Small-scale Mining and its impact on Rural Livelihoods and Health in Prestea, Ghana.

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Dedication

This thesis is dedicated to my wife; Queensley Eduful Gyan and my newborn son Lemuel Nyamekye Gyan and to all my siblings and parents. I really appreciate your prayers and support. God richly bless you all.

Secondly, to my academic supervisor Associate Professor Dageid Wenche, what else can I say, thank you for your help, advice, feedback and comments. You have made me a better person in the field of academia.

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List of Abbreviations

PMMC - Precious Mineral Marketing Corporation

DMC - Diamond Marketing Corporation

NPP - New Patriotic Party

EPA - Environmental Protection Agencies

WHO - World Health Organization

NGO - Non-governmental Organization

FGD - Focus group discussion

Abstract

Background: This study explores small-scale gold mining and its impact on the livelihoods and health of miners and community members in Prestea, Ghana. Small-scale mining has served as a source of livelihood for many people in Ghana and Prestea is no exception. The activity is mostly operated on an informal basis, and most of its operations are illegal. Earlier studies on small-scale mining have mostly focused on its impacts on the environment and vegetation. The socio-economic factors that first prompt miners to engaging in the activity as well as its impacts on health and livelihood of people seldom feature in mining related research.

Research objectives: The main objective of the study was to examine why people engage in small-scale mining and the extent to which small-scale mining have impacts on the health and livelihoods of miners and individuals in the Prestea mining community

Data materials and methods: Drawing on a two months qualitative fieldwork in Prestea, this qualitative study used interviews and focus group discussions to gather data to answer the study's overarching research questions. The 26 participants included small-scale miners, community members and stakeholder officials (people from the Lands Commission, Minerals Commission and the Prestea government hospital).

Findings of the study: In this thesis, I show that a combination of factors (economic and social) operate together to explain why people decide to engage in small-scale mining. The research found that people engage in small-scale mining because of poverty, unemployment, it requiring less skills, no or less capital and equipment, destruction of farmlands, unproductive farmlands and loss of farmlands. In addition, the procedures, amount and time frame to be granted a mining concession discourages people and make them cut corners to mine illegally. Also, I show that most people in Prestea decide to engage in small-scale gold mining in order to get rich 'overnight'.

Small-scale mining has resulted in the improvement of standard of living of miners. However, it has had negative impact environmentally in terms of polluting water bodies, destroying vegetation and farmlands that serve as sources of livelihood for people.

In addition, my study elucidates the health impact of small-scale mining in Prestea. Miners experience body pains, headache, injuries, eye problems, hearing problems, malaria, kidney and lungs problems and sometimes death whereas its impact on community members are reported to be malaria, cholera, diarrhea, skin related diseases and sometimes loss of lives.

Using the social determinants of health framework, I show the socio-economic conditions that surround miners and community members in Prestea, which affect their livelihood, health and wellbeing.

Conclusion: Using the social determinants of health framework, I show that several people in Prestea have created their own means of earning a livelihood even though most of their operations and activities are considered illegal. This have resulted in negative practices that have affected the livelihoods as well as the health and wellbeing of people in Prestea.

Keywords: Small-scale mining, livelihood, health, wellbeing, Prestea, Ghana.

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

Introduction

Ghana continues to be a 'hot-spot' of mineral resource extraction (for example gold, bauxite, and diamonds) by small-scale miners in West Africa. Small-scale mining is a term used to describe mining activities that use simple methods (e.g. picks, chisels, shovels, sluices and head pans) to extract and process minerals on a small scale (Hilson, 2009; Shoko & Love, 2005). A labour force mostly not formally trained characterizes it and its operations are usually informal and sometimes illegal (Hilson, 2009). In Ghana, small-scale gold mining is a major economic activity for some people. It is an activity that has contributed not only to wealth creation but has also provided an avenue of employment and forms an important source of livelihood for many people (Awudi, 2002; Mensah & Okyere, 2014). It has attracted about one million people with almost 4.5 million people depending on miners for a living (Mensah & Okyere, 2014). Even though it is one of the sector contributing significantly to the economy of Ghana, contributing about 35% of the total gold production of Ghana in 2014, the majority of the people who engage in small-scale gold mining operate illegally or informally without a government concession (Mensah & Okyere, 2014).

Research in the mining sector has often focused on livelihoods and development impacts which capture the extent to which mining is contributing to changes in economic, political and environmental conditions (Horsley, Prout, Tonts, & Ali, 2015), as well as environmental problems such as water pollution (Agyemang, 2012; Ravengai, Love, Mabvira-Meck, Musiwa, & Moyce, 2005; Shoko & Love, 2005). These researches have led to policy guidelines and laws to regulate the sector effectively in order to reduce negative impacts whilst maximizing development potentials both in Ghana and internationally. This has been an important step in mining research foci in Ghana but there still remain important research gaps. There is limited scientific research investigating the impacts of small-scale mining activities on the health and livelihood of the miners themselves as well as the wellbeing and livelihood of the communities within which small-scale mining takes place in Ghana. This study therefore aims at investigating the impact of small-scale mining on miners and their communities in a particular area in Ghana; Prestea, where mining is prevalent.

Overview of mining activities in Ghana

Ghana is located on the West Coast of Africa. It shares borders with Ivory Coast to the West, Gulf of Guinea to the south, Burkina Faso to the north and Togo to the east. It now has sixteen

administrative regions with an estimated population of about twenty-eight million people (National Population Council Ghana, 2018). Ghana has a total land area of 238, 53 kilometre square: 227, 533 square kilometre constitute land with water covering a land size of 11, 000 square kilometre (The World Fact Book, 2011). Agricultural production is the backbone of the country. The country is also well endowed with natural mineral resources such as gold, bauxite timber, manganese and oil. Mineral resources also constitute a major revenue generator for the nation thereby driving many people to engage in mining. Mining activities in Ghana can be categorized as either small-scale mining or large-scale mining. Large-scale mining mainly consists of using mechanized tools and equipment such as tractors, drillers, and so forth in mining. It is mostly contracted to foreign nationals as the main actors and mining is done on a large scale. Small-scale mining on the other hand do not require mechanized tools. It also requires less capital investment and is strictly restricted to Ghanaians by law (Hilson & Clifford, 2010; Kumah, 2006). It is an activity undertaken by small artisans either individually or in a group. The dominant method of mining for small-scale miners is surface mining.

How small-scale mining is carried out

Small-scale mining starts with rudimentary tools such as picks, axes, shovels and sluice boxes. At times water pumps and "Chinese chanfa machines"[1] are also used in the production. The picks, axes, shovels are used in excavating the land. After excavation, the ore is obtained which is mixed with gravels or sand. It is then crushed into smaller pieces either with a hammer or a machine. The grinded particles then go through series of processes of grinding which is then washed afterwards. The grinded pebbles are then carried in sacks or cloth bags to the place of washing (either the riverside or a manmade pool) to be washed either with machine or at times by the hand to separate the gold from the stones. Mercury is then used to pan the gold from the stones.

Legislations and Policies on Small-scale or Small-scale mining in Ghana

Before the 1980's, small-scale mining which is locally known in Ghana as "galamsey[2]" was considered illegal and highly unregulated. The activity was considered to be under the informal sector because government institutions were not in place to monitor and control the activities of people who engaged in small-scale mining (Hilson & Clifford, 2010; Kumah, 2006). This attracted many people into small-scale mining (Aryee, Ntibery, & Atorkui, 2003). With the

[1] a machine popularly used by Chinese in grinding the stones and soil to bring out the gold in mining

[2] Which means 'gather' and 'sell'

activity serving as a major source of livelihood for people and also being unregulated, the government of Ghana from the 1980s decided to regularize small-scale mining. Institutions and ministries were created and given the mandate to monitor the operations and activities of small-scale mining in Ghana (Aryee et al., 2003). Institutions such as the Minerals Commission, Lands Commission and the Environment Protection Agencies were created. This led to the enactment of several legislations. Laws and legislations such as the Ghana Mineral's and Mining act of 1986 (PNDC law 153), the small-scale Gold Mining Law of 1989 (PNDC Law 218) and the PNDC Law 219 governed the institutions (Aryee et al., 2003). Under the Ghana Mineral's and Mining act of 1986 (PNDC law 153), all minerals in the country are the property of the republic of Ghana (Aryee et al., 2003). The small-scale Gold Mining Law of 1989 (PNDC Law 218) was also enacted for people to have the mandate to legally mine in the country (Aryee et al., 2003). This was however, restricted to only Ghanaians and excluded foreign nationals from engaging in small-scale mining. The law notes that, anybody who would want to engage in small-scale mining should register with the Minerals Commission. The Minerals Commission then assigns your area of operation and the limit or boundary to your concession. One is then given a legal concession or permission to mine. Any mining activity that does not go through such a process is regarded as illegal (ibid). Under the PNDC Law 219, an institution was created and mandated to be solely responsible for buying and selling gold. The Precious Mineral Marketing Corporation (PMMC) was mandated as a branch from the Diamond Marketing Corporation (DMC) which was state owned to have the sole authority to sell and buy gold from miners (Aryee et al., 2003). An important law was also passed in relation to the chemicals used in mining operations especially mercury (Aryee et al., 2003). The mercury act under the PNDC Law 218 was enacted in 1989 and aims to control the use of mercury in the mining sector.

Two groups of people have therefore emerged in the small-scale mining sector. Those with concession and those without a concession of which the latter forms the majority (Awumbila & Tsikata, 2007; Hilson, 2001). The majority of people who engage in small scale gold mining activities are unregistered, hence, operate illegally without mining concession. Because their activities are not monitored, mining regulations cannot be enforced and this has led to several environmental, livelihood and health related problems.

Why Prestea District as my research setting?

Prestea is one of the districts situated in the Prestea-Huni Valley Municipal in the Western Region of Ghana. It has an estimated total land area of 1,809 square km with about 159,304

people according to 2010 population and housing census (80,493 males and 78,811 females) (Ghana Statistical Service, 2010). Prestea shares boundaries with Amenfi West Municipal to the west, Amenfi East Municipal and Amenfi Central Districts in the north, Mpohor District to the east and Tarkwa Nsuaem Municipality to the south. It is situated within the wettest part of the country and records a rainfall averagely 150m to 180m annually. During the rainy season, between March to early August, rainfall can reach 200m. The district has a thick vegetation cover. Prestea district boasts of rich deposits of mineral sources such as gold, bauxite, diamond and manganese. It is also mainly an agricultural zone with about 70% of its people engaging in agricultural production (Ghana Statistical Service, 2010). Agricultural production is mostly not mechanized. Rudimentary tools and methods are used in its production.

Prestea has witnessed the activities and operations of small-scale mining for decades. Like many other districts and regions in the country, the activity has caused deleterious environmental and socio-economic impacts altering the environmental composition, and structural composition of the district. Major minerals in the district include gold, bauxite, diamond and manganese. However, gold is mostly mined in the district. Mining in the region is predominantly on a small scale with most people operating illegally and using rudimentary tools in their mining operations. Small-scale mining in the district mostly consist of indigenes operators who have no other source of living, have no or little education and have little chance of being employed in the formal sector.

The dramatic nature of small-scale mining operations in Ghana caught the attention of the media, government agencies, local and international pressure groups due to their operations destroying several water bodies and causing serious environmental problems (Agyemang, 2012). Therefore, the New Patriotic Party (NPP) presidential candidate in 2016 elections pledged to regularize the operations in the country if elected into power. After his election to power in January 2017, the President has set up a task force to eliminate illegal and inappropriate mining operations in Ghana. Despite the fact that the government has set up a task force to eliminate illegal mining practices, people still engage in the activity for their livelihood.

This study thus seeks to examine why people engage in small-scale mining looking at the nature of the work as discussed above, mining practices and the extent to which these have impacts on the health and livelihoods of miners and individuals in the Prestea mining community.

Brief description of thesis structure

In chapter one, I have presented the background of the study, the chosen topic and why I chose Prestea as my research setting. In addition, I have explained why the activity is on the political agenda, how the activity began and the various legislations and rules governing small-scale mining in Ghana.

In chapter two, I situate my work within the Social determinants of health framework. I also explain key theoretical concepts and indicate how the theory will be employed in my empirical analysis.

Chapter three focuses on literature review. I also show how there is a gap in knowledge of the phenomenon under study, hence, the relevance of my study. The chapter also includes the problem statement and the research questions of the study.

Chapter four presents the epistemological foundation of the study, the research design employed and the research methods I used in exploring the small-scale mining phenomenon in Prestea. Ethical issues are also explained in this chapter.

Chapter five explores and presents the empirical findings of the study. It shows why people engage in small-scale mining, its impact on the livelihood of people as well as its health impact on both miners and the community.

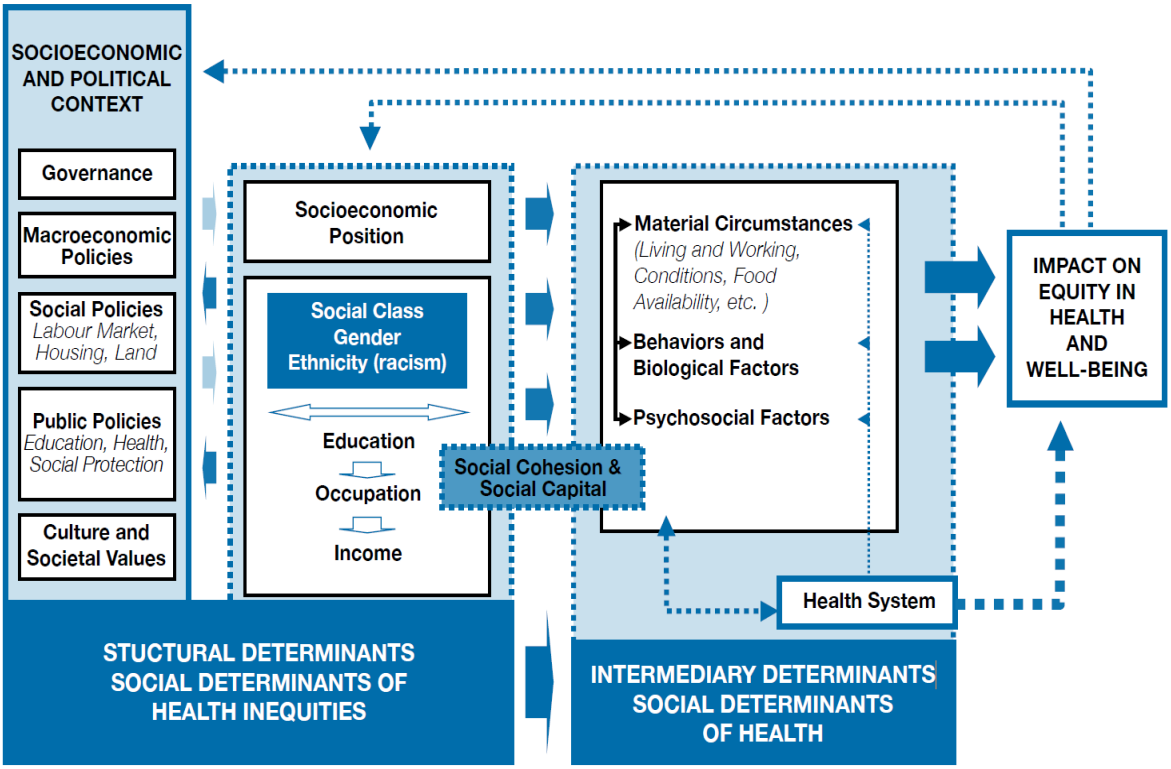
Chapter six discusses the empirical findings in chapter five, shows connection with previous research done and how it fits with the theoretical framework of the study.

Chapter seven is the last chapter. It concludes the findings and discussions by emphasizing contributions to existing knowledge. Recommendations and possibilities of future research are mentioned.

CHAPTER TWO: THEORETICAL FRAMEWORK

In this chapter, I discuss the conceptual framework social determinants of health (WHO, 2008, 2010), its nature, how it is being used in addressing several socio-economic factors that influence the livelihood position of people and how these determinants are important in explaining the health situations, behaviour and general wellbeing of miners and community members in Prestea, Ghana.

figure 1



Source: (WHO, 2010) The Social Determinants of Health Framework

The above framework takes as its starting point that a variety of factors constitute positively or negatively towards the health and wellbeing of an individual. Whiles some are noted to be fixed; genetic or biological (WHO, 2009; Wilkinson & Marmot, 2003) others are said to arise from social and economic conditions that surround us, hence are not fixed in nature. There is an increasing attention to these 'non-fixed' factors that influence our health and wellbeing. These factors and influences have become known as the social determinants of health. Social determinants of health are '*the conditions in which people are born, grow, live, work and age, including the health system. These circumstances are shaped by the distribution of money,*

power and resources at global, national and local levels, which are themselves influenced by policy choices' (WHO, 2010).

The social determinants of health framework discusses some universally and commonly identified determinants that impact on the health and wellbeing of people. These include policies, education, employment, income, occupation (working conditions) and the environment. The framework therefore consists of a range of interacting elements that are key to addressing issues of wellbeing, health and livelihood. These elements are the socio-economic and political context, structural determinants of health and socio-economic position and the intermediary determinants.

Socio-economic and political context

One of the key elements in defining and determining the wellbeing and health of people is attributed to the socio-economic and political context within which an individual finds him or herself. The socio-economic and political context has to do with issues around governance, macro-economic policies, social policies (e.g. land, housing, labour market) and public policies (e.g. education, health, social protection and culture and societal values). It posits that *livelihoods* are shaped by policies, institutions and processes (PIPs) at all levels from local to international and this has a role to play in the wellbeing of people. The socio-economic and political context consist of several indicators or factors that according to the framework cannot be measured directly at the individual level in a society and yet impact on the health and wellbeing of people.

The socio-economic and political context of the framework notes that the unequal distribution of resources and materials that exist within society impact on the lives of people that bring about the attainment of different positions or social hierarchy in a society; e.g. social class, occupational status, income levels of people and the educational attainment or achievements of people.

Structural determinants

As can be seen from the pictorial view of the framework (figure 1), the socioeconomic and political mechanisms explained above give rise to a set of structural mechanisms that are rooted in key institutions and policy-making bodies in a particular society where the population is stratified according to income, education, occupation, social class etcetera. According to the framework, structural determinants refers to 'the interplay that exist between the socio-economic and political context, structural mechanisms generating social stratification and the resulting socio-economic position of individuals' (WHO, 2010) see also (WHO, 2009).

