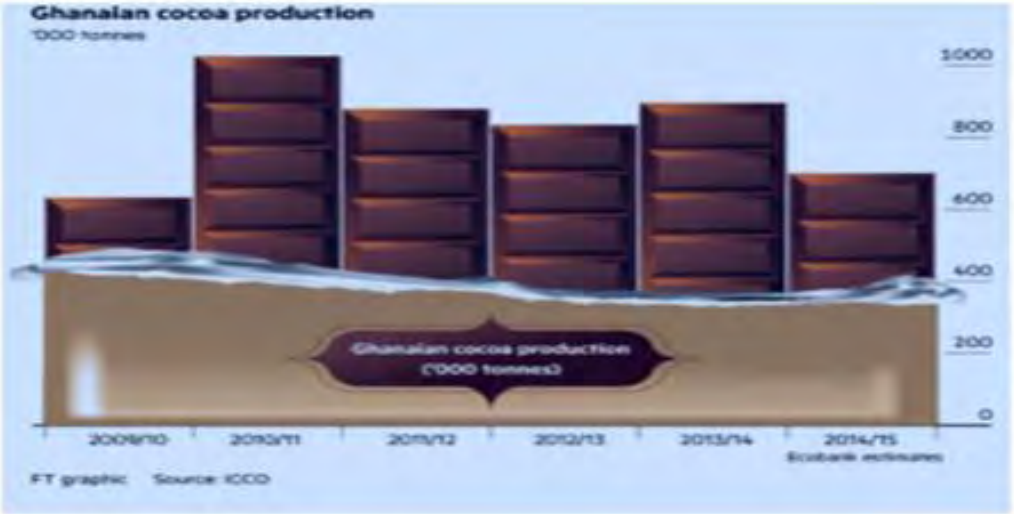
Destructive Nature of Galamsey on Ecology (Cocoa farms & farm Lands)

Source: Researcher's Field Survey, 2017

Pollution of Water Bodies

Source: Researcher Field Work, 2017

The Decline of the Ghana Cocoa Industry



Source: Ghana Business News (GBN) – June, 2015

APPENDIX B

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI
UNIVERSITY OF EDUCATION WINNEBA
DEPARTMENT OF MANAGEMENT STUDIES
MBA (HUMAN RESOURCE MANAGEMENT) PROGRAMME
QUESTIONNAIRE TOPIC: *Effects of illegal small scale mining on cocoa production and livelihood; case study of selected communities in the Amansie West District*

QUESTIONNAIRE

Please fill blank spaces where appropriate. Where boxes have been provided, please tick the ones that apply. NB: You may tick more than one option where appropriate. The information you provide will solely be used for academic purpose

1. Name of your community? .....
2. How long have you been living in the community? .....
3. What is your occupation?

A. Cocoa farmer [ ] B. Trader [ ] C. Galamsey operator [ ] D. Civil Servant [ ]

Section B: Effects of Illegal Small Scale Mining Activities on Cocoa Production

4. Do you have any idea about mining activities in this town/village? Yes [ ] No [ ]
5. If yes, what method(s) of extraction is/are used by the galamsey/mining operators?

A. Surface Mining [ ] B. Underground Mining [ ] C. Dredging
D. Alluvia mining

6. Do you think the methods of operation by illegal miners (galamsey operators) have some effects on the natural environment and cocoa production?

Yes [ ] No [ ] uncertain [ ]

7. If yes, what are some of the effects? A. Degradation of land and vegetation [ ] B. Water pollution [ ] C. Air pollution [ ] D. Noise pollution [ ] E. Decline in cocoa production F. Other, please specify……..
…….

8. Comment on the following activities in your community by ticking **Yes** or **No** in the table below;

Activity	Yes	No
Gradual extinction of some plant species		
Extinction of plant species (cocoa)		
Change from dense to light vegetation cover		
Drying up of water bodies		
Reduction of cocoa production		
Mass deforestation		

9. Would you attribute your responses in 9 above to illegal mining activities?

A. Yes [ ] B. No [ ]

10. What cause(s) pollution (of any sort as chosen in Q7 above) on the environment?

A. Presence of tailing dumps [ ] B. Use of toxic materials [ ] C. Use of heavy machines [ ] D. Clearing of Vegetation [ ] E. Long period of extraction [ ]

F. Failure to refill extraction sites [ ] G. Others, please specify

……..

11. Which operations of galamsey/illegal mining do affect the community and cocoa lands the most?

A. Waste Disposal [ ] B. Excavation [ ] C. Exploration

[ ] D. Blasting activities [ ] E. Clearing of vegetation [ ]

12. On a scale of 1 to 5 grade the effect of the activities in 11 above on the following; Where 1, is the lowest grade and 5 is the highest.

	1	2	3	4	5
Vegetation					
Landscape					
Cocoa production					

13. How does the mining activities in 11 above affect the following:

i. Cocoa production

……

……

……

ii. Water and Vegetation;

……

……

……

……

……

iii. Landscape;

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……

14. In your opinion, how would you describe illegal mining activities in the community? A. Adverse [ ] B. Beneficial [ ]

Section C: Source of Livelihood and How it Boosts Economic Activity in the Area

15. What is/are the main source(s) of livelihood in your community

A. Cocoa farming [ ] B. Galamsey [ ] C. Official work [ ] D. Any other [ ]

16. Have you noticed any changes in the source of livelihood in the community? A. Yes [ ] B. No [ ]

17. Which of these changes have you noticed in the source of livelihood?

A. Change from farming to galamsey [ ]

B. Change from official works to galamsey [ ]

C. Change from galamsey to farming [ ]

D. Others, specify…….

18. Will you attribute such change(s) to the operations of the galamsey/illegal mining?

A. Yes [ ] B. No [ ] C. Uncertain [ ]

Section D: The Effects of the Illegal Small Scale Mining Activities on the Livelihoods of the Communities in the District

19. Has the community taken any steps to reduce or curtail the adverse environmental effects of illegal mining activities in the community? Yes [ ] No [ ] Don‘t know [ ]

20. If **Yes**, what were some of the steps taken?

……

……

……

……

……

21. Have the measures stated in 19 above yielded any positive results? Yes [ ] No [ ]

21. What were some of the positive outcomes of the steps taken in 19 above……

……..……

……..