The structural determinants of health consist of variables that affect the socio-economic position in society which affect health and wellbeing directly or indirectly. In the section below, I explain these variables and how they play a role in determining the health situation and the general wellbeing of people and also impact on their livelihoods.

Income

Income is a major determinant of health and can influence health both positively and negatively (Graham, 2004; Lapointe, Ford, & Zumbo, 2007; Mackenbach et al., 2004; WHO, 2009). Positively in the sense that income can improve the living conditions of people because they can afford basic food and services and hence improve upon their wellbeing. On the other hand, it negatively affects people because without an income they cannot afford basic needs (food and services). This means that an individual's income level is key to ensuring his or her health outcome and further contribute to the overall wellbeing of people. In addition to this, the framework sees income as having a 'dose response' effect (WHO, 2008) which is associated with an individual's health in that it influences a wide range of factors or circumstances that have direct and indirect implications on health.

Education

The social determinants of health framework place emphasis on education as being an important determinant of health. Education impacts directly and indirectly on health. It has a direct influence on health in the sense that one's educational attainment impact on health behaviour and indirectly in that it influences other determinants of health such as occupation and income. There are several instances why education and health may be related according to the framework. The first instance is early health problems in life leading to attaining low educational status and the other being lower educational status subsequently influencing health (WHO, 2010). For instance, people's level of education affects their health seeking behaviour which have implications on their overall wellbeing. If someone attain a higher educational level, there is the possibility of the person securing a good job, get paid well and be able to afford health care services (Ross & Mirowsky, 2011; Tremblay et al., 2011). The reverse is the case for people with low educational levels, securing menial jobs and not being able to afford quality health care services with a low income. There is an association between levels of education and other social determinants of health such as employment, income and working conditions. In addition, the higher the educational level of an individual, the higher the possibility of making better informed health decisions such as buying healthy, varied food and affording health care services (WHO, 2008, 2010; Wilkinson & Marmot, 2003).

Social stratification and class

The framework further argues that, the way society is stratified and the position within this stratification also affect the health and wellbeing of people**.** Social stratification from the sociological perspective refers to the arrangement of people or groups in terms of their social hierarchies on a particular ranked order in a society. This can refer to the income level of people, one's educational attainment and so forth. According to WHO (2010), these indicators of social hierarchies play a key role in determining the health and wellbeing of people. Nevertheless, even though these mechanisms are useful in determining or perhaps predicting one's health outcome, they do not reveal the processes and social mechanisms that explains why and how people achieve these economic, political and cultural resources levels. As a reason, the mechanisms by which there is control over these resources in terms of ownership or production is referred to as social class (WHO, 2010). These examples mentioned above also interrelate to bring about health outcomes. For instance, one's educational level may affect a person's occupational opportunities and further impact on his/her income. The effect of education on income is assumed to be mediated mainly through occupation (WHO, 2010). These indicators of the socio-economic and political context known as the structural determinants are mechanisms that bring about social stratification in the societies and define individual's socio-economic position which directly or indirectly affect their health and livelihoods.

Intermediary Determinants

The intermediary determinants focus on issues around material circumstances (e.g. physical environment, housing, financial means to a livelihood), psychosocial circumstances (e.g. stressful living conditions such as high debt, lack of social support, copying lifestyle; negative life events, and job strain), behavioural and biological factors (e.g. age, sex, diet, smoking status) and the health system itself (e.g. issues of availability and access) as determinants of health and also livelihoods.

Work

The type of work people engages in impact on their health status. Stress at the workplace plays a role in contributing to the differences in health situations of people, absence from work and even the death of people (Evans & Kim, 2012; World Health Organization, 2008). The role one plays in his/her working environment is important in determining or impacting on their health. People with demanding roles and little control over their work conditions carry risks which affect health. Hence, the conditions at work are important determinants of health (WHO, 2010).

Unemployment

Unemployment has a negative effect on the health and wellbeing of people. It is a situation where individuals do not have any formal work or job that provides income, which affect their ability to afford quality services for health and livelihoods. People who are unemployed are more likely to have negative health outcomes than people who are employed. People who are employed have the possibility of buying and catering for their health situations. On the other hand, unemployed people may have no earnings and may thus have less chance of affording good health care services or make good health care choices. The psychological consequences associated with unemployment in conjunction with financial problems, such as debt affect the overall health and wellbeing of people (WHO, 2010). According to World Health Organization, (2010), even the insecurity associated with losing one's job is detrimental to one's health.

Poverty

Poverty consists of compounding economic and social circumstances which have adverse health and livelihood outcomes. Social risk factors such as growing up in poverty have been associated with poorer health outcomes because being exposed to multiple social and economic risk factors can have an accumulative effect on health across physical and socio-emotional domains (WHO, 2009, 2010). According to the framework, even though poverty is a root cause to many diseases and sicknesses, its health outcome is not only limited to material, but also psychological and social problems or trauma associated with living in poverty. As a result, people living in poverty risk being socially excluded. The social exclusion of people living in poverty affect their health and overall wellbeing (WHO, 2009).

The social gradient

The social gradient is a key element of the social determinants of health framework. It highlights the nature of health inequalities between different groups of classes in society. As earlier on indicated, differences in people's economic and social position influence their health situations. Individuals on a low social gradient suffer the risk of dangerous illness and premature death (WHO, 2010). Moreover, the effect of the social gradient, is not only restricted to the poor, but cut across all social groups such as the middle and upper class people (WHO, 2010; Wilkinson & Marmot, 2003).

The social gradient points out the unequal distribution of both social and economic resources such as income, education, goods and services as contributing to the disparities in health among people. This suggests that some people have advantage over others in terms of having more

access to health promotion resources than others. The World Health Organization (2008) has noted that people further down the social ladder stand at the risk of negative health outcomes due to certain circumstances they have no control over. According to WHO (2008), such people run at least twice the risk associated with serious illness and even at times pre-mature death as compared to those at the top of the social ladder. Moreover, they further note that in-between the top and bottom of the social ladder, there lies a continuous standard of the social gradient. That is, there are still health disparities even between senior and junior staff. In that case, junior staff are more prone to negative health outcomes than senior staff. This is as a result of the differences in the social and economic status. For example, senior staff are more likely to afford good and better health care because they are mostly paid well than low or junior staff. The differences in their income and standard of living make the differences in their health ratios.

Disadvantages in health outcomes come in several forms and could be relative or absolute (WHO, 2013). For instance, having poor education, few family assets, living in poor housing, trying to bring up a family in difficult circumstances, or having insecure employment. These disadvantages tend to concentrate among the same people, and their effect on health are cumulative.

According to the framework, the duration or period within which people find themselves in such disadvantaged situations have major influences on their health life. This means that, the longer you live in such circumstances, the less likely you are to enjoy a healthy and long life. On the other hand, there would be good health if for instance, educational failures, unemployment, stressful life living, insufficient fund to provide for yourself are reduced.

Addressing the social determinants of health is important for reducing health inequalities and inequities. It helps us to raise awareness about non-medical factors that have direct or indirect influence on our health to promote a fair and equal distribution of goods and services that affect our health.

Moreover, social determinants of health help us to know that things that affect our health or our life are not from a particular or to say ‘one source’ but are rather interconnected.

The theory was relevant to my study and helped in answering my study’s overarching question in that, the socioeconomic context helped in examining social issues, culture and societal values and other mechanisms that surrounds the community and serve as an avenue to impacting on the health and wellbeing of the miners and the community members at large. The structural mechanisms on the other hand helped in exploring the various institutions (for example the

institutions responsible for the processes of granting the mining concession, the educational level of the miners, their social class, and income) and policies that play a role to affecting the decision, choice and activities of the miners which can also affect the overall health and wellbeing of the community. Finally, the intermediary determinants helped in determining or explaining the motivation for engaging in mining as a means of livelihood.

It is now recognized that more attention must be paid to the various factors and processes which either constrain or enhance poor people`s ability to make a living in an economically, ecologically and socially sustainable manner. This perspective therefore helped to bring to bear the real-life situation of the miners and community members and how they conceptualize socio-economic, cultural and political phenomena in relation to their environment. I this thesis, I use the Social Determinants of Health framework to address the connectivity of the various determinants of health in ensuring livelihood and the socio-institutional arrangements that mediate the governance of mining operations and impacts on livelihoods, health and the wellbeing of people. This helped me to examine how mining activities have direct or indirect implications on the health of miners and the community within the catchment area where mining takes place despite interventions made by the current government in Ghana.

CHAPTER THREE: LITERATURE REVIEW

In this section of the thesis, I review relevant literature as to the reasons why people are into illegal small-scale mining, its impact on livelihood and its implication on the health and wellbeing of people. Literature reviewed consist of peer-reviewed articles from various researchers, academic theses and publications from international, governmental and non-governmental organizations. Literature was found online through google search engine and also documents or books available at the University of Bergen's Psychology and Social Sciences library, and the Minerals and Lands Commissions in Prestea, Ghana.

Motivation for engaging in small-scale mining

The majority of people who engage in small-scale mining or minerals extraction are poor (Ghana Action Aid, 2006; World Bank, 2013). These are people who live in poverty and do not have any other paid jobs or source of livelihood. Scholars have also examined why people engage in illegal small-scale mining (Antwi, Boakye-Danquah, Asabere, Takeuchi, & Wiegleb, 2014; Mactaggart, McDermott, Tynan, & Gericke, 2016; Opoku-Ware, 2010; WHO, 2013). These researchers and governmental organizations found that people decide to engage in illegal small-scale mining as a result of poverty. They categorize illegal miners as people who either previously did not have any source of livelihood or people who lived on less than a dollar a day and therefore decide to find an alternative means to their survival, hence the decision to engage in illegal mining. According to Opoku-Ware (2010), poverty predispose people to engage in small-scale mining whether legally or illegally to earn a living.

Related to the issue of poverty is the incident of high unemployment rate in Ghana being a major cause and reason for people to engaging in illegal small-scale mining. About 39 percent of people are unemployed especially in the formal or government sector (Akabzaa T. M., 2009). In a research conducted by Hilson and Clifford (2010) in Akwatia in the eastern region of Ghana on the subject 'once a miner, always a miner', the researchers make it clear in their submission based on the respondents view that, the fact that there are several risk associated with illegal small scale mining and yet people still do it means that, they do that out of necessity. They further argue that even though people are aware of the risk involved in small-scale mining, they have no option because they have no other or paid work to do (Hilson & Clifford, 2010). The majority of their respondents stated unemployment as the main reason why they decided to engage in illegal small-scale mining. Furthermore, in a similar research conducted by Awumbila and Tsikata (2004) in the Talensi-Nabdam District in the northern region of Ghana, the researchers stated that unemployment is the reason why several people in the region take

up the mining activity in concurrence with Hilson's work in 2001. Ghana Action Aid, (2006) and World Bank (2013) have also mentioned lack of jobs as being a major reason that make people decide to do illegal mining.

Another cause of illegal mining activity is loss of farmlands. Dealing with illegal small-scale mining as a threat to food security in Ghana, the researchers Danyo and Osei-Bonsu (2016) emphasized that, the activity has affected a lot of farmers and for that matter productivity. People who usually depended on their farms for survival do not have that opportunity anymore. This is due to the fact that such people have lost their farms (either sold it by themselves or taken away from them by authorities, for example chiefs and the Lands Commission) to mining organizations and companies. Farmlands have therefore turned into mining sites. This is one of the reasons why some famers have diverted to illegal mining activity in Ghana as a way of living, and this is a threat to food security in Ghana (Amponsah-Tawiah & Dartey-Baah, 2011; Danyo & Osei-Bonsu, 2016; Hayes K, 2008).

Another reason why people engage in illegal small-scale mining is poor business performance such as selling of cosmetics, selling of sachet water[3], collapse of some mining companies, car spare parts etcetera. Mining communities and its environs are places where people do petty trading with success (Hilson & Clifford, 2010). Success in the sense that it is an environment where people get 'more' money. However, this is not the case always to some people. In a qualitative research conducted by Hilson (2001), the researcher found that, people with low or poor business performance rely on illegal mining activities to help gather funds to boost their businesses. However, he noted that the majority of such people are people who have migrated to mining communities with smaller proportion being natives themselves in such mining communities. The causes of migration are as a result of unavailability of jobs in their places of origin.

Non-granting of mining concession is another reason for engaging in illegal mining activity. According to Awumbila and Tsikata (2004), some small-scale miners in Ghana are constrained by procedures for acquiring mining licenses and therefore adopt strategies to cut corners to engage in mining without adhering to the laws and regulations governing mining in the country. The procedures and processes involved in the granting of mining concession have been argued to be 'problematic' (Awumbila & Tsikata, 2004). The amount of money and time involved and

[3] a 300ml distilled water packaged in a sachet

the procedures to follow to be granted mining concessions causes people to abandon the whole process and engage in the activity illegally.

The Mineral Commission clearly spells out certain procedures or rules to follow in getting a concession in Ghana. Below are the rules and procedures to follow to be granted a concession.

Rules to follow in getting concession

You need to get a concession of where you want to mine. There should also be a document showing your concession which you must get to show the boundaries of the place. The document must show the locality in which you want to mine, the district and region where the concession is. Surveyors come to pick the limit of your concession as it is on the ground. This is to make sure that you do not go beyond your boundary of operation. You need to register the land or your concession for a license surveyor to endorse your concession before you can carry out your activity.

During this process, anyone who registers the land first and has legal documents of a particular concession is the official owner of that particular land. This is because more than one person can also have interest in one place or concession. Traditional authorities of that area of concession are informed about the concession of land to create the awareness of the particular activity in the area.

Stages you have to go through before the acquisition of a permit

Basically, there are five main stages a firm or an individual have to go through before the issuance of a permit.

***Prospect Stage*:** In this stage individuals or group of people who wants to mine go in search for the land to know where the resource is or are. There is a lease of land in this stage and it applies to all other stages. You need a permit before you can mine from the minerals commission and the Environmental Protection Agencies (EPA).

***Exploration Stage*:** During this stage, the piece of land is drilled to know where the resource can be found on the piece of land.

***Exploitation*:** If the quantity of the mineral is good, you may proceed to harness the resource. It is very important to note that every minerals has its own way of exploitation.

***Development*:** This is when you set up plants, machines, all tools and equipment for exploitation of the mineral. It includes all the necessary requirements including funds and accommodation. In other words, we may say the site set up.

***Reclamation*:** This is the last stage. Any individual or firm has the responsibility of putting the land into shape again after exploiting the resource. It includes filling of pits, planting of trees and any other means to put the land back to its original form or very similar to be used for other activities.

Small-scale mining and its impact on livelihood

Small-scale mining activities have impact on people's lives both positively and negatively. Ezeji Onyebuchi, (2014) for instance revealed in his research conducted in the Wassa Amenfi East District of Ghana that, the impact of illegal small-scale mining is of major concern to government officials, district authorities and the people at large. This is because the activity has destroyed several farmlands that serves as livelihood for people. It has also destroyed the vegetation and rendered the lands unfertile for agricultural purposes because of chemicals miners discharge into farms or chemicals that run through their farms when it rains due to the operations of miners. Madzimure, (2015) in Zimbabwe made a similar observation as the researcher found that the activities of illegal gold miners have caused severe environmental problems such as destroying farmlands and creating trenches that serve as death traps for people. Ezeji Onyebuchi, (2014) discussed both the advantages and disadvantages of engaging in illegal mining. According to the researcher, while most people talk about the disadvantages of illegal mining activities, it is also necessary to shed some light on its positive impact. Among the positive impact or advantages of illegal mining, he noted was the activity creating employment for a large number of people in Ghana. Hilson, (2001), also opined that an estimated 200,000 people are employed into illegal small-scale mining and this contribute to about 60% of the labour force in the mining sector. This is recommendable looking at the level of unemployment rate in the country, he argued.

Also, socially, to some extent, the activity keeps people from engaging in social vices such as armed robbery, prostitution and so forth (Ezeji Onyebuchi, 2014; Mactaggart, McDermott, Tynan, & Whittaker, 2018). The reason being that people can now work within the sector and get something (money) to lean on for their basic needs.

Most importantly, the activity has served as a source of livelihood for not only the miners but also people who depend on them for a livelihood (Agyemang, 2012; Akabzaa T. & Darimani,

2001; Awumbila M and Tsikata D, 2004; Hilson, 2001). More than 80,000 people rely or depend on 'galamsey' operators for a livelihood (Ezeji Onyebuchi, 2014). "Galamsey" therefore has been a source of relief for several people who once were unemployed or dependent on others.

However, having pointed out some advantages of small-scale mining, several researchers have stated that the disadvantages far outweigh the advantages (Agyemang, 2012; Akabzaa T. & Darimani, 2001; Awumbila M and Tsikata D, 2004; Hilson, 2001). Small-scale mining activities have affected the environment and thus the livelihood options of many people who live in such mining communities (Ontoyin & Agyemang, 2014). Even though the current Ghanaian government is making strenuous effort to regularize mining activities, media reports show increased mining activities and the concomitant destruction of water bodies and farmlands in the country (GhanaWeb, 2018). Chemicals used in mining activities run into water bodies that serves as sources of drinking water for people (Mactaggart et al., 2018). In a research conducted by Kwateng (2012) in Akwatia, respondents were asked whether they experienced any form of environmental impact from 'galamsey' activities especially or mining in general. The majority of the respondents had experienced some environmental impact from miners. Only a few of the people answered not being aware of the consequences or impact of mining activities on the environment and some only knew of the impact of mining activities as land and air pollution. The researcher observed that "galamsey" activities had really affected the natural resources in the region especially lands and rivers that serves as source of livelihood for people. In Tarkwa in the western region of Ghana, Akabzaa and Darimani, (2001) also observed that mining activities have destroyed over 70% of the land area, hence destroyed farmlands that serve as a basic source of livelihood of people within such communities. A similar observation has been made in Mali and Zimbabwe that through small-scale mining, there has been numerous farmlands that have been destroyed which served as an income generating livelihood for people (Belem, 2009; Madzimure, 2015).

Activities of small-scale miners have also led to deforestation in mining areas. Surface mining represents a significant threat to the land/forest resources (Abdus-Saleque, 2008; Kwateng, 2012). An important aspect of the removal of forest cover which has often been neglected by the government authorities and community leaders is the extent to which it facilitates the drying up of rivers and streams at these mining sites/communities thereby affecting the overall livelihood and wellbeing of people. Kwateng, (2012) asked respondents whether they see deforestation as a challenge as a result of the mining activities going on in the region. A majority

of the respondents (60%) saw it as a challenge. Based on observation and participants responses, he concluded that indeed mining activities in Akwatia is a threat to the environment and forest reserves. Abdus-Saleque, (2008) notes that mining activity on a smaller scale should be properly planned and its impact being carefully anticipated. That is to say that it is an activity the leads to the destruction of vegetation and renders the vegetation bare. Not only does it have long-term effect, but the extent of its impacts can also be linked to the different stages of the mining process (Gualnam, 2008). These different stages for example beginning with the deposit prospecting and exploration stage, mine development and preparation stage, mine exploration stage and treatment of the mineral itself with each of the mine stages involving specific environmental impact. Abdus-Saleque, (2008) further notes that even preparing access routes to mine sites causes environmental impact as some forest reserves are being cleared leading to deforestation. This further leads to land erosion when it rains (Opoku-Ware, 2010). Danyo and Osei-Bonsu, (2016) note that the massive destruction of arable lands especially in agro/ecological areas and zones by illegal small-scale gold mining have affected agricultural production in the country and hence threatens food security in Ghana. Their research revealed that major 'galamsey' mining regions and zones in the country (Western, Brong Ahafo, Ashanti, Central and Eastern regions) recorded higher consumer prices in 2016 with lower food production progressively, comparatively to the last few years from 2012. The destruction of farmlands also affected the contribution of agricultural products to the GDP in the same year. Their concluding remarks was that, by degrading vast lands, shifting labour from food crops farming to engaging in mining activities, polluting the air and contaminating water bodies and more importantly displacing farmers as a result of 'galamsey' activities are responsible for the low production of foods which is a threat to food security not only in the region of operation but nationwide.

Dangers occur and aggravate its negative impact on livelihood when the mining operators fall victims to accidents occurring at mining sites. In 2010 for instance, more than 100 'galamsey' operators died in Dunkwa On-Offin, a city in the central region of Ghana due to 'galamsey' pits caving on them and killing all of them (Teschner, 2012). A similar incident occurred a year later in the Ashanti region this time killing about 12 people in a town called Attaso (Tschakert, 2009). Illegal small-scale mining causes the death of miners and is a regular occurrence in Ghana. Tschakert, (2009) added that, this is not only a sad news to hear but more also, majority of the miners are breadwinners of their family bringing about a negative impact on the livelihood of their family members.

The social impacts of 'galamsey' activities have also been researched by organizations like the World Bank, International Labour Organization (ILO) and International Institute for Environment and Development which mostly centre on education and public health. Danyo and Osei-Bonsu, (2016) note that the activities have resulted in high incidence of young people in Ghana absenting themselves from school with the aim of engaging in illegal mining to get rich early or overnight. Because of this, there has been several school dropouts in mining zones and regions in Ghana. Danyo and Osei-Bonsu, (2016) noted that the allure of gold money has caused many children to mortgage their future for wealth. Even though Danyo and Osei-Bonsu, (2016) did not provide numbers or evidence whether the children actually get rich or not, they noted that parents who oppose the decision of their children dropping out from school for illegal mining do not get their views adhered to. This is because such children are able to fend for themselves with their new found job (Danyo & Osei-Bonsu, 2016). This has further resulted to several street children out of parental care, and this is a big blow in mining communities. In addition to this, incidence of social vices, criminal acts and violent are more than other areas in mining communities such as drug abuse, prostitution, armed robbery and teenage pregnancy (Danyo & Osei-Bonsu, 2016; Mactaggart et al., 2018).

Stagnant waters are being left uncovered in mining communities. According to Kwateng, (2012), this is large to the extent that it has created a 'man-made' lake in the region (*see also*) (Mensah & Okyere, 2014). Streams and water bodies have been polluted making life difficult for people to get access to good and portable drinking water and for their basic household chores. In this case, people now have shifted to the use of sachet water (a 300ml distilled water packaged in a sachet) as a source of drinking water (Kwateng, 2012). It has also been found that even though the government of Ghana in 1991 adopted a national environmental policy in the country to make sure that our environment and surroundings are safe and protected during and after exploitation of various minerals resources, yet still, such implementation have done no good as far as the various mining communities are concerned as this is not effectively monitored and controlled (Yelpaala, 2004).

Small-scale mining and its implication on health

Small-scale mining operators usually work under dangerous conditions that can have impact on their health. They engage in environmentally destructive practices such us leaving pits uncovered that serves as death traps for people Awumbila and Tsikata (2004) and breeding grounds for mosquitoes that causes malaria (Agyemang, 2012; de Santi et al., 2016; Kwateng, 2012). Kwateng (2012) asked community members whether or not mining activities had

impacted on their health. The majority of the respondents noted having suffered from malaria from uncovered pits left after by mining activities that serves as a breeding place for mosquitoes, the very cause of malaria. According to Yelpaala, (2004), in the whole nation, 43% people suffered from malaria; the leading killer disease that year with 35% normally occurring in the eastern region of Ghana, a place where Akwatia is located.

In the same research conducted by (Kwateng, 2012), people complained about having suffered from cholera. Agyemang, (2012) and Ezeji Onyebuchi, (2014) have also shown that polluted water bodies as a result of mining activities by chemicals such as cyanide and mercury used in their operations leads to people being infected with cholera when they might know but still have to drink from such polluted water bodies. In Tarkwa in the Western Region of Ghana, health related diseases associated with mining as recorded were diarrhoea and skin diseases (Awudi, 2002). In addition, Opoku-Ware, (2010) found that the increased pollution of water bodies by galamsey operations in Ghana have posed a big challenge to communities of mining operation causing an increase in water-borne diseases like bilharzias.

In a research in Ghana by Opoku-Ware, (2010), it was also noted by the Public health officer in the region that, the uncovered pits of illegal small-scale mining operators have led to many people breaking their leg, which has affected their overall health and wellbeing. It was observed in research that some even die as a result of falling in the uncovered pits (Aryee et al., 2003; Awudi, 2002).

Health issues related to mining operations are also caused by the nature of machines and equipment used in the process. Occupational health hazards are therefore possible or common to people who engage in mining activities especially those who practice such activities illegally or informally with little or no technical knowhow (WHO, 2010, 2013). Mining operators are often exposed to physical hazards such as injuries, explosions, they fall from heights, fall in pits, rocks fall on them, while others experience the effect of noise in the ears and other effects because of drilling materials and blasting (Hinton, 2006). Researchers have therefore argued that hearing loss is common in the mining industry and poses a major health threat to the miners (Hinton, 2006; WHO, 2010, 2013). Moreover, some of the machines used in the activity cause miner's bodies to vibrate especially mobile equipment such as diggers, drilling machines and trucks. Researchers have shown that this can cause serious damage to the miners' spinal cords and can paralyze them (Hinton, 2006; WHO, 2010, 2013). The drilling machines can affect the arms, hands and other vital parts of the body. Mining operators stretch their hands and throw

off the sand, some work bare-chested and bare-footed; others stand in muds that are mixed with chemicals. All these practices affect the health of miners (Hinton, 2006; WHO, 2009, 2013)

Studies show that inhaling of chemicals used in the mining process can affect eyes (Haile, Hussein, & Haile, 2017), lungs, cause respiratory failures, kidney problems and even death (Landrigan & Etzel, 2013). Research by Awudi, (2002) on the impact of mining activities in Obuasi by the Ash-Gold Mining Company, found that activities of the company have led to several community member's being affected by upper respiratory tract infections (URTI). Medical experts within the region attributed the outcome of such diseases to the operations of mining companies and its associated pollution.

Problem statement and research questions

Rationale of the study

Research has addressed broad livelihood, development and environmental impacts of mining operations (Horsley et al., 2015) but the extent to which small-scale mining operations have direct or indirect implications on the health and livelihood of miners and community members in *specific* mining areas do not feature prominently in the academic literature. Given the fact that small-scale mining practice in Ghana involves the simplest form of mineral extraction, which is characterized by extreme labour-intensive procedures, unsafe working environments, and repeated negative human and environmental impacts (Aubynn, 2015), it will be particularly interesting to examine why and how people engage in such an activity, and how small scale mining practices impacts on the miners themselves as well as its implications on the communities. To the best of my knowledge, the health-livelihood connections regarding small-scale mining operations in specific communities have been largely anecdotal and often based on media headlines, opinion surveys and casual observations by government officials and pressure groups/NGOs. The usual migratory and 'clandestine' nature of small-scale mining operations, usually based on diverse cross-community networks, (Nyame & Grant, 2014), however, makes it difficult to track effectively these small-scale mining operators and examine the extent to which mining operations have had specific impacts on their livelihoods and health. This study will therefore contribute to health promotion and development studies by identifying the impacts of small-scale mining activities on the health and livelihood of miners and their communities and then make recommendations on how they can increase control over such determinants of health to improve their overall health and wellbeing.

Research objectives

The main objective of the study was to examine the direct and indirect impacts of mining activities on the health and livelihood of small-scale miners and their communities in Prestea, Ghana. The study's objective was addressed by focusing on the following specific research questions:

1 Why do people engage in small-scale mining in Prestea?
2 In what ways do small-scale mining activities shape the livelihood of miners and their community?
3 In what ways do small-scale mining activities impact on the health of miners and their community?

CHAPTER FOUR: METHODOLOGY

Epistemological Foundation

My research took as its starting point the interpretive approach as its epistemological foundation. Interpretive belief in the multiple and relative nature of reality and that to get a deeper understanding, overview and interpretation of how people create and maintain their perceived reality or social world, there should be a systematic analysis of the actions of people socially created by observing people's action in a natural setting (Creswell, Hanson, Clark Plano, & Morales, 2007; Neuman, 2014). The goal of the epistemological approach is to allow the researcher to systematically analyze social meanings and human behaviour in a natural setting (Creswell et al., 2007). With this goal in mind, I entered the research setting not with pre-conceived idea about the people or phenomenon under study but rather went there to understand the participants' lives from their own worldview. Based on the philosophical underpinnings of the interpretive approach, I spent much time with my participants, interacted with them directly and paid particular attention to their actions, behaviour and views about the phenomenon under study.

Phenomenological research design

Drawing on the above epistemological foundation, the research adopted the phenomenological research design. Creswell and Poth, (2017) posit that using the phenomenological approach as your research design to a study is necessary when the research problem requires a profound understanding of *human experiences* common to a group of people. People within such a group should be able to articulate their lived experiences and give detailed information about their situation (Creswell & Poth, 2017). Welman and Kruger, (1999) note that "the phenomenologists are concerned with understanding social and psychological phenomena from the perspectives of people involved" and also the ways in which ordinary members of society attend to their everyday lives (Welman & Kruger, 1999). Since the main purpose of my study was to explore from a self-reported angle the impact of 'galamsey' activities on miners' and community's members health, livelihood and general wellbeing, it was appropriate to use this research design for the study. The phenomenological perspective helped bring to bear the real-life situation of the miners and locals, how they see the mining activity and how they conceptualize socio-cultural phenomena in relation to their environment.

Methodology helps to bear in mind the kind of data that is required for your study, the appropriate methods to be used in gathering the data, how the data gathered will be analyzed

by the said method and how all this is going to answer the study's overarching questions (Creswell & Poth, 2017). I chose the phenomenological research design because literature reviewed prior to conducting the study on mining activities have only focused on how the activity is affecting the environment. Even with those that deal with the health of miners, the literature restricted their findings to only large-scale miners. No particular attention has been paid to people who engage in the activity from a self-reported angle of the miners themselves. Moreover, I chose the phenomenological design because I had also wanted to know from the community members how the activity is affecting their health, environment and livelihood in general.

How it started

With the issue of "galamsey" mining activities being on the political agenda, I was curious to know exactly what actually goes on in small-scale mining or 'galamsey' mining. Previous research and campaign messages have stressed the way 'galamsey' activities are destroying water bodies and having negative environmental impact on our environments. I therefore decided to take a whole different turn to further explore how the activities is having impact on the miners themselves, the society of operations and how the activity is affecting livelihood and general wellbeing of people. The current government have set up a task force to deal with individuals operating in 'galamsey' activities. However, people still do it for a living. With the task force in place, I knew I had to get to some government institutions into mining and seek approval for the study. I therefore before leaving for fieldwork in Ghana contacted stakeholders or institutions that would be of importance to my study, namely, Lands Commission, Minerals Commission and the Prestea government hospital. I contacted the first two institutions because they deal directly with the miners, their welfare and how mining activities should be carried out. I contacted them via e-mail and explained my interest in conducting a research study in Prestea on how 'galamsey' activities are impacting on people's health and livelihood. I explained the scope of my study to them via telephone communication after contact on email and also gave them information about the duration of the study and what I actually wanted to do upon my arrival in Ghana. I was fortunate to receive a good response from the Lands Commission that they were willing to host me upon my arrival and help give any vital information needed to carry out my study in the area. This was a verbal consent and I told them will provide documentation from my supervisor to them upon my arrival in Ghana. Having gotten an assurance and a hope that the work is doable, I went to Ghana where I proceeded to the field site. I visited the Lands Commission and discussed with the director about the whole project, which we had earlier on discussed on phone and followed it up with an introductory

letter from my supervisor. He read the letter and assured me of any help needed to carry out the project successfully. This was a happy start. He then minuted the letter and gave me a copy of it. I was then introduced to the staff in the lands commission. Fortunately for me, one of the staff was a mate of mine at the university level. This made it easier for information to be shared since we both knew each other long ago. He gave me all the documents needed to read and go through but said it was illegal for me to take a copy outside the institution at the moment but legal to read and use. This was no problem to me at all since I could have access to it all day and take any section that would be of help in my study. His director told him to help me go to the minerals commissions' office and introduce me to them since they both work hand in hand and offer me any help to carry out my research. We then proceeded to the Minerals Commissions' office. The presence of my friend as a staff at the Lands Commission as well as the minuted copy of my introductory letter really helped for them to easily accept me to come to their institution, do any interview or request for any documentation needed to carry out my study. This to me was a good start and gave me more hope that the research was on course.

Even though I had not contacted the Prestea government hospital before arriving in Ghana as I indicated in my proposal, I contacted them after contacts with the Lands and Minerals Commissions. All the three institutions visited without hesitation accepted to be part of the study and provided me with any help and documentation needed. The next big question I asked myself was, now what about my informants, referring to the miners and the community members, how do I recruit them? I discussed it with my friend from the Lands Commission. He told me he knows the assemblyman[4] of the town and that he will send me to him and inform him I'm a friend and would like to do a research for my master's degree. I got a response two days later that the assembly man had agreed to help me and that he suggested that we meet him for an official introduction and also hear from me as the researcher; what I actually want to do and how I intend to do it or go about it. Fortunately for me, it was a period and time where the association of small-scale miners were going to have a meeting and so he suggested that I join the meeting so he can introduce me to the whole group and ask them to help me in any way to carry out my study. This was a good opportunity for me. I joined their meeting and was introduced to the miners as a student from Norway about to undertake a research about mining activities and its impacts on health and livelihood. He reiterated the fact that it was purely for academic purpose and so they should feel free, share their views and help me successfully finish

[4] The assembly man is a representative of the people to the district assembly. He is elected by the community members to channel their grievances and request to the government.

my project. This was a good initiative because I was thinking about how they will freely talk to me because the government has banned their activities till further notice as some illegal miners have been exposed and arrested by the current government.

Participant inclusion or exclusion criteria

After all contacts were made, both with the institutions, the miners and community members themselves, and agreement being established as to them wanting to be part of the study, my participants were selected in two categories or ways. The first had to do with people from the stakeholders or institutions contacted (Lands Commission, Minerals Commission, and the Prestea Government hospital.). In all these institutions, participants were selected with the help of their directors. That is to say that the directors in the various institution with the help of the notes they gave to me paved the way to help get access to key people to recruit them for the study and not the directors themselves who selected the participants for me. They had already informed me to come to their institution at any time for the purpose of the study and that if I have to conduct interviews, we would schedule a date for that. We therefore scheduled dates and booked appointment on when I could come around for the interview section. The first appointment was made with the director himself of which I interviewed him. After that, I contacted some staff and they assured me to come the following day for the interview. Participants were thus recruited in this manner in all the three institutions contacted. I interviewed two people from each institution making six in all.

With respect to the miners, participants were recruited after the meeting held of which I was introduced to them. A majority willingly told me that I could include them in my study and that I should remember not to leave them out because they want their voices to be heard and appear in the thesis. This was interesting to know and made it a bit easy for me. Their contact details were taken. A call was then made to discuss when we could meet, where and the time for the interview. Participants recruited with this strategy were six. Others were also recruited after contacts with these people (those who willingly agreed to be interviewed). They suggested some friends to me that they can talk to them for me to interview them as well. A snow-balling method was thus used here to recruit six more miners. Therefore, the total number of key miner informants recruited for the study were twelve.

The assembly member again helped me in recommending some people for the focus group. He recommended such people on the grounds that they are natives of the land and have lived in the place all their lifetime and would therefore be able to give me useful information. Through this

strategy, I was able to select five people of which they also suggested some others that I could include and again, through the same snow-balling technique, I was able to recruit three more people to add up to eight focus group participants. Therefore, in total, twenty-six participants were recruited for the entire study. See figure 2 for a description of the participants

figure 2

A tabular description of participants

Numbers	Names (Pseudonyms)	Gender	Age	Description of Participant
1	Kwamena	Male	52	A miner
2	Nika	Male	39	A miner
3	Philip	Male	28	A miner
4	Adama	Male	29	A miner (who used to work with a large-scale mining company)
5	Abudu	Male	24	A miner (inherited the skills from parents)
6	Mensah	Male	27	A miner
7	Odeneho	Male	33	A miner
8	Adjei	Male	24	A miner
9	Tamakloe	Male	38	A miner
10	Nhyira	Male	38	A miner
11	Kojo	Male	27	A miner
12	Herbert	Male	43	A miner
13	Nadia	Female	26	A community member
14	Zenabu	Female	39	A community member
15	Tina	Female	25	A community member
16	Keziah	Female	26	A community member
17	Anamzoya	Male	29	A community member
18	Yaw Daani	Male	23	A community member
19	Adwoa	Female	38	A community member
20	Danso	Male	40	A community member
21	Reuben	Male	33	Minerals Commission
22	Festus	Male	41	Minerals Commission
23	Kojo	Male	34	Lands Commission
24	Atingah	Male	31	Lands Commission
25	Mumuni	Female	39	Prestea Government Hospital
26	Michael	Male	32	Prestea Government Hospital

Interviews

Kvale and Brinkman, (2009) explain that research interview is an interpersonal situation, a conversation between two or more partners about a theme of mutual interest.