22. Do you have any idea of agencies or organizations that hold stake in monitoring, regulating and addressing mining activities in the community?

A. Yes [ ] B. No [ ] C. Don‘t know [ ]

23. If yes, what are some of them? A. EPA [ ] B. Chamber of Mines [ ] C. Ghana Minerals Commission [ ] NGO‘s E. District Assembly [ ] F. Cocobod [ ]

24. Do you often hear of any of the above organization‘s activities relating to mining activities in the town? A. Yes [ ] B. No [ ] C. uncertain [ ]

25. If yes, which of them do you usually hear of?

A. EPA [ ] B. Chamber of Mines [ ] C. Ghana Minerals Commission [ ]

D. NGO‘s [ ] (Name: ……..)

E. District Assembly [ ]

F. Cocobod [ ]

26. What basically do these organizations come to do in the community in relation to mining and cocoa production?

……

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……

27. What would you suggest as measures of reducing illegal mining activities in your community?

……

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……

……

Thank you

APPENDIX C

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI
UNIVERSITY OF EDUCATION WINNEBA
DEPARTMENT OF MANAGEMENT STUDIES
MBA (HUMAN RESOURCE MANAGEMENT) PROGRAMME

TOPIC: ***Effects of illegal small scale mining on cocoa production; case study of selected communities in the Amansie West District***

QUESTIONNAIRE FOR AMANSIE WEST DISTRICT ASSEMBLY

Please fill in blank spaces or thick where applicable. ***NB: You may tick more than one option where appropriate.***

1. Department/Position……
2. Do you have any idea about illegal mining activities in this district?

Yes [ ] No [ ]

3. How did the illegal mining activities come to your notice?

A. Complains by inhabitants [ ] B. Observation [ ] C. Complains by other regulating authorities [ ] C. Other, specify……

4. What method(s) of extraction is/are used by the illegal mining operators A. Surface Mining [ ] B. Underground Mining [ ] C. Dredging [ ] D. Other, specify…….
5. Do you think the methods of operation by illegal miners have some effects on the natural environment? Yes [ ] No [ ]
6. If yes, what are some of the effects?

A. Degradation of land and vegetation [ ] B. Water pollution [ ] C. Air pollution [ ] D. Noise pollution [ ] E. Other, specify ……

7. Has the Assembly made attempts to reduce or curtail the adverse effects of illegal small scale mining activities? A. Yes [ ] B. No [ ]

8. If yes, what are some of the measures being undertaken?

……

……

……

……

……

……

9. Have the measures stated in 8 above yielded any positive results? Yes [ ] No [ ]

10. What were some of the positive outcomes of the steps taken in 8 above……

……..…….

……

……

11. How is the District Assembly's relationship with other regulating authorities of mining activities?

A. Very cordial [ ]

B. Cordial [ ]

C. Satisfactory [ ]

D. Bad [ ]

E. Very Bad [ ]

12. Are the following Agencies/ Organizations monitoring and assessing the environmental impacts of mining activities in this District?

A. COCOBOD Yes [ ] No [ ]

B. EPA Yes [ ] No [ ]

C. Ghana Chamber of Mines Yes [ ] No [ ]

D. Ghana Minerals Commission Yes [ ] No [ ]

E. Lands and Forestry Commission Yes [ ] No [ ]

F. NGOs Yes [ ] No [ ]

13. Which of these agencies/organizations are very active? (Tick all that apply)

A. COCOBOD [ ]

B. EPA [ ]

C. Chamber of Mines [ ]

D. Ghana Minerals Commission [ ]

E. Lands and Forestry Commission [ ]

F. NGO's (Name: ……)

14. Would you say that these (any of them) agencies and organizations are doing well in monitoring and assessing mining activities in the district? Yes [ ] No [ ]

15. Give reasons for your answer in 13 above;

……

……

……

……

16. What would you suggest as ways of reducing illegal mining activities in the District?

……

……

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……

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……

……

Thank you

APPENDIX D

College of Technology Education, Kumasi

University of Education, Winneba.

P. O. Box, 1277, Kumasi.

January 1, 2017

The Operations manager,

The Ghana Cocoa Board (COCOBOD)

Accra.

Dear sir,

REQUEST ON THE TREND IN COCOA PRODUCTION AND SALE IN GHANA

I am final year student of the University of Education, Winneba and researching on the impact of illegal mining/galamsey on cocoa production as part of the fulfilment for the award of Masters of Business Administration and contribute to the knowledge base of the society.

I would therefore be glad if your outfit could provide me with the trend of cocoa production since the early 90's till date. The information that would be obtained shall be used to assess whether illegal mining practices affect cocoa production and livelihood.

The research is purely academic and any information provided shall be treated as confidential.

Thank you

Yours faithfully

……

Agyei Anthony