Setting the interview stage and conducting interviews

People selected to be interviewed were contacted, and the scope of the study explained to them to know exactly what the interview discussion will be all about. They were also asked to select a location for the interview in the same manner as that of the focus group discussion. This was to give them a free range and to get to a place where they can freely express themselves and share their opinions. The researcher was however careful about the choice of place (setting for the interview). Some suggested that the interview be conducted in their homes and others at a school premise. Doing the interview in their homes was to almost all of them the only way they can share more information with me because they would feel safe. In setting an interview stage or choosing a setting for an interview section, the choice of place should be an area that will encourage the interviewee to freely, openly and without threat describe their point of view on the said subject or topic (Kvale & Brinkmann, 2009). I therefore did not reject their opinion. The interview began by first briefing participants about the purpose of the study and the interview, the use of a sound recorder, and further asked if they had any questions or concern before the start of the interview. None of my interviewees wanted to be recorded. Some of the reasons given were: they will not be comfortable if they have in mind that their voices are being recorded and that it can be played anywhere without them even though they were aware that recording is solely for academic purpose and that all the data or information gathered will be anonymized. For this reason, no interview was recorded. However, the respondents agreed that the researcher resort to detailed note taking instead. The challenge with this was that the interview took a long time than the average thirty to forty minutes time span to almost an hour and beyond. However, all questions (*refer to the interview guide in appendix 1*) were covered and answered by the respondents.

After the interview, the researcher debriefed the interviewees. Respondents were asked if they had anything more to say, and about their experience of the interview section. This really helped me as some of the respondents either added more viewpoints or explained themselves better on previously shared information.

After the debriefing stage, I concluded the section by telling my respondents there was not any further questions and that if there were anything they would like to add or bring up, they were

at ease to do so before we finally concluded the interview section. Kvale and Brinkman, (2009) note that 'giving respondents the opportunity to talk or bring up anything else relating to the interview gives them an additional opportunity for them to talk about issues or discuss something they were worried about during the interview'. Respondents were therefore given such an opportunity as this really helped me to further add some questions of importance in answering my overall research question to my subsequent interviews.

After the interview as I thanked them for participating in the interview, some of the participants during the post interview conversation decided to throw more light on previously provided information during the interview. In such instances, I did not resist the conversation, but allowed them to elaborate more on their opinions. Having said this, it is important to note that respondents in this respect were asked whether the post interview conversation could be included. They agreed to it and suggested it can be used since it is all part of what I am seeking to research about. Kvale and Brinkman, (2009) explain that, there is the possibility of respondents showing interest to talk more about their opinions during an interview section after the end of an interview. In this case, the researcher must seek permission from the interviewee to report or include in their paper or thesis the findings that emerged from the post interview or informal conversation.

After each interview section, the researcher immediately spent ten to fifteen minutes of quiet time reflecting on the issues discussed, and responses given of which had been written in a notebook. Emerging themes were therefore drawn from this period and bodily and facial experiences accompanying their statements were reflected on to capture the deeper meaning of their responses and further analysis of data as noted by Kvale and Brinkman, (2009).

Scripting the interview

An interview guide (*appendix 1*) was used in which I structured some topics with each having follow-up questions to answer the study's overarching questions. The sequence of the questions was predetermined, however, there were moments I needed follow up questions and therefore chipped in some questions. This was useful as it helped in gathering and getting deeper understanding about participants opinions.

The questions were brief, simple and easy to understand. It was also kept as short as possible and devoid of any academic language. Kvale and Brinkman, (2009) noted that the interviewer or researcher is a research tool (pp. 134). A research tool in the sense that his or her ability to immediately sense the behaviour, actions and meaning of the interviewee and their answers is

key in helping the interviewer in his analysis or opening up more questions for deeper insights. I agree with Kvale and Brinkman, (2009) because in the course of some of my interviews, participants or respondents gave answers upon which after looking at their facial expressions, I felt they did not either understand the question or perhaps were telling lies. In such instances, I either rephrased my questions, or repeated their answers to them to make sure that it is what they really meant to say or there is something else to that.

This bring to bear how I structured my interview questions. The introduction questions were a bit broad and open. This was meant to get a general overview of the phenomenon under study and to keep the interview rolling with more opinions from the respondents. Some examples of the questions asked were; can you please tell me about the 'galamsey' activity here? It was very important and helped me in the sense that respondents when asked questions that way, gave rich descriptions where they vividly explained and provided me with information of which they have experienced as a major aspect of the phenomenon being investigated. This opened up our conversation for more follow up questions linked to answering the studies overarching objective. This was done by putting across direct questions to the interviewees based on the information they provided me. The curiosity to know more and showing interest by nodding, or saying something like' hmmm', 'ah ha' made the respondents to continue sharing and pouring their opinions and their descriptions. Even though I allowed them to talk, I made sure that it was within the topic under discussion and not any other thing. I was also very particular about unusual terms and phrases interviewees were presenting which signaled other important areas and topics to explore necessary to the study.

Focus Group Discussions

According to Krueger and Casey, (2014) the purpose of a focus group discussion is to listen and gather information and that focus group discussions help the researcher to understand how people think about an issue, or service, hence used in gathering opinions of people. Focus group discussions should comprise of about 5-10 individuals (Jakobsen, 2012; Krueger & Casey, 2014). In my case, the number of people included were eight. Participants thus were selected from two separate groups. Meaning the first focus group discussion comprised of only miners (people who engage in illegal mining or 'galamsey') and the second group (FGDs) were community members (eight from each group. Also, the FGD with miners were the same miners that I had interviewed). I chose these two groups in the sense that with the former, the intention was to get their opinions on how the activity impact on their health. Even though I did one on one interview with the miners, I realized one of the days when we met for discussions that, they

were more open, to talk in a group than on the one-on-one interview. I therefore scheduled a FGD to gather information and supplement it with already done interviews with the miners. I was able to gather more and detailed information during this section than on one-on-one interview. In the second group (FGDs) of community members, the main idea was to gather information about how the mining activities was impacting on their livelihoods and health.

Discussions within the group were relaxed and everyone had the right and opportunity to share his or her view at any point in time but in relation to the topic or questions under discussion. Jakobsen, (2012) notes that although the researcher being the moderator should try as much as possible to have minimal self-involvement in the discussions, he or she should however guard the discussions towards the aim of conducting the focus group discussions, which is to answer his research questions (Doody, Slevin, & Taggart, 2013; Krueger & Casey, 2014). I was therefore cautious about this and kept the discussions as focused as possible without any form of threat and made the atmosphere good for discussions. Even though I had minimal self-involvement, I however directed the discussions towards answering my overall research questions. For example, in the course of the discussions on how the activity of miners is impacting on their livelihood, I realized one woman talking about conflict that has arisen between her and a miner because of some payment settlements and did my best to keep the discussion in focus. Moreover, even though I was moderating the discussions, the participants were encouraged to freely share their opinions and discuss among themselves. There were no strict questions put to each other one after the other. Participants were told they can freely chip in their views as others finished sharing their opinions and experiences. As Jakobsen, (2012) argue that, in dealing with focus group discussions, the moderator should be careful not to turn the discussions into group interviews where there will only be interaction between the researcher and the interviewee on a group scale (Krueger & Casey, 2014; W. Neuman, 2011). Participants before the focus group discussions were therefore made aware that this is not a personal one-to one interview on a group level where I will pose questions to them one after the other and that they are at ease at any point in time in the course of the discussion to chip in their opinions however should be geared towards the topic under discussion.

As earlier on indicated, I realized that, participants were more open and free to share more opinions in groups than at the individual level. One man noted that, '*I was happy to pour my hearts out when we met as a group because my other colleagues also experience and go through the same thing. So I had the urge to talk more and say whatever I had wanted to say than our meeting on one on one*'. This goes to confirm what Krueger and Casey, (2014) observed in a

focus group setting. According to them, focus group discussions make people to show attitudes as socially performed instead of as individual persons. That is to say because it comprises of people with the same group and having discussion on a given topic they are all used to, makes them to fell that whatever they are saying, others also go through the same thing, hence not only their voice but also the opinions of others.

Why FGDs worked in my case

Focus group work when participants feel comfortable, respected and free to give their opinions without being judged. The intent of the FGS is to promote self-disclosure among participants (Jakobsen, 2012; Krueger & Casey, 2014). Participants were informed about their common characteristics right from the start of the discussion. Even though, the group members varied as far as their ages, occupation and gender are concerned, they however all had the commonality of being adults and community members.

Although, I gathered good information during the interview sections, I realized that during the FGD, participants were influenced by others and also influencing other participants thereby making them to share more information and opinions than during the interview section. Throughout all the discussions, I served as the moderator, and at the same time listener, observer and more importantly an analyst. The questions were phrased in a way that were easy to understand. The questions were arranged in three parts: engaging, exploratory and exit questions. The introductory questions were more general and engaging. This made their opinions concerning the outcome of illegal mining on the livelihood and health to be revealed. Questions placed however at the end of the focus group placed more emphasis on the feelings, actions and thought processes of the respondents during the submissions.

Data management and analysis

Data management and analysis are important as it helps the researcher to secure relevant information given by participants and furthermore help to organize arguments, make choices about relevant and interesting issues, organize and categorize thoughts or viewpoints as well as group data to making relevant arguments in a logical manner (Skovdal & Cornish, 2015).

In this regard, data gathered through interviews and focus group discussion were managed by first typing field notes into text-based for easy storage as Skovdal and Cornish (2015) advices. Detailed notes were written in English and information was written as given by participants without distorting their original meaning. Any digital data was password protected. The information was then inputed into Open- Code software to help in my further analysis of data.

I used the software to help identify key themes or patterns, relationships between data by looking at links, associations, and patterns in my data. I used Thematic Network Analysis (Attride-Stirling, 2001) as a tool to help organize my analysis.

Positionality

In terms of positionality, one can summarize it as who are we (researcher) for the respondents? And who are they (respondents) to the researcher? Ibid (England, 1994; Hopkins, 2007). In my case, the respondents saw me as 'part of them' in the sense that I am a Ghanaian and speak the same language as them. This helped participants to freely converse with me and share their opinions. Jakobsen, (2012) emphasizes that the power relations or differentials between the research and those being researched stem from how both parties sees each other (*see also*)(Krueger & Casey, 2014). On the part of the respondents, it flows from how they perceive the researcher to be and adds that even in situations where the research is associated with aid, there is the likelihood of respondents giving answers they think will attract external assistance. In our first meeting when I was introduced to the miners, one woman exclaimed that '*people from abroad only speak English, and I cannot speak English'*. I was quick to respond in our local dialect that I speak the same language as they speak. Then the woman responded '*oh fine fine fine, then we can talk. I thought you only speak English. For this, then we can pour my heart out because what the government is doing to us is not fine at all so you can help us in that.*' Knowing their intention of trying to use me as a vehicle to get to the government about their issues as (Jakobsen, 2012) noted, I responded that I am only a student trying to do a research on how small scale mining affect their livelihood and health. I am therefore using it purely for academic purpose, however, findings and recommendations that may emerge from the study can serve as a policy guidance that help the government in dealing with issues of small-scale mining and galamsey.

Trustworthiness of the study

Credibility: one of the key ways of establishing trustworthiness in research is credibility (Golafshani, 2003; Neuman, 2014). Credibility has to do with the internal validity of a study which deals with how consistent or similar are a study's findings with reality (Golafshani, 2003; Neuman, 2014). To ensure credibility, there are provisions I followed in my research. One is how well I adopted a research method and the specific procedures I employed. For example, how I followed questions in my topic guide in the data gathering sessions and data analysis methods. These are all processes that were derived from previously successful comparable projects. Moreover, I developed familiarity with stakeholders involved even before data

gathering processes took place. This was achieved because I made prior contacts to stakeholders involved in my study through e-mails and the submission of an introductory letter from my supervisor.

Finally, the triangulation technique was also used since I relied documents/desk top analysis, interviews and focus group discussion in the research to help compensate for their weaknesses or limitations and hence exploit their various strengths. In order to ensure honesty in data gathering, participants were given the free will either to be part of the study or not to avoid any false representation of information to be given or provided.

Transferability: how the findings of a study can be replicable or applied in other situations or studies (Golafshani, 2003; Neuman, 2014). It has to do with external validity. In order to achieve this, researchers argue that a researcher should convey the boundaries of his or her study to readers in terms of the time period within which the research was conducted/data gathered, the length or number of data gathering sessions, data gathering methods used and the number of participants selected (Golafshani, 2003; Neuman, 2014). Also, any restrictions with participants who contributed to data gathering process should be explained as well as the number of stakeholders or organizations that were part of the research process as a whole (Golafshani, 2003; Neuman, 2014). My study was conducted within two months. In all, 26 participants were recruited for the study. Twelve miners, eight community members and six stakeholder members from institutions contacted. It is important to note that mining activities or processes be it small or large scale go through similar procedures in extracting minerals. The research could therefore be transferred since mining activities take similar procedures throughout their operations.

Dependability: how the work will be replicated with the same findings in the same context should a similar methods and participants be used (ibid) (Golafshani, 2003; Neuman, 2014). My study therefore used a topic guide with broad and sub questions covering the three research questions and the overall aim of the project. Instances where the researcher was not clear, questions were rephrased, and probing was also used to gain deeper understanding of information given. Detailed note taking was used throughout the study. In order to avoid misrepresentation, questions were rephrased for participants.

Ethical Considerations

First and foremost, this research was subjected to the Norwegian Social Science Data Services (NSD) code of ethics for guidance and clearance (*appendix 5*). Moreover, because small-scale

mining was on the political agenda of Ghana, I ensured that respondent were freely and with full understanding of the research agreed to be part of the study. Participants were also informed of their right to withdraw from the study at any time. An introductory letter was sent to the various stakeholders or institutions contacted. Participants signed a consent form (*appendix 2*) to endorse their full participation in the research. Where the consent form could not be signed, verbal consent was given before conducting the research from respondents by telling them the scope and purpose of the research, what was going to be used for, the expected duration and that their participation was completely voluntary and also had the right to withdraw from the study at any point in time. Furthermore, I ensured that I kept the identity of participants private so that they would not personally be identifiable in any output that had been produced by the researcher and furthermore ensured confidentiality since respondents entrusted private information to me. All data gathered were treated and processed confidentially. Field notes were kept safe and any digital data was password protected. In line with general ethical requirement for social research, all names of individuals were anonymized with pseudonyms used.

Challenges in data gathering

With respect to the challenges encountered during the data collection process, I would say that I did not get enough time to visit the sites of operation and observe the activities of the miners. This was because there was a ban on all 'galamsey' activities at the time of the data collection. I only got the opportunity to visit the site with officials from the Lands and Mineral Commissions to show me the extent of the impact of the activity of miners on the environment and how the activity have destroyed several river bodies, left deep holes that serve as death traps for both humans and animals. The people from both commissions informed me about a recent incident where two children fell in one of the pits which was full of water and died. This visitation to the site was even done at the latter part of the study. For security reasons, even though some of the miners informed me I could join them one day to observe how the activity was done, I could not. This is because I was informed by the Minerals and Lands Commissions that because of the ban on all illegal activities at the moment, it is illegal and dangerous to be found in any of the sites of these miners. Also, military men have been deployed to such places to monitor and arrest people who come there to mine. This limited my study a little bit because I proposed that I would in the course of my data collection visit the mining sites to see how miners carry out their daily activities. Even though I did not pay visit to see for myself how they do such activities, I was fortunate to see some videos of them engaging in 'galamsey' activities on their phones. This was interesting and very helpful as it gave me an overview of

how they go by their daily activities on the mining sites but did not get the opportunity to have a ‘real life’ experience of it.

CHAPTER FIVE: EMPIRICAL FINDINGS

In this chapter, I present the empirical findings and results from the study's field site, Prestea. The chapter contains the responses given by participants through interviews and focus group discussions. Findings in this chapter are divided into three parts based on the study's research questions.

Socio-demographic characteristics of respondents

In entirety, twenty-six people took part in the research, six from stakeholders contacted, twelve miners and eight community members. Out of the total number of people who took part in the research, eighteen were males and eight were females.

Occupational background of respondents

Occupation is a determinant factor of the socio-economic position of people in a society. That is to say, one's occupation helps to understand their economic livelihood. Four of the participants (community members) were farmers (some are still farmers). Two were traders, two worked at a government hospital, two at Lands Commission, two were from the Minerals Commission and twelve were small-scale gold miners. With respect to the stakeholder (government) and petty traders, some of them have farms and work on as their second job or perhaps as a backup to support their livelihood.

Number of years stayed in Prestea

Since the overall aim was to know and explore how 'galamsey' or small-scale mining activities have impacted on the livelihood and health of both the miners and community members as a whole, it was necessary to explore the number of years participants had resided in Prestea. This was intended to know and help determine the level of respondent's familiarity of and within the society and to help ascertain their knowledge of social, economic and environmental issues before the advent of the 'galamsey' activities and after mining operation impacts. Of the number of participants in the study, almost all (twenty) were indigenes or community members and six were from other parts or regions of the country. Out of the total number of miner participants, ten were indigenes whereas two were migrants (people from other regions outside Prestea). Even with the two migrants, they had lived in the community not less than six years. This shows they at least have some sort of familiarity with the community and have some knowledge about issues and matters concerning the community or relating to the community in general. Also, all the people I interviewed in the Lands Commission, Minerals Commission and

the Prestea government hospital were indigenes. They had lived all their lives in Prestea and were born and raised in Prestea.

Reasons why people engage in small-scale mining

Poverty

People engage in small-scale mining for several reasons. One of the reasons given was poverty. Some participants perceived poverty as not having any source of livelihood and hence had no option than to do small-scale mining for a living. In addition, others defined poverty as earning very little from their businesses or activity of livelihood such as selling sachet water or recharge cards[5]. Because of their small or meagre earnings, they decided to take up another job to help sustain them or even invest more into their businesses. This as a result compelled them to do small-scale mining. Kwamena, a miner noted that

> "*it is very hard to live without having a work that gives you good income. The work I used to only do: selling "pure water" (sachet water) was not giving me enough income to cater for my family. I therefore decided to take up another job. That is how come I came to do galamsey*"

In a similar way as the miners, and from a focus group perspective, some community members noted that poverty is a major reason why people decide to engage in small-scale mining. Responses given were based on the participant's experience or their contact with people who engage in illegal or small-scale mining. For instance, Nadia, a community member opined that

> *"I know some people who do galamsey. I know that they entered into the business because they had no money to cater for themselves. They kept telling me they want to do galamsey and before I realized they had already started. So from my experience with people, I will say that people do galamsey because they are poor"*

Zenabu, a community member also noted that "*my friend's husband also do galamsey. For him, I know they needed money to buy a container to help them in selling construction materials*."

Unemployment

Related to the notion of poverty as a deciding factor for people engaging in small-scale mining was the problem of unavailability of jobs in Prestea. Almost all participants confirmed this during the interview section. Nika, a miner said that

[5]Popularly known as credit card in Ghana. They are mobile network top up cards

> "*my brother (referring to researcher), for Prestea here, it is very difficult to get a job. Even people who have graduated from the university finds it difficult securing a job how much more those who haven't been to school of which I am part. So I decided to do galamsey*"

Philip, a graduate participant and a miner also confirmed the notion of Nika above by emphasizing that

> "*after graduating from the university, I have been trying to secure some job to help cater for myself but to no avail. And you know I cannot depend on my parents any longer at my age. I should be able to fend for myself and even cater for my parents. So Augustine (researcher), your brother (referring to himself) have to do small-scale mining to survive*".

Also, all community members agreed to a response by their fellow focus group member that because of the unemployment situation in the community, people have to do small-scale mining to live. Tina (a community member) had this to say

> "*the community lacks jobs. A lot of people are unemployed so how should they eat and cater for their families. The government should do something about this unemployment thing*".

This was also buttressed by responses from participants in the Mineral and Lands Commission. Reuben (from the Minerals Commission) for instance stated that

> "*our community lacks jobs and this is a big issue not only in this region but nationwide. I believe that if nothing is done about the situation, small-scale mining will be a difficult phenomenon to solve as it's bad but people do it*"

While Kojo (from the Lands Commission), explained that

> **"***honestly, lack of jobs is a nationwide problem but its impact on mining zones like Prestea here is dangerous to our wellbeing as people who decide to do mining as a source of livelihood only think about the money they will get and not the effect of their operations on the environment and community***"**

Collapse of businesses/ companies

The study further revealed that poor business performances prompt people to engage in small-scale mining. The fact that people's businesses were not giving them the income or money they expected in a day, caused them to seek for an additional source of livelihood, hence they decided to do small-scale mining. Others who previously engaged in large scale mining with some companies also noted that, they decided to engage in small-scale mining due to the collapse of the companies they worked with. Having been in the mining sector for a number of years, the participants noted that they had to use their skills in working for themselves.

Adama, a miner for example said that,

> "*I used to work with one big mining company here. But the company was collapsing so they laid some workers off and that affected me also. Mining has also been my source of livelihood since I started working in my life. This is to say it has been the work I have been doing all my life. I therefore decided to do my own mining with my skills after my laying off and that is how come I work with my friends illegally here"*

Several other participants also shared in the view above.

Educational status/ achievement

No or low educational status or achievement also compel people to engage in illegal or small-scale mining. Almost all miner participants have either never been to school or at the highest is a high school leaver with the exception of one person who had had university education and another who is still an undergraduate student. This is what Abudu, a miner participant had to say:

> "*I have never been to school my brother to do a formal job that can give me money every month. My parents were once small-scale miners and since they themselves were uneducated and thought mining can also help me get what other school attending people also struggle for, they decided to teach me how to mine rather than go to school. So it was my parents who introduce me to it and it is something my family has been doing all these while, after all, is it not money we are all looking for? I get it here so why go to school?"*

Mensah, a miner who arrived in Prestea six years ago also confirmed what Abudu claims by noting that

"*I have never been to school and a friend told me to come to Prestea so we can mine. I used to live in Accra. I was doing head potterage there till he told me there is money in mining so I should come. That is how come I got here. In fact, let me be sincere with you I don't regret coming here because I get money to even send to my parent. I'm ok here".*

Moreover, there are others who are school dropouts or have had education to the senior high school level. Such participants also dropped out from school to engage in illegal small-scale mining. It was evident from their responses that, whether their parent did not have money to help them continue their education or as they said 'had no brains' to study, made them stop schooling. For instance, Odeneho, a miner stated that,

"*Bro Augustine, let me tell you the truth, I don't have the brains to study. I was always either last at school or chop the last but one position. So I decided to stop schooling and do something else and that is how come I ventured in mining. The business looks good and I even get more money than some of my classmates who were good in school. I went to a bank to deposit my money and I met one of my school mates who works there. When he saw the amount I went there to deposit he marveled and said Odeneho, in fact, I even don't have that money as my life sayings. For me, mining has really helped me and that is what keeps me moving in life*."

Nature of mining activity

People are compelled to engage in small-scale mining because the activity requires less skills in it execution. All miners interviewed for the study cited this as a reason. According to the participants, it is a matter of being strong or having the muscles to dig and carry sand or gravels, that's all. Adjei, a miner for example said that

"with this activity you don't have to go to school to acquire a particular skill like what the bankers and medical doctors do, all you need is the ability to dig and carry. Just have the strength and you are set to do. It is also a routine work, so you don't have to even think about what to do. You do one thing almost all the time because there are others who also do the rest. In fact, there is less or no skill required and that is why I decided to do mining"

The study further revealed that, small-scale mining do not require huge capital or expensive tools, logistics or equipment in carrying out the activity as compared to licensed large and mining companies. According to the participants, all you need for illegal or small-scale mining

is your shovel, head pan and pick axe to help you separate the gold from the sand. This is not as costly as heavy tracts and equipment licensed companies use. This is another reason why people engage in small-scale mining. Tamakloe, a miner noted that,

> *"I chose to do mining because I don't have enough capital to start my own business like trading. A friend however told me that if I like I can join them do galamsey. With that, all I need is my pick axe, shovel and head pan. And even with that I don't have to buy all. I can buy only one since we will work in a group and that can cost at most 30 Ghana cedis. So I bought some and joined them"*

Non-granting of mining concession

Findings from the study showed that, non-granting of mining concession compel people to engage in small-scale mining. It was revealed by miners and community members that the procedures for acquiring a mining license is cumbersome and hence people decide to cut corners to engage in mining without adhering to laws and regulations governing mining activities in the country. Nhyira (a miner) for example opined that

> "*I had the money to go and seek for approval to mine, but what they were saying discourage me; you have to go here, go there and after that come here, it will take you 3 months before you will be granted permit. After that people from the minerals and lands commission will go with you to inspect your land, the level of minerals in the land and bla, bla, bla. I intentionally pretended I have gotten a call and that was the end. I never went there again and decided to do my own thing "*

Also, the study found that, the amount of money people need to pay to be granted a mining concession causes them to abandon the whole process. The participants explained that the amount is too "much" or "high" and since they do not have that huge sums of money to pay to be granted a concession, they do it illegally. Nika, a miner stated that

> "*oh, the minerals and land commission people, don't mind them. If you want us to stop mining illegally, what is the essence of giving high fees to be paid before you are granted concession. I won't and will never pay. Anyway, I even don't have that amount so let me keep quiet*"

Kojo (a miner) also noted that "*their (referring to the minerals and lands commission) fees are too high, they should reduce it. How many people will get that amount to pay. If they do that people will continue to do mining illegally*"

The study found that even when you have your own money to pay for the concession, the time frame to be granted a concession discourages people to do so. Herbert (a miner) shared his opinion on this

> "*talking about the granting of a mining concession, it is even not the huge amount of money that you must pay which annoys me. but the time you have to wait till you are granted a concession is very frustrating and annoying. Can you believe for about two year now, I have still not been granted concession, meanwhile I have paid my money. If I had invested it, I would have gotten interest now. So since I can't wait any longer, I am doing the business (mining) without any concession. When they come, I will tell them I have paid my money, but they have delayed the process*".

Community members also shared the views of miners in the above points during a focus group session. Keziah revealed that

> "*my husband's friend engages in galamsey mining. According to my husband, the man had his money ready to pay for any cost involved but the procedure he had to follow discouraged him."*

Anamzoya (a community member) also noted that. "*Yes, that is true because I know of a man who complained bitterly also about to cost /amount he had to pay before he would be granted a license. I don't know whether he paid the amount or not, but he is doing the business with some boys*".

Also, the study sought the views and opinions of stakeholders from the Minerals and Lands Commissions and officials from the Prestea Government hospital. According to participants from the Minerals and Lands Commissions, people find it difficult following the required procedures to be granted a legal license to mine. People also complain about the cost involved to be granted a concession. Festus (from the Minerals Commission) shared his experience by saying that

> "*if they come here and we tell them the procedures they must follow in order to be granted a concession, majority of them go and never come back. Later, we catch them engaging in illegal mining and we arrest them. It is not our fault, we must go by the constitution and also teach them certain rules and regulations they must follow so they don't cause harm to the environment and put people in the community at risk".*

Unattractive agricultural production

Interviews conducted from miners revealed that agricultural production in Prestea does not appeal to them anymore because of the long periods they have to wait before their crops are harvested, and sold to get money to live for as mining provides faster cash. Because of this, the miners are motivated to take up small-scale mining as an alternative source of livelihood. Here is what Tamakloe (a miner) had to say

> "*I used to do farming, but Augustine, it really takes a long time before they can grow not to talk about harvesting it. It is really time consuming that is how come I decided to do mining*".

Several other miners also shared this view.

Fast money/ higher income/ quick money

Moreover, the study discovered that another reason why people decide to engage in illegal or small-scale mining is because the activity gives quick money unlike other work that you have to wait till the end of the month before you can get your salary. According to participants who reported this as a reason for their engaging in illegal mining, after the day's activity they go to sell whatever gold they had to registered gold selling and buying vendors during the day and share the money among themselves. Others also noted that, for them, they wait to the end of the week or two where they have gathered a lot of gold and then sell it

Kwamena, a miner said

> "*for my group, whatever we get in the days mine, we sell and share on that day or a day after. This helps to avoid any doubt or fight among us. At first we used to do it every two weeks. But we realized that some people sneak and sell some. That is why we now pay ourselves every day. So it is a pay as you go thing*."

Nika, a miner also opined that

"*I have been in the business for about twenty years. The least amount I have received is 2000 Ghana cedis as compared to some government workers who receive 1100 Ghana cedis a month. As you know this is a good amount to earn. So you see, people who work in the so called government sectors or have good jobs don't even get this amount"*.

Others who were employed by people also emphasized that, payment is an agreement between them and their leaders. Adama (a miner) noted that his group receives their salary on weekly basis

"*for me my boss pays me every week. That is what he told me when I joined their group. No need to wait till the end on the month."*

From the focus group discussion, it was also revealed that young guys of nowadays especially in the community do not want to go to school because they think it will take a very long time before they get money. The urge therefore to get rich overnight compel people also to do small-scale mining. According to the participants, people do not want to waste several years in school of which the outcome is to secure a job and get money in the end. This they will get should they start doing galamsey now. For instance, Danso, a community member noted that

"*Today's children [referring to children of school going age) don't want to go to school but get rich overnight. If I show you the houses some young guys have built, you will marvel. We adults don't even have that money to build such houses. Meanwhile they have never been to school. This galamsey 'naa' [meaning, it is through this galamsey activity that they have built such mansions). So if you were to be a young boy growing up, and you see your colleague riding in big cars and living in mansions, will you go and waste time in school, obviously no, you will do galamsey too. That is why we have many young guys doing galamsey now."*

Livelihood option

Again, all miners stated categorically that they entered into illegal mining to earn a living and help cater for themselves and their families. There were several reasons for this, and participants gave diverse answers. To some, they lost their jobs and since they have to survive, they decided to do mining illegally to earn a living. For instance, Odeneho, a miner said that

" *I used to work with a starch company (name withheld) but the company is no longer in operation so I had to seek an alternative option to survive. And that is how come I landed in galamsey mining.*

Taking the views of officials of the government hospital in Prestea, they also noted that, people engage in mining to seek for a livelihood. They noted that inadequacy of jobs in the community had caused a lot of people to venture into illegal small-scale mining to survive. Mumuni mentioned that

"*At times you can't blame them that much because they have to survive. The economy is also so hard that people do whatever will give them money to live even at the expense of their health. There should be more jobs for the youth"*

Loss of land/ farmlands

The study's findings revealed that as a result of people losing their lands to larger mining companies which they worked on as farmers caused them to do galamsey for livelihood. A participant noted that, her husband was faced with such a challenge. The husband's land given to him by his father was taken away (sold by the chief or government authorities) by some large scale mining company to mine gold rendering him jobless and without any means of livelihood for a survival. Because of this, the husband decided to do galamsey for a while to get money and start a business for himself to cater for the family. That was how the husband once engaged in galamsey but is now doing his petty trade (selling cosmetics) for a living.

Inherited act

Some participants were of the opinion that they were 'born and bred' into mining. That is how come they are in the sector and that has been the source of their livelihood in feeding the family. This is what Abudu (a miner) had to say,

> *"both my dad and mum were small-scale miners. And that was what they used in taking care of our family. I inherited it from them and I'm also using it to cater for my family".*

Livelihood impact of small-scale mining

Positive impact

When asked about ways in which small-scale mining shape the livelihood of miners, the majority noted that, it has really improved their standard of living. That is to say the activity has provided money and hence improved their shelter, eating habit, clothing and can now provide for their basic needs. Herbert (a miner) noted that

> "*I wouldn't say the activity hasn't help me even though it is a risky job. Through this, I have been able to acquire a plot of land and I am even now building my own house. I have also been able to marry out of this and this is what I use to feed my family*".

Philip (a miner) also noted that

> "*I wouldn't say it has not help me to be honest. I moved from Walewale to this place (Prestea) to engage in galamsey. Through galamsey , I have been able to provide school fees for my siblings who are in Walewale. I also use this to cater for myself*."

One person noted that for him, the main reason for engaging in the activity was to get money to further his education to the university. Here is what Adjei said

"*I have completed senior high school. Even though I passed my exams, there was not any money to further my studies. My mother is old and my dad too is dead so I had to find a way to survive and that is how come I came to Prestea. And as I speak to you now. I am in level three hundred at my undergraduate level*"[6]

Livelihood impact of small-scale mining on community

Community members were asked about the impact of mining activities on the community. They reported that the negative impact on livelihood is enormous and findings are grouped under environmental and socio-economic impacts.

Environmental impact of small-scale mining on the community

When participants were asked about the impact of 'galamsey' activities on the community, immediately, a participant noted that '*then we have a lot to talk about today'*. Focus group discussion revealed that the impact of small-scale mining on the environment covers from water pollution, air pollution, destruction of the vegetation to farmlands. The participants revealed the extent to which the activity has destroyed their lands, farms and water bodies all in the name of mining for gold. Forest and land reserves that were used for agricultural purposes, now according to the participants have been cleared for mining activities. For example, Yaw Daani, a community member stated that

"*before this galamsey started, most of our forests were not cleared and the land was good for farming. I used to have a vast land that was used for farming, but as I speak to you now it is a mining site. I sold them all*"

While some participants shared their views on the extent to how their lands are now used for mining activities, other noted also the extent of damage caused by clearing the land. Adwoa, a community member opined that

"*when I used to be a farmer, we didn't destroy the farms like that. We only cleared a small portion for farming and even with that we didn't cut all the trees. But for the galamsey miners, hmmmm, they clear the land bare and leave it just like that after mining. They dig deep to the ground and don't even cover is after all. How can you farm in these deep pits? They should abolish it for life*"

[6] a level three hundred student is a third-year student at the undergraduate level in Ghana

Participants who used to be hunters pointed out how mining activities have affected their way of life. Anamzoya (a community member) stated that

> "*we can no longer go for hunting. There is even no forest to go and hunt. All have been cleared and destroyed by mining companies and galamsey people. The animals have all run away to other area. We don't get bush meat to eat anymore*".

Miners indicated that although the activity has taken some portion of land for mining, there is however more land for people to engage in whatever activity they want to. Philip (a miner) revealed that

> *"Augustine, it is not as if we have destroyed all the lands here. We only mine areas that belong to us. I don't know about other mining groups and companies. But my point is there are still left vast portions of land for agricultural and other purposes. If I say that our activity hasn't destroyed some lands, I would be a liar. However, they are more land left so people should stop saying our activity is destroying the environment. They should tell us how we should also survive*"

Socio-economic Impact

All participants indicated that, mining activities in the community has resulted to the destruction and pollution of water bodies (streams and rivers) that served as sources of drinking water. Farmers who depend on such waters for irrigation purposes in the dry season all complained about the operations of miners destroying water bodies. In addition, participants explained that, the environmental and Protection Agency had notified and advised them of the poisonous nature of the water due to chemicals from miners that has run into their water bodies. All the participants indicated that the impact has been negative and that the manner in which small-scale mining is destroying their environment is unacceptable. For instance, Danso, a community member noted that

> "*what I even hate about them is that they have destroyed all our water bodies. At first, we used to drink from them but now you can't even use it to wash your feet. The colour of our water bodies looks like tea with milk. We therefore no longer drink, cook or wash from them anymore."*

Responses from my participants further showed that, major river bodies and streams that serve as sources for domestic and official purposes in the town and even its surrounding communities have been polluted by the activities and operations of illegal small-scale miners in the region.

Findings revealed that small-scale miners' operations have also resulted in the release of dangerous and harmful chemicals into water bodies and streams that serves as sources of drinking water in the town. Chemicals used in mining include mercury, cyanide arsenic etc. The spillage of these chemicals into river bodies has even led to not only the contamination of water bodies but also the loss of aquatic animals in the community. People who first relied and depended on such water bodies for a livelihood have been forced to relocate.

Moreover, since most of the small-scale mining activities are done in the 'open air' or 'space' state, in the course of their operations, they release dangerous chemicals into the community's surroundings. The chemicals run into people's farms and displaces them from engaging in agricultural production. Zenabu, a community member stated that

> *"if I show you my farm right now, you will say we should collapse all mining companies and activities of illegal small-scale miners. When it rains, it combines with their chemicals and run into our farms. We even do not know whether we are eating poison or not. Last year, I was made to cut down my crops by the agricultural extension people because they say my crops are not good for consumption".*

Interviews with some stakeholder participants revealed that, due to the level of pollution caused by illegal miners, the government, non-governmental agencies and even affluent community members are spending huge sums of money to drill new bore holes and standing pipes. Community members therefore do not drink and use water from rivers and streams anymore in their everyday activities. Atingah (from the Lands Commission) opined that

> *"it is not safe to drink from the streams or river bodies here. Almost all are polluted according to the environmental and protection agencies. Boreholes are therefore being drilled for the community members by some philanthropists and the government"*

Participants noted that the way they used to live is not the same as they do now and according to the participants, before the advent of small-scale mining in Prestea, the major source of livelihoods were hunting, farming and herbal medicine selling. The participants noted further that, activities of illegal small-scale miners have destroyed these livelihoods they lived on. They were of the opinion that, the activity has negatively affected their vegetation and lands to the extent that they can no longer farm on them. Out of the three sources of livelihood they depend on, almost all noted that farming was most negatively affected as compared to selling herbal medicine and trading.

How small-scale mining affect farming as a source of livelihood

A follow up question was asked about how the activities have destroyed farming/farmlands that serve as a source of livelihood for people. The participants highlighted livestock rearing, crop farming and at times fishing as their major areas affected by the activities of small-scale mining. Participants whose source of livelihood depend on agriculture claimed that the activity has caused unproductive farmlands. When they grow they reap very little as a result of the land losing its nutrients from dangerous chemicals from illegal small-scale mining. Their livestock die due to contaminated water bodies and even weeds that serve as feeds for the animals have been affected. On the other hand, two of the participants noted that they have not experienced anything of that sort. Almost all participants claimed the activity has affected their livestock, and farm produce attributed it to the fact that small-scale miners use chemicals such as mercury and cyanide. These chemicals which run off into water bodies or thrown into land, render the land unproductive. Chemicals that run into water bodies also pollute it therefore endangering the lives of the livestock.

Moreover, participants told me that chemicals used by miners prevent grasses from growing for the livestock to graze on, the very source of their feeds. Nadia, a community member said that,

> "*I don't know what at all is in the chemicals. I see them (miners) using their hands in their operations without dying, but as soon as our animals get contact with them (chemicals), they die. About four months ago, I lost like eight of my livestock*".

It was also revealed during the focus group discussion that, people at times do not see their livestock again after their livestock move to the mining sites to graze. They expressed frustration as to the way the livestock goes missing and noted that either they fall into the miner's pits or they get stolen by the miners.

Out of the eight people who took part in the focus group discussions three noted that galamsey operations have led to low farm outputs a result of the unproductive nature of their lands now. They were of the view that illegal or small-scale miners 'hop' from one land to the another after extracting gold and do not undertake any form of land reclamation, this makes the land bare and expose their farmlands to erosion and flood during rainy season. Such participants emphasized that farming is no longer attractive in the region and this has led to shortage of food in the region.

On the other hand, the miners who do farming as an alternative or additional source of livelihood noted that, with the money they get from mining, they have employed more people

on their farms and hence improved their farm produce. Participants miners who noted that their ability to employ people on their farms argue that, they are able to produce more to feed their family and even sell some for income. The assembly man in response to the two claims noted that, all of them are true but the extent of the damage in relation to the reduction in farm produce/farm labour is high. He further noted during a conversation that

> "*at first, Prestea used to be on top when it comes to farming. But my brother (referring to me), since this illegal or small-scale mining came, people don't want to venture into agriculture anymore. They prefer to mine and get money early than do agriculture. Only few do it alongside but even with that, it is during the rainy season where they can get more produce and hence get more income and food to feed their families."*

Small-scale mining has impacted on the level of trade in Prestea. Responses generated from interview and focus group discussions revealed that small-scale mining has had both negative and positive impact on trade. Participants who revealed that small-scale mining has impacted positively on trade noted that there has been an increase in the number of stores, vendors who sell provisions etc. because of the massive income generated from mining activities. On the other hand, findings revealed that small-scale mining has also impacted negatively on trade in the sense that people who depended on their farm produce before coming to sell in the market have had low productivity and even to some, they have had their whole farm destroyed by mining activities. This either cause them to get low or no income. Also, people who relied solely on agriculture find it now difficult to buy from stores and market. They noted that prices are too high to afford. Zenabu (community member) opined that

> " *…brother Augustine, if I tell you what these galamsey people have done to my family, you will cry for us. I do solely farm on a land I inherited from my parents, but these people have cleared my land for mining activities. I don't have anything to depend on now how much more money to buy their expensive products from the market.*

Some participants also expressed dissatisfaction and frustration on the way miners have cut down some areas that helped serve as their source of living. For instance, they argued that mango trees, apple trees and shea butter trees have been cut down and hence the women now stay at home for their husbands to cater for them. This is what Adwoa (a community member) had to say

> "*before these galamsey people came, I go to the forest to plug mangoes, and pick shea butter to sell to feed my children. As I speak to you now and I have 4 children. If my*

husband doesn't bring anything home, we don't eat, so what these people have done is it fair?"

Another participant also confirmed a similar situation and the extent to which she has to let his children go and live with people so she can have something to eat. Nadia opined that

"*my story is a bit sad, but I have to say it. Do you know that my three girls are now staying and living with people so that I can also eat. Who will want that to happen to his children and family but ask me why? These so called galamsey people have cut down all my avocado trees. Things I have toiled for and sold all this while to feed my family." It is not nice, they are greedy people". Only them want money".*

Health implications of small-scale mining in Prestea

Participants were asked about how small-scale mining has impacted on their health. Findings from the study revealed through interviews with miners that, the activity exposes them to several risky and health related problems and diseases such as body pains, arms pains, headache, injuries, eye problems (popularly referred to as "apollo" in Ghana), malaria, leg breaking and ulcer, sometimes death, lungs problems, respiratory failures and kidney problems.

Body Pains / weakness

All miners experienced body pains associated with the small-scale mining. According to the participants, the activity is physically demanding because they use rudimentary equipment such as pick-axes, shovels, and head pans in carrying out their activities. Due to that they mostly experience body pains. Tamakloe, who has engaged in mining for over 20 years noted that,

"*the way the activity is done, I mostly have body pains all over my body. I do the digging aspect with my colleagues and it's not easy. The work is very tedious but I have to survive. I always have my pain killer (medicine) with me to help reduce the pain*"

Other participants noted that, they experience arms and waist pains. It was evident from the miners that, the type of role one plays in the process of mining actually determines the level and type of body pains one endures. For instance, miners whose role is to pick up broken gravels, soils and particles in the process of mining complained about experiencing waist pains. Whereas those who carry the particles complained of mostly experiencing headache and the diggers complained of arm pains and waist pains. Below are how participants describe and

expressed how they feel mining activity is or has impact on their health and wellbeing. Kwamena (a miner) said that

> "*whenever I carry my load (referring to particles of gravels and sand), I have to take some pain killer by close of day. It is a usual thing that occurs anytime I carry the load*"

Odeneho (a miner) also stated that

> "*Talking about health impact of galamsey, I will say that my role in digging trenches and pits for us to search for gold usually make me feel pains at my arms always. I use pick-axe and you know one have to exert energy and pressure on it before it can dig. My friend who works with me however also complain of waist pains most of the time. His role is to take the sand with shovel anytime I finish dragging. So I will say that it depends on what you do at the field site*"

Herbert also noted that

> "*The gravels, which contains particles of sand and gold is very heavy. Anytime I carry it, I get severe headache. But what can I do, it gives me money to live so I can't complain that much."*

The miners further complained of chest pain, weight loss and weakness. All the people interviewed mentioned weakness as a major health implication they experience in doing illegal small-scale mining. Nika mentioned,

> *"I never experience any form of chest pain till I started doing this business. I really feel pains all over my chest and this causes me to be weak. I asked some of the people I do this activity with and it seems almost all of them experience the same thing"*

Fever and cough

Some miners also revealed having had fever and cough. When asked what might have caused this, participants gave several reasons. Some noted that it may be due to the mercury they use in the process of washing and mining the gold. Others think it is due to the head pan they use in carrying sand to the place they wash with water to separate the gold from the sand. Others also informed me they believe they got it from the dust that comes out from the soil, gravels or sand as they dig.

Philip for example noted that,

I even don't know where I got this from none of my relatives is experiencing this for me to even say that I got it from them. But I believe strongly that it is due to the dust that comes from the soil because my part of the activity is digging"

Injuries

From the study's findings, it was revealed from participants that, accidental cases are very common and rampant with severe injuries happening almost all the time. Sometimes a person can be wounded by the machine or tools use for working. Moreover, the study found that another source of injury to miners is how some people unfortunately fall in pits created by themselves. This is common and happens very often, the participants informed me.

Adama, (a miner) had this to say

"*I have suffered several injuries since I started this galamsey business. I have had my leg broken before by falling in one of our pits, have also had a deeper cut at my feet by a shovel. One of the days we even have to send one of our colleague to the hospital when a pick-axe pierced through the leg. So this is not an easy job to do. The risk involved is high but we have to do it to survive"*

Eye Problems

The findings showed how illegal small-scale mining sometimes cause most of the workers to have problems with their eyes as a result of the chemicals they use in mining. It was revealed that this kind of health impact is common especially in the rainy season. During this time the chemicals especially the cyanide which mixes up with the dust wash down their bodies, so when it comes into contact with the eyes, the eye develops sores and hence causes eye challenges. This is because they are in direct contact with chemicals, so their chances are very high as compared to community members. Adjei (a miner) noted that

"All of us have had eye problems before. The mercury and cyanide we use are dangerous to our health and I think that is why. Dust is also a major cause to most of us getting reddened eyes"

Issues of hearing

With respect to issues of hearing, responses came from participants who uses a Chinese manufactured machine called "Chanfa". According to such participants, the machine makes a

lot of noise and vibrate their body in the process of grinding the stones and soil and this affect their hearing abilities. Abudu noted,

> "*I mostly suffer from hearing. This is because the "Chanfa" machine we use in grinding the stones and soil to separate the gold is too noisy and this is the cause*".

It was revealed that, people who suffer from hearing problems do not use protective clothes and materials (headsets) and other materials causing them to suffer the risk thereof. This came to light as one of the participants noted that for him, they use headphones or set whenever they use the "Chanfa" machine. As a result, he doesn't have or experience hearing problems. This was what Mensah had to say

> "*for me 1 don't experience any hearing problem because I use my head (ear phones anytime I go close to the Chanfa machine."*

Malaria

Participants further noted through interviews that they sometimes get malaria as a result of mosquito bites. Participants revealed that through their own activity of leaving some pits uncovered after mining serves as a breeding place for mosquitoes and this they believe causes them to get malaria. Responses given to confirm such health impact include

"*malaria is very common here. Almost all of us have been affected by malaria as a result of mosquito bites. To be honest we cause it by leaving some pits uncovered so when it rains and fall in them, it breeds mosquitoes and they bite us. That is why we usually get malaria*" (Kojo).

Nika, a miner also mentioned that

> "*this place and mosquitoes, don't go there, so we get malaria most of the time. This is a big challenge that we face here*".

It was moreover revealed that, another big challenge and health impact of small-scale activity among the miners was leg ulcer. Participants who had engaged in the activity for over 10 years mostly complained of having experienced this. According to such participants, this is caused by the cyanide they use in their mining activities. Cyanide is a very dangerous chemical that has a lot of serious repercussions on the individual and as a result has been banned by the government for use by small-scale miners, but they still use it. As a result of this, they develop wounds around their leg, a potential source of getting leg ulcer.

Nhyira for example noted tat

> "*when I went to the Prestea hospital, the doctor asked me whether I am a miner or has come into contact with some mining chemicals. And I said yes. We use cyanide and mercury in our mining activity. And that was when he confirmed that I have leg ulcer as a result of the cyanide I constantly come into contact with my leg*".

Other members who have also contracted wounds on their legs by coming into contact with chemicals used in mining also confirmed this.

Depending on the number of years one has been in the mining sector, certain long effect diseases or impacts were found. Diseases such as lung disease, respiratory failures and kidney problems were noted to be among those who have engaged in the activity for a very long time. For instance, two of my participants who have engaged in galamsey for over thirty years had experienced kidney and lungs problems.

> "*the doctors told me I have lung problem and claimed it was as a result of the chemicals I have been exposed to for several years since I started illegal small- scale mining." (*Herbert, a miner)

> *"hmm, I was diagnosed of kidney problem. The doctors told me it was due to the mining chemicals I have come into contact with for a long time*". (Kwamena, a miner).

Information from some health officials in Prestea government hospital also confirmed that small-scale mining predispose people to kidney and lung problems. Michael, a told me that

> *"the chemicals small-scale miners used are very harmful to their health. When gotten into contact with for a long period (for example by inhaling) affect their lungs and kidney"*

Landslide and death

The study further found out that another health impact of illegal small-scale mining was land-slides and death. Landslide occurs where there are loose particles of soil. When the rains fall very heavily, the soil that is very loose develop cracks and fall. The issue of landslide is very common which all miners and everyone even in the community has a good knowledge of. This has cost a lot of lives in Prestea.

Abudu, a miner for instance noted that

> "*some time ago, it rained heavily but we still decided to mine. When we were entering the pit dug to mine, one of our colleagues slipped and fell into the pit and died. It is something that occur at times as people either die or sustain injuries*"

Also, Anamzoya, a community member shared the same views of Abudu by saying that

> "*pit collapse and fall on miners most of the times. I know many people who have lost their lives through this. The lucky ones don't die but sustain serious injuries*"

Health impact on community and its members

Views and opinions of community members were also sought on how the activities of illegal small-scale miners has impacted on their health. Findings from the focus group discussion showed that galamsey activities have caused several health impacts such as loss of lives, sustained injuries, malaria, cholera, diarrhoea, and skin diseases.

Loss of lives and bodily harm

Participants noted that the dangerous aspect of the activity is the loss of lives as a result of the uncovered open pits. The participants noted that uncovered pits cause danger and serve as a death traps to people. Keziah (a community member) shared an incident that had occurred two weeks prior to starting my research in the area

> "*Brother Augustine, do you know that two children were seen floating on the surfaces of open pits that were covered with water when it rained? This caused the death of the children. Not only the children have the activity resulted to their death, but it is something that usually occurs in the community".*

The study also found that pits that are covered by miners but not done properly also lead to the community members breaking their legs. This was also of a major concern to the participants as a threat to their health. This causes severe injuries to some community members and hence a major impact on their health and wellbeing.

Malaria

In addition, as earlier on indicated by the miners themselves that their operations lead to them getting malaria, the same finding were made by community members. The community members also noted that uncovered pits by miners served as breeding grounds for mosquitoes when it rains and hence increased the chances of them getting malaria. All participants (community

members who were selected for the focus group discussing agreed to this as a member raised such a point. Below is what Danso noted

> "*the activities of these so called galamsey miners have led when it rains it get into these pits. As it stays there for some time, it breeds mosquitoes and that lead to us getting malaria day in and day out when they bite us*".

Cholera / diarrhoea

Participants highlighted that, people in Prestea are prone to getting cholera and diarrhoea because of the impact of mining activities by miners. The findings showed that as chemicals used by galamsey operators run into water bodies and rivers, they pollute such waters and become dangerous to use. People who fetch the water to drink get cholera and diarrhea as a result of the harmful chemicals which has polluted the water bodies. It was revealed that, this is the major health issues arisen out of the operations of illegal small-scale miners: For example, this is what Adwoa (a community member) had to say,

> "*water pollution is of a major concern to us and our health. As they say water is life, if you come here it is not giving us life but rather killing us because of these galamsey operators. The chemicals they use for mining are released into our water bodies making it impossible for use. We get cholera and diarrhoea anytime we drink from them, and this is serious. What should we use for our domestic activities?"*

Yaw Daani (community member) also noted that,

"*…my brother, do you know that as I speak to you now, my child is suffering from diarrhoea. This is all because we don't have money to buy water from the communities standing pipes and boreholes so we drink from the polluted water caused by the activities of these galamsey people. They should be banned forever from doing galamsey because it is destroying all our water bodies and source of drinking water".*

Skin Diseases

The study revealed that chemicals used by mining companies that run into water bodies causes people to experience some form of skin diseases when they use the water to bath or even drink from them. Six out of eight participants from the focus group discussion noted having suffered from some sort of skin disease or rashes as a result of using water from the community's stream

to bath of which they have been cautioned about. This is what Zenabu, a community member has to say

> *"when I don't have money to buy pipe water (standing pipe water), and fetch water from the stream to bath, I will get rashes all over my body. This does not affect me alone but all my children also. We didn't understand so one day I bathed the stream water and bought some standing pipe for my children and husband to use it. shockingly, I had some rashes and they didn't. it was then I became convinced that our stream is really polluted and hence dangerous for our health".*

Reuben (from the Minerals Commission) also opined that

> *"At first, when there was no galamsey operation, we drunk and bath from our stream without getting any disease or rashes. But when these so called galamsey became rampant in the community, you dare not drink from or use any of our water bodies for domestic purpose. They have all been polluted. If you use it to bath, you get some rashes all over your body. So we don't use it anymore"*

CHAPTER SIX: DISCUSSION OF EMPIRICAL FINDINGS

In this chapter, I will first begin with recapping the study's findings, and then go ahead and discuss the findings.

The study's findings show that people engage in small-scale mining because of poverty, unemployment and collapse of businesses. Also, people with low or no educational attainment are compelled to do small-scale mining for a livelihood. The nature of the small-scale mining itself in terms of the activity requiring less skills, it being easily accessible, not requiring huge capital or at time no capital at all to start makes it easier for people to want to do small-scale mining. Small-scale mining also gives quick money, require less or no expensive tools, the procedures, amount and processing times to be granted a mining concession not being favourable and agricultural production being unattractive in the region now causes many people to do small-scale mining.

Moreover, I have revealed in the findings chapter that, the impact of small-scale mining on livelihood include improvement in the standard of living of people (positive impact) especially on the part of miners and others who depend on them for their livelihood. However, its negative impacts were environmental pollution, destruction of water bodies and farmlands. In terms of health impact, small-scale miners experience body pains, weaknesses, injuries, eye problems, hearing problems, malaria, leg breaking/ulcers, skin related diseases, fever and cough. Health impact on the community members also include malaria, loss of lives, leg breaking/injuries, diarrhoea, cholera and skin diseases.

Reasons why People engage in mining

The study's findings suggest the majority of people who engage in small-scale mining are poor. These people do not have anything to live on and hence describe the activity as poverty driven (Ghana Action Aid, 2006). The implication is that such people need work that will earn them money. Because of this, people resort to engaging in small-scale mining. Opoku-Ware, (2010) and Antwi et al., (2014) also found that people engage in illegal small-scale mining because of poverty as people do not have enough money to provide for either themselves or their family relations. Similar finding was made by Belem (2009) in Mali that, people do small scale mining because they want to provide for their basic needs. My study's findings are in consistent with the findings of these scholars as majority of the participants mentioned poverty as a reason why they do small-scale mining in Prestea. The social determinant of health framework notes that, socio-economic factors are key in explaining the health and wellbeing of people. My findings show that a socio-economic factor that impact on the wellbeing of miners in Prestea is poverty.

In addition, another reason that prompt people to engage in small-scale mining is unemployment. Critical reflections on this motivation revealed that there are not many paid jobs or formal jobs in Ghana and Prestea for that matter and therefore people find it difficult to get sources of income to cater for themselves. In the Ghanaian context, it is expected that once someone gets to age eighteen and above, even though it may be contextual, one should be able to cater for himself and the society has come to accept this. If one does not work, he or she is not respected especially if you cannot provide for your own self and family. People who tend to be first born in their family even have a bigger obligation. The implication is that once someone reach such an age group, he or she must find his or her way out to live by himself and even cater for other family relations. This underpinning societal values and customs and the unavailability of jobs in the country prompt people to want to do anything for a livelihood. In this sense, people prefer to engage in small-scale mining for a livelihood. Even though there are institutions mandated to monitor the operations of people who engage in mining in the country such as the Minerals Commission and the Lands Commissions, such stakeholders find it difficult in executing their task. Responses generated from stakeholders revealed that, one would have done the same thing to survive as the community lacks good paid jobs. The findings support previous research by Hilson (2001). The researcher noted that despite the fact that people are aware of the risk associated with small-scale mining, they still do it because they have no work to live on and survive. Similarly, Awumbila and Tsikata (2004) found that unemployment is the reason why people in the region take up mining activities (illegal mining). My study is in line with theirs as my findings revealed that unemployment in Prestea resort to people engaging in small-scale mining as a form of livelihood approach. The social determinants of health framework also note that the unemployed state of people causes them to engage in practices that affect their overall wellbeing. Staying in that state for a longer time the framework argues, is detrimental to one's health. The mental or psychological notion of being unemployed itself is a negative impact to our health. People that were unemployed before deciding to do small-scale mining see it as a burden anytime they have to think of something to eat. This was even worse when they sleep and realize the day is about to break. For examples, people think of what they are going to eat or where they can get work to earn money to cater for themselves. These were the questions that miners posed, and this affects them psychologically or mentally as argued by the social determinants of health framework.

Moreover, the level of people's education or their educational status is a major reason why they engage in small-scale mining. The findings suggest that people who have never been to school

or have low educational status find it difficult to secure formal jobs. This is linked to unemployment (discussed above) as being an issue now in Ghana to the extent that there is an association of unemployed graduate union in the country. These are people who have completed university but do not have jobs. Having said this, the study's findings suggest that people with no educational background at all are the most vulnerable to engaging in small-scale mining for a livelihood. The Ghanaian society is structured in a way that once one completes university, the society expects and demands that you work to fend for yourself as well as your parents and other siblings, especially the younger ones. There is a local adage in Ghana that, "if your parents catered for you to develop teeth, then you must also look after them till they lose their teeth". The implication is that, it puts pressure on people to find job (a source of livelihood) and lack of securing one compels people to engage in illegal mining. Lapointe et al., (2007) found that people's level of education impacts on the choice of work to do and this also have implications on their overall wellbeing. The social determinant of health framework notes that education is an important determinant of health. According to the framework, education impacts indirectly on the health of people. Indirectly in that, it influences other determinants of health such as occupation and income (Graham, 2004; Lapointe et al., 2007; Mackenbach et al., 2004; WHO, 2008). In Canada, Tremblay et al., (2011) recognized that, there is high level of association between education and health. People with high educational levels are likely to get good jobs, with well-paid salaries and this can change the way they eat, behave, and the environment they live in which is key to ensuring good health and wellbeing. Similarly, Ross and Mirowsky, (2011) observed that people with low educational backgrounds may be disadvantaged in terms of the work they might get, its working conditions which may affect their health and wellbeing. My findings are consistent with the framework and previous research in the sense that the educational attainment of participants was mostly low or that people have never been to school at all. This suggest that it is unlikely for such people to get formal jobs in Ghana, hence compels them to venture into small-scale mining.

Additionally, another fundamental issue raised by people as being a reason why they engage in mining was as a result of the collapse of companies and the non-performing nature of petty trades. The study's findings suggest that the non-making of profits by mining companies' people previously worked for was due to the fact that almost all the land they acquired a mining concession on had been used. This make the company not to get enough gold to sell and make profit to pay their employees hence laying some workers off. In addition, people who engaged in their own petty trade but were not making profit or breaking even either led to the collapse

of the business or the owners opting to stop its operations. The implication is that such people have to seek for a source of livelihood and hence decide to engage in small-scale mining. The findings support previous work by (Kumah, 2006) who for instance notes in his study that, the non-performing nature of businesses especially in communities of mining operations compel people to want to do small-scale mining looking at the fact that small-scale mining provides faster money and is easily accessible to people. Placing it in the social determinants of health framework, it is evident from the framework that one of the ways to improve one's health is having "good income" as one can provide for his or her needs. By implication, this requires that one would need a job to make a living. People who do not have any source of livelihood in Prestea have also develop their own means to making a living. That is resorting to small-scale mining and this impact on their health and wellbeing.

Small-scale mining by nature requires less skills, rudimentary tools and therefore do not need any special training or technique to do it. Moreover, it is an activity that do not require strictly educational qualification to engage in. The implication is that, it is an activity that is open to all and everyone can decide to engage in it. Almost all participants (miners, community members, stakeholder members) noted such reason as a motivation factor for people engaging in illegal or small-scale mining. The activity is also known to help generate quick or fast money and this attract many people into it. Even though this was mostly the reason for several people, there were some other sides to this. Some felt that even if small-scale mining generates less remuneration or wages, they would still have engaged in it considering that they have no source of livelihood or paid jobs. Secondly, it can help them to cater for their own basic needs and that of their families. There is a popular adage that, "*half a loaf is better than none*". That is to say, to stay without a job or no other means to an end, people would rather prefer to engage in small-scale mining (even though they may operate illegally) for a livelihood. This is consistent with previous work conducted by Amponsah-Tawiah and Dartey-Baah (2011) that the overarching objective of people engaging in small-scale mining is to seek for a living; a livelihood that can help them cater for their basic needs or that of their siblings. Other research works show that there are others who depend on the miners for their livelihood (Adam, Owen, & Kemp, 2015; Belem, 2009). My study revealed a similar situation and further shows that the urge that miners have so many obligations to deal with (for instance catering for their siblings) encourages them to continue to mine as they feel that mining is helping them to fulfilling and discharging their duties despite the risk and health related problems associated with it. My study is in line with the social determinants of health framework that material circumstance or the living conditions

of people directly or indirectly impact on their wellbeing as I found that the situations people find themselves in as being the breadwinner of the family requires them to have money. This further implies that they have to seek for a source of living; thereby compelling them to engage in small-scale mining.

Also, the study's findings suggest that, even though people are aware that in order to engage in any mining activity in Ghana, one must seek for a concession, some people ignore the whole procedures to getting a mining concession and mine illegally. The findings suggest public policies contribute to factors that make people to want to do small-scale mining illegally. For example, the findings suggest that procedures involved in getting a concession in Ghana is too tiresome and cumbersome. Because of this, people prefer to cut corners and mine illegally. In a research conducted by Awumbila and Tsikata (2004), the researchers also found that some small-scale miners are constraint by procedures for acquiring a mining concession and therefore adopt strategies to cut corners to engage in mining without adhering to the laws governing mining. The findings further suggest that the procedures are too long (as can be seen from the introductory chapter about the various procedures you have to go through to be granted a concession) and that discourages people. In addition, not only are the procedures tiresome and discouraging, but also the fact that the amount one must pay in order to be granted a concession is also high. The implication is that not all people will get the amount needed to go for a concession. This causes them to abandon the whole process. According to Awumbila and Tsikata, (2004), some small-scale miners in Ghana are constrained by the amount of money involved to be granted a concession and this causes them to ignore the whole process and resort to their own mining; which is mostly illegal. Hilson and Clifford, (2010) revealed a similar finding to being a constraint on why people do not acquire a concession before mining. Also, the duration within which one must wait before a concession is granted the study suggest are is even more discouraging. Even though the exact number of months or weeks were not given, the study shows that one can wait up to about two years before your processes go through. People prefer not to wait before they are issued a concession because they feel insecure on the land they want to be given license on. They presume someone will go to mine first or pay more money to appropriate authorities (for instance the Lands Commission) for the land to be given to another person to mine. My research findings are consistent with the notion of the social determinants of health framework that there are public policies that impact directly or indirectly on people's wellbeing. My findings revealed that a public policy that play in role in prompting people to engaging in small-scale mining and further impacting on their health and wellbeing

is the time frame, procedures and the cost by government institutions to granting a mining concession. Moreover, the findings suggest that people are also not willing to pay for the license even though they have to money to do so. That is to say, it is not just lack of money that prevent people from acquiring a license to mine, but also lack of willingness on the part of others to pay.

People tend to engage in small-scale mining on the notion that their farmlands are no longer productive and cannot give them an adequate source of living. People's farmlands are destroyed by polluted running water from mining companies (or miners) to people's farms. The chemicals therefore make the land unproductive for agricultural purposes causing them to leave agricultural production to seek for another source of living such as small-scale mining. Dealing with illegal small-scale mining as a threat to food security, the researchers Danyo and Osei-Bonsu (2016) emphasized that, the activity of miners has affected a lot of farmers and productivity. People who usually depended on their farms for survival do not have that opportunity anymore. Farmlands have therefore turn into mining sites. This is one of the reasons why some famers have diverted to illegal mining activity. My study therefore agrees with the findings of Danyo and Osei-Bonsu (2016) that, loss of farmlands, destruction of farmlands and unproductive farmlands are reasons why some people decide to engage in small-scale mining for a livelihood. It is consistent with the social determinants of health framework that living conditions of people compel them to do things that impact negatively on their health and the study suggests that loss of farmlands and not having a livelihood make people to illegally engage in mining that lead to negative health impact such as injuries (see impact on health), for example.

Impact of small-scale mining on livelihood

While some of the impact are positive (e.g. improved standard of living), others are said to be negative (e.g. destruction of water bodies). My study's findings suggest that the impact of small-scale mining has mostly been negative on the part of the communities in terms of destroying their lands, causing environmental pollution etcetera. On the other hand, the findings suggest that it has rather had positive impact on the lives of miners by helping them get money to provide for their basic needs as well as those who depend on them for a livelihood.

In terms of positive impact, the study suggest that through small-scale mining, people have been able to educate themselves, provide for their families and friends, buy a plot of land, build houses, invested some of their earnings and are able to provide for their basic needs. Others

have also been able to marry and make a family; something that is highly esteemed and respected in Ghana. According to the Ghanaian culture, if one is not able to fend for himself and take up certain responsibilities, you cannot marry. Ghanaians believe that if you cannot provide for your own self, how can you provide and cater for someone's daughter. Therefore, being able to marry is highly respected and the study suggest that through small-scale mining, people have been able to do that.

Others also have been able to expand their business through small-scale mining. This implies that small-scale mining lead to people improving their standard of living. This can be explained in two ways. In a study by Ezeji Onyebuchi (2014), the researcher found that through illegal small-scale mining people have been able to get enough money and can now provide for themselves. For instance, people can now pay for their utilities, school fees, clothing and three-square meals in a day. The study's findings are in line with the social determinants of health framework. This is because the framework places emphasis on people's occupation helping them to generate income which impacts positively on their health and wellbeing because they can now afford to cater for their needs and improve their wellbeing. This is the case for people who engage in small-scale mining as it improves the standard of living by providing jobs and helping others expand their businesses as enumerated above.

Whereas miners gave only positive responses as to how small-scale has imparted on their lives, the reverse was the case for community members especially in terms of it environmental and social impacts. Environmentally, small-scale mining has had negative impact in Prestea in terms of destroying water bodies, vegetation and farmlands. For example, the findings chapter showed that, small-scale mining has destroyed and polluted several water bodies that serves as sources of drinking water for community members. Not only has it destroyed water bodies that serve as sources of drinking for people but has also affected how people go by their daily household chores thereby causing a negative impact on their well-being. Community members do not easily have access to open sources of water for their daily household chores. People who do not have money to buy borehole on standpipes water (a water collecting place) fetch some of the polluted water that go a long way to affecting their health. There is consistency of my findings with a research conducted by Kwateng, (2012). In that research, the researcher found that activities of illegal small-scale miners have destroyed several water bodies thereby having negative impact on the environment. Similarly, another research conducted by Madzimure (2015) in Zimbabwe also proves that small-scale mining causes damage to several water bodies if not properly managed and monitored. It is important to note that, as a result of this, the living

conditions of people in Prestea have been affected in several ways such as not getting good drinking water especially for people who cannot afford to buy "sachet waters" or standpipe waters. This has affected community members' livelihood negatively. The implication is that it has exposed them to several sicknesses and diseases such as cholera and affecting their overall wellbeing. The social determinants of health framework opine that, the condition in which people live and the circumstances in which they find themselves in is a major determinant factor of their health. My results fit with the social determinant of health framework in the sense that small-scale mining has destroyed several water bodies in Prestea and have put the health and wellbeing of people in the region at risk.

Moreover, what became evident was that miners have cut off trees and vegetation without permission which is not generally good for people's wellbeing. Danyo and Osei-Bonsu, (2016) for instance note that the massive destruction of arable lands especially in agro-ecological areas and zones by illegal small-scale gold miners have affected agricultural production in the country and hence threatens food security in Ghana. The destruction of the vegetation has therefore shifted labour from food crop farming to other sources of living including illegal mining itself. Hayes, (2008) also found similar findings that the destruction of farmlands or the vegetation by small-scale miners affect agriculture and food securities (Awumbila & Tsikata, 2007; Ghana News Agency, 2011). Ghana News Agency, (2011) also revealed that livelihood such as shear nut picking were affected by the operation of miners, displacing about 527 farmers and destroying 3040 shear nut trees. The resulting outcome is that such people tend to engage in small-scale mining as their alternative source of livelihood.

Impact of small-scale mining on health and wellbeing

The third research question of the study was to find out the health impact of small-scale mining on miners and the community. The study's findings suggest there are several health impacts associated with small-scale mining. These impacts include body pains, headache, injuries, eye problems (popularly known as 'appollo' in Ghana), malaria, leg breaking and its related implications, death, problems with lungs and kidneys.

The study's findings suggest that depending on the role one plays in the mining process, brings about it associated body pains. For instance, people who engage in digging experience severe waist and arms pains. Those that carry or collect the dug particles or sand with shovels experience arm and waist pains. In the same manner, people who carry collected gravels or particles with head pans to a place of wash where they separate the gravels from the gold

experience head problems, neck pains and arm pains. Also, others whose role is to separate the gold from the gravels or sand particles with water mostly experience waist, arm and leg pains. This is in support of a research conducted by WHO (2013). Even though WHO did not specifically look from the miner's point of view, they however explained how equipment used in mining and how small-scale mining activity is carried out actually have implications on the health of people involved. WHO, (2013) concluded that mining operators are often exposed to physical hazards such as injuries and pains. My research findings share similar results with (WHO, 2013). It is highly possible that, these feelings contribute to negative health impact of people as has been reported by WHO (2013) and the implication is that it also has negative impact on people's wellbeing.

Moreover, findings suggest that miners experience weakness in their body because of the physically demanding nature of small-scale mining. Further investigation as to how stressful the activity is revealed that because miners know that they are operating illegally, they are always in a hurry to mine from one site to another. The longer they stay on a particular site, the easier it is for their activities to be traced and for them to be caught by the proper authorities (such as the Environmental Protection Agency and the Minerals Commission for further actions). If caught one can be fined or even jailed. In that way the miners work faster and, in a rush, so that they are not caught. This causes them to stress and impact negatively on their overall health and wellbeing by causing them to be weak. Again, the severity of participants' weaknesses is related to the type of role played in the mining process. Miners who dig, carry gravels, collect gravels after digging experience more severe weakness than those who only wash and separate the gold from gravels or sand. My study is in line with previous researches conducted by Evans and Kim (2012) and WHO (2008) that stress at the work place play a role in contributing to the differences in health situations of people and that the role one plays in his or her working environment is important in determining or impacting on their health. People with physically demanding roles carry risks which affect health, hence the social and psychological environment at work is an important determinant of health.

Moreover, the study's findings suggest that people sustain injuries in mining areas. Injuries include broken legs and deep cuts from equipment or machines used in the mining process. Injuries suffered from in the mining sector again also depends on the type of role played by the miners. For example, the findings revealed that there was a time that one of the miners was rushed to hospital because he was pierced by a pick-axe through the legs while digging. A similar observation was made by Kwateng (2012) who found that, the type of role small-scale

miner's play in the mining site is connected to the type of injury they encounter. Broken legs on the other hand was a type of injury but could happen to any miner irrespective of the role played. The findings suggest that, even with that some people are at a higher risk than others. For instance, people who are stable at a place in the process of mining, (for example people who wash and separate the gravels from the gold) are less likely to suffer from broken legs as compared to those who move from one place to another. Miners who carry gravels from the digging site to the washing site for instance stand at a higher risk of breaking their legs. My study's results fit with the social gradient notion and the social determinant of health framework in general that the work and role people engage in predispose them to several and different health related problems and their overall wellbeing.

Furthermore, the study findings suggest that small-scale miners encounter eye problems as an impact the activity has on their health and wellbeing. Miners who are into digging, picking, collecting of gravels and those who carry them get eye problems from the dust from the particles. When the dust gets in contact with their eyes, it causes their eyes to "redden" making it difficult for them to see. Also, there are others that experience eye problems through the chemicals they use in mining (mercury and cyanide) especially when separating the gold from the gravels. When the chemicals get in touch with their eyes, the eye develop sore causing them to have eye problems or challenges. Haile et al., (2017) state that people who engage in mining especially for a long period stand a greater chance of experiencing eye problems. When the dust accumulates in the eyes, the problem aggravates, and this can lead to even blindness.

Another health impact of small-scale mining to miners has to do with the issue of hearing. Research has found such health impact (hearing problems) to be present in large-scale mining activities and even licensed and regulated small-scale mining companies. The situation seems to also be the case for illegal small-scale mining. It was revealed in Prestea that, small-scale mining also causes some form of hearing issues but to a specific group of people; that is people who uses a Chinese manufactured machine called "chanfa" in their operations. This machine is purposely used for grinding stones and gravels to bring out the gold and also helps to separate particles that are likely to contain gold from the other. The study suggests that, due to its nature, that is to grind, it makes a lot of noise and vibrate people's body in the process of grinding. The implication is that it causes hearing problems. The findings further suggest that people who suffer from hearing problems do not use protective clothes and materials (for instance headsets). This seems to have led to them suffering the risk thereof. My study is in line with a research by Hinton (2006) that, miners experience the effect of noise in their ears that have implications

of their hearing because of drilling materials and blasting and that non-induced hearing loss is common in the mining industry and poses a major health threat especially to miners. Even though the miners interviewed did not have much to share about the vibration aspect of the "Chanfa" machine, the study is consistent with findings by World Health Organization, (2013) that machines used in mining activities for grinding, drilling and digging may have serious damage to the miners' spinal cord and other health related diseases that can even paralyze them. Also, Haile et al., (2017) revealed in their study that, people experience neurological effect due to mercury use in mining zones. Symptoms of the neurological effect are poor concentration and problems with hearing and sight. My results fit with the social determinants of health framework that work people engage in and their working environment is a major determinant of health and this affect their overall wellbeing. Considering that any factor that negatively impact on the operations of miners also negatively affect their health and wellbeing, I can therefore note that small-scale mining affects the health of miners negatively.

Environmentally destructive practices impact negatively on the wellbeing of people. Small-scale miners sometimes or most of the time do not cover pits dug after mining. When it rains, water settles on such uncovered areas. After some time, the water starts to breed mosquitoes and this affect both the miners and the community members. In a research conducted by Kwateng, (2012) in Akwatia, another mining area in the Eastern Region of Ghana, the majority of the researcher's participants also mentioned having suffered from malaria as a result of uncovered pits left after mining activities that serves as breeding place for mosquitoes. Similarly, Agyemang, (2012) and de Santi et al., (2016) have also noted in their research findings that, activities of miners by leaving certain pits uncovered, serves as breeding grounds for mosquitoes that cause malaria. My findings are in line with such scholars as my findings suggest that small-scale miners in Prestea get malaria as a result of uncovered pits and that malaria is a common health impact as a result of activities and operations of miners. In the desktop study at the Prestea government hospital, it was found that the usually reported health cases in the district was malaria in 2017, and even at the first half of 2018. It is possible that it is through the activities of miners that contributed to the negative health effect among people especially the miners themselves. According to the Social determinant of health framework, this is a clear indication of an intermediary determinant, specifically psychosocial circumstances that impact on the health of people. I therefore argue that indeed, psychosocial circumstances such as negative life practices have impact on the health of people.

Leg breaking and leg sores are negative impacts of small-scale mining on miner's health. When people fall in uncovered pits in mining areas, they break their legs. As miners cited experiencing broken legs and injuries, the same was the case of community members. A study by Kwateng (2012) also found that several community members fall as victims of such situations. People break their legs or sustain injuries. Similarly, Opoku-Ware (2010) also opine that, the activity should be properly regulated to ensure that the precious lives of people are protected and preserved. My research showed similar findings in Prestea and therefore agrees with the above researchers that small-scale mining causes injuries and even lead to the death of people within the communities in which such activities takes place. Another big challenge and health impact of small-scale mining among the miners was leg ulcer. Leg ulcer is caused by getting into contact with the cyanide chemical miner's use in mining. Cyanide is a very dangerous chemical that has a lot of serious repercussions on the individual and as a result has been banned for use by small-scale miners in Ghana. However, they still use it. When the miners' step in muddy soils that contains cyanide, they generate sores or wounds around their legs. The implication is that, they suffer health wise. People who have engaged in small-scale mining for a very long time stand at the risk of getting this health impact.

Moreover, findings from the study suggest that another health impact of small-scale mining is skin diseases. This is because of the chemicals used in mining operations. The chemicals when gotten into contact with directly or indirectly have impact on miners and community member's skin. My findings are consistent with other research that showed that chemicals such as mercury and cyanide used in the mining process are dangerous to human health especially if there are no proper protectives clothes and expertise to manage the use of the chemicals (Gibb & O'Leary, 2014). This result is skin diseases such as burns and rashes (Gibb & O'Leary, 2014). Community members also get skin related diseases like the miners themselves. This was as a result of the polluted water bodies in the region by chemicals used by miners. When the community members fetch these polluted waters to bath, they develop skin rashes.

The study's findings further suggest that fever and cough are also negative impact that small-scale mining brings on the health and wellbeing of people. The findings show that when people especially miners inhale the dust and the chemicals in the mining area, they cough. Again, desktop study from thee Prestea government hospital shows that, another reported health cases of miners in general (not only illegal miners) was fever and cough. It therefore implies that mining impacts negatively on people's health and this affect the general wellbeing of people. My findings are in line with studies by Yelpaala, (2004), Hilson, (2001) and Adei, Addei and

Kwadjosse, (2011). These researchers all found that mining communities are prone to certain kind of infections and diseases such as cough and fever either from the chemicals used in mining or the nature of mining itself.

Small-scale mining has destroyed several water bodies in Prestea. This has made it unsafe to drink from streams and other open sources of drinking water in the region. People in Prestea have therefore resorted to buying sachet water or standpipe for their household chores. People who do not have money to buy water from the community's standing pipes, rely on the polluted water. The implication is that they become victims of diseases associated with polluted water such as diarrhea. Findings from the Prestea government hospital revealed how rampant and risky community members get cholera and diarrhea. My findings are in line with the social determinants of health framework that circumstances within which people live impact on their general wellbeing. There is therefore a connection to the circumstances that community members live in (such as polluted environment and water bodies) impacting negatively on the health and wellbeing of both miners and community members. At present, the study's findings lead to the belief that polluted water bodies as a result of mining activities causes community members to experience cholera, diarrhea, and other waterborne diseases. The findings support previous research by Ghana Action Aid (2006) that, mining impacts negatively on the environment. It goes further to suggest that this is likely to continue if stringent measures are not taken into consideration by appropriate authorities as it will be a threat to human race.

CHAPTER SEVEN: SUMMARY AND CONCLUSION

Small-scale mining was considered illegal and unregulated before the 1980s. It was during these periods controlled by chiefs who managed and served as custodians to the land and laws within their jurisdiction (Kumah, 2006). However, from the 1980s, small-scale mining began to be regularized. The minerals commission, lands commission, the environmental protection agencies and the PMMC was given the mandate to see to the welfare of minerals in Ghana (Kumah, 2006). The PNDC Laws 218 and 219 were enacted to help them in their operations. This made it mandatory for anyone who would want to mine to get registered. Also, it was restricted to only Ghanaian nationals. Any mining activity that do not register with these institutions but mine is considered illegal.

Despite all these laws and regulations, people still engage in small-scale mining. This became a political debate especially in 2016 because the activity was causing more harm than good to societies and communities where small-scale mining are found. Prestea is a small-scale mining zone hence, the study sought to explore how small-scale mining has impacted on the livelihood, health and general wellbeing of people. It took as its starting point why people decide to engage in small-scale mining in the first place. This was mainly the focus in chapter one.

In chapter two, I explained using the social determinants of health framework that, there are a variety of factors that constitute positively or negatively towards the wellbeing and health of people. I show that some of the factors arise from social and economic conditions that surrounds people in where they are born, grow, live and work. I have discussed the fact that in Prestea, commonly identified determinants that impact on the health and wellbeing of people include policies, education, employment, income, occupation (working conditions) and environment or society within which they find themselves.

In chapter three, I reviewed literature on the motivation for people engaging in small-scale mining, its impact on livelihood and society as well as the health problems or impacts associated with small-scale mining in general. In these literatures, researchers explained that the majority of people who engage in small-scale mining are poor. Also, unemployment, loss of farmlands, cumbersome procedures and amounts to be paid before a mining concession is granted causes people to decide to do small-scale mining.

Also, in terms of its impact on livelihood, small-scale mining has impacted negatively on the environment by destroying water bodies and farmlands that serves as sources of livelihood of people.

Further discovery on the health impact of miners revealed that the role miners play in their work environment determines the type of health impact the activity brings on miners. For instance, miners who dig pits complained of waist and arm pains whereas those who carry dug particles to washing sites complained of headaches and arm pains.

Moreover, I explained in chapter four that the study used interviews, focus group discussions and observations as its data gathering methods. It also focuses on the philosophical underpinnings of the interpretive approach as my epistemological foundation and the phenomenology approach as my research design. These two approaches really helped as the study required a profound understanding of human experiences common to a group and a systematic analysis of the actions of people socially created.

In chapter five and six, further discovery of the complex variety of socio-economic factors that operate together and causes people to engage in small-scale mining were shown and discussed. These include poverty, unemployment, collapse of businesses, no or low educational status or achievement, the fact that the nature of the small-scale mining require less or special skills, easily accessible, with no or huge capital involved, the activity giving quick money, does not require expensive tools or equipment to engage in make people to decide to do small-scale mining. Others reason were problems and procedures in the granting of a mining concession, and unattractive agricultural production to community members because of the loss of farmlands, destruction of farmlands by chemicals used by miners and their operations in general, and unproductive farmlands.

The study further discussed that in terms of livelihood impact, small-scale mining has had positive impact on people in that it has improved the standard of living of miners and serves as livelihood option for several others (people who depend on miners for a living). Nevertheless, it has rather destroyed and caused several environmental problems such as the destruction of the vegetation, farmlands and water bodies that serves as sources of people's livelihood. In short, miners benefit more than non-miners (community members) do.

Situating my research within the lens of the social determinant of health framework, I have enumerated that small-scale mining has not only impacted on the livelihood strategy of people but also their health and general wellbeing. For instance, socio-economic factors such as poverty, unemployment, income and education compel people to engage in small-scale mining. This has led to some health problems such as cholera, diarrhea, skin diseases and malaria, loss of lives, leg breaking, weakness and death.

I have discussed in my study the empirical evidence of the mining activities in Prestea by showing the numerous motivations that compel people to engage in small-scale mining and its associated impacts of health and livelihood. However, in the future, I will from a broader perspective like to compare communities within which mining activities takes place. I will also like to consider the operations of large of large-scale mining companies. This will help provide a holistic view and understanding of mining and its impact on health and livelihood.

Finally, in this thesis, I have shown that socio-economic factors prompt people to engage in small-scale mining, which further lead to positive or negative livelihood and health impacts with the negative ones far outweighing the positive impacts.

Limitations of the study

Prior to the start of this project work, there were some challenges or ban on small-scale mining especially on illegal mining. This actually limited the study in a way because I was unable to observe how small-scale mining is actually done in the field. Personal observation would have helped in giving a more detailed description of activities.

In the initial stage of the thesis, informants were unwilling to give detailed information about the phenomenon since participants thought I could be an official of the government trying to know which people are still involved in the activity, which could lead to their arrest because several people have been arrested before my project begun. This delayed the study a bit and participants started giving more information in the middle periods to the latter part of the study.

The duration of the study (two months) was not enough. As earlier on indicated, it was getting to the latter part of the study when participants gained more interest and confidence and had more to share. At the same time, my period was up to run-up the project and return to Bergen to finalize my thesis for submission.

Notwithstanding all these circumstances, I managed to complete the research and gather information in answering the study's overarching research questions and successfully complete the thesis.

Recommendations

It is evident from the study that, the root cause of the small-scale mining phenomenon mostly starts with people being unemployed and thus poor. The government, non-governmental

agencies and affluent people should establish businesses or companies to help employ people and reduce or curb unemployment in Prestea.

Also, existing commissions and structures such as the lands commission, minerals commission and the environmental protection agencies should be strengthened to help in monitoring and safeguarding the environment and natural resources from illegal mining activities.

The processes, time frame and amount of money involved in the granting of a mining concession should be improved and reduced to help individuals go through the appropriate channel to get a concession. Procedures should be fast tracked, and appropriate training given to miners before they start operating.

Finally, both miners and community members should be educated on the environment and health hazards or impacts associated with small-scale mining. This will help reduce its negative impact on the environment and people.

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Appendices

Appendix 1

Interview Guide
Miners

What do you know about small-scale mining?

What are your impressions about it in Prestea?

Can you please tell me your motivation for engaging in Small-scale mining?

Do you require any license before operating?

If yes, how is the process like?

If no, why?

How is the activity done?

What methods/equipment do you use in the mining process?

Do you do the same thing repeatedly?

Does it have any implication on your health?

If yes, how?

In what ways does it shape your livelihood?

Community members

What are your impressions about small-scale mining in Prestea? Or How do you see small-scale mining here?

Do their operations affect the community?

If yes, how?

If no, any reason?

In what ways do small-scale mining activities impact on the livelihood of the community members?

Stakeholders to be contacted. (E.g minerals and land commission**)**

Can you please tell me about small-scale mining activities here?

Do they have rules to follow? If yes how is the process like?

Are they followed and what role does your sector play?

Health centre

Can you please tell me about small-scale mining activities here?

What are the usually reported health cases by miners?

FOCUS GROUP DISCUSSION.

Engagement Questions

What do you know about small-scale mining?

What are your impressions about small-scale mining?

Exploratory Questions

Why do people engage in small-scale mining in Prestea?

Do people need concession before engaging in the activity here?

If yes, what are the procedures then?

If no, why?

Does it have any implication on the health of people? Miners? Non-miners?

Possible follow up question, If Yes, how does it affect people's health?

If no, any reason?

Does it have any implication on the livelihood of people? Miners? Non-miners?

Possible follow up question, If Yes, Please how does it affect people's livelihood?

If no, any reason?

How does the local community see the activities of small-scale mining?

Exit Question

Is there anything else you would like to say about what you think of small scale mining?

Appendix 2

Informed consent form in English

Project Title: Small-Scale Mining, Health and Rural Livelihoods in Prestea, Ghana.

Informed Consent Form

Background and Purpose: My name is Augustine Gyan, a graduate student from University of Bergen department of Health Promotion and Development pursuing a programme on Global Development, Theories and Practice with specialization in Health Promotion. As part of the requirement for acquiring my master's degree, I am conducting a research on the topic 'Small-Scale Mining, Health and Rural Livelihoods in Prestea, Ghana'. The purpose is to examine how mining activities have direct or indirect implications on the health of miners and the general wellbeing of community members where small-scale mining activities take place. In view of this, I am interviewing miners, stakeholders and community members to gather information to answer the study's overarching goal as mentioned above.

Your Participation: Your participation in this project is completely voluntary. Moreover, your participation in this study will consist of an interview/focus group discussion lasting approximately 45 minutes. You will generally be asked questions about small-scale mining, its health implications and impact on the community at large. You have the right to withdraw from the study at any point in time by notifying the researcher. There is no penalty to this. All your personal data will be anonymized even after your discontinuation.

Why Participate in this project: This is purely for academic purpose and your participation would help gather information to undoubtedly boost the hitherto research literature base on mining, its health implications and the general wellbeing of people and communities where mining activities go on.

Confidentiality: All data would be treated confidentially. The interview will be recorded and notes would also be taken in the course of the interview. Kindly note that your name will not be recorded, and the recordings and field notes would both be kept safe. Any digital information will be password protected. Your name and identifiable information will not be associated with any part of the written report of the research. I will use pseudonyms and report findings in a

way that fully anonymizes you. The researcher will not share any individual responses with others other than the academic research supervisor.

Kindly contact the researcher or his academic supervisor in case of any concern, questions or further enquiry on: Researcher: Augustine Gyan (agyan19@yahoo.com)

Supervisor: Associate Professor Dageid Wenche (Wenche.Dageid@uib.no)

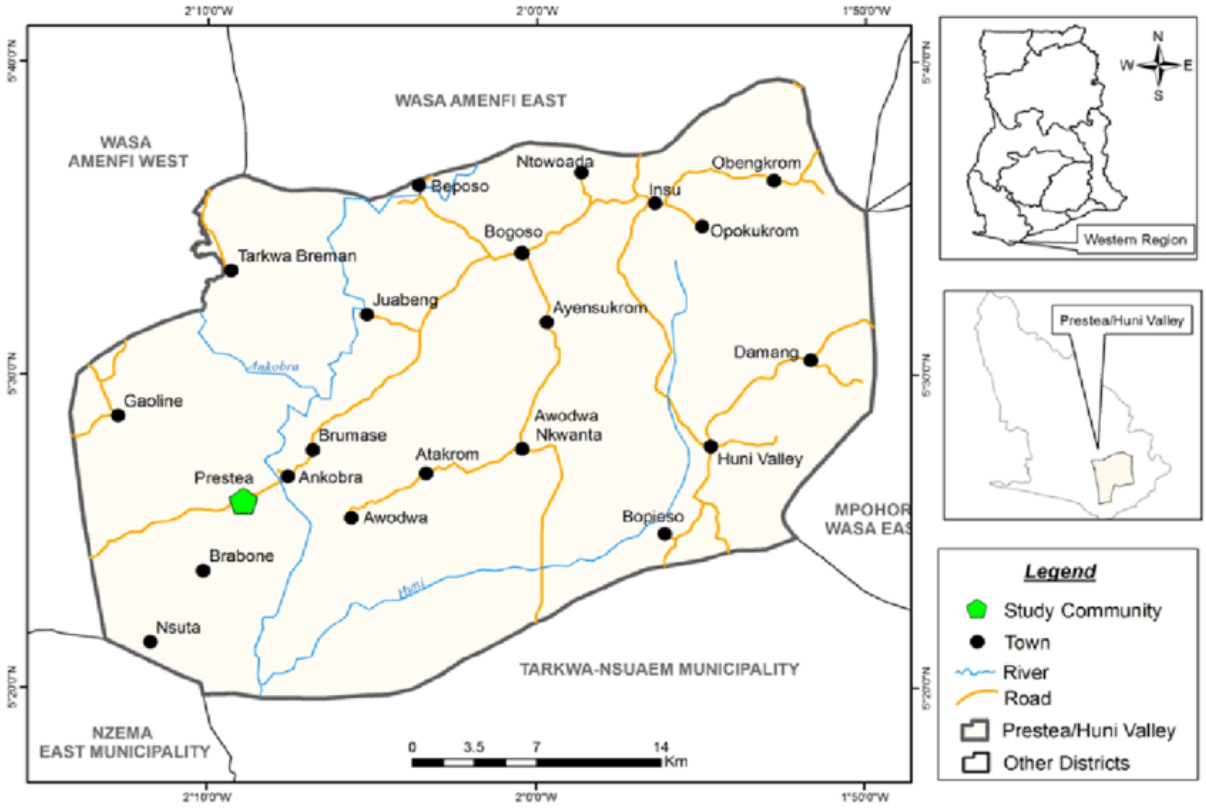
By signing this consent form you acknowledge that you have thoroughly read and understood the information above and that you are aware that you have the right to withdraw from the study at any point in time.

Signature:……..

Date……/……./…….....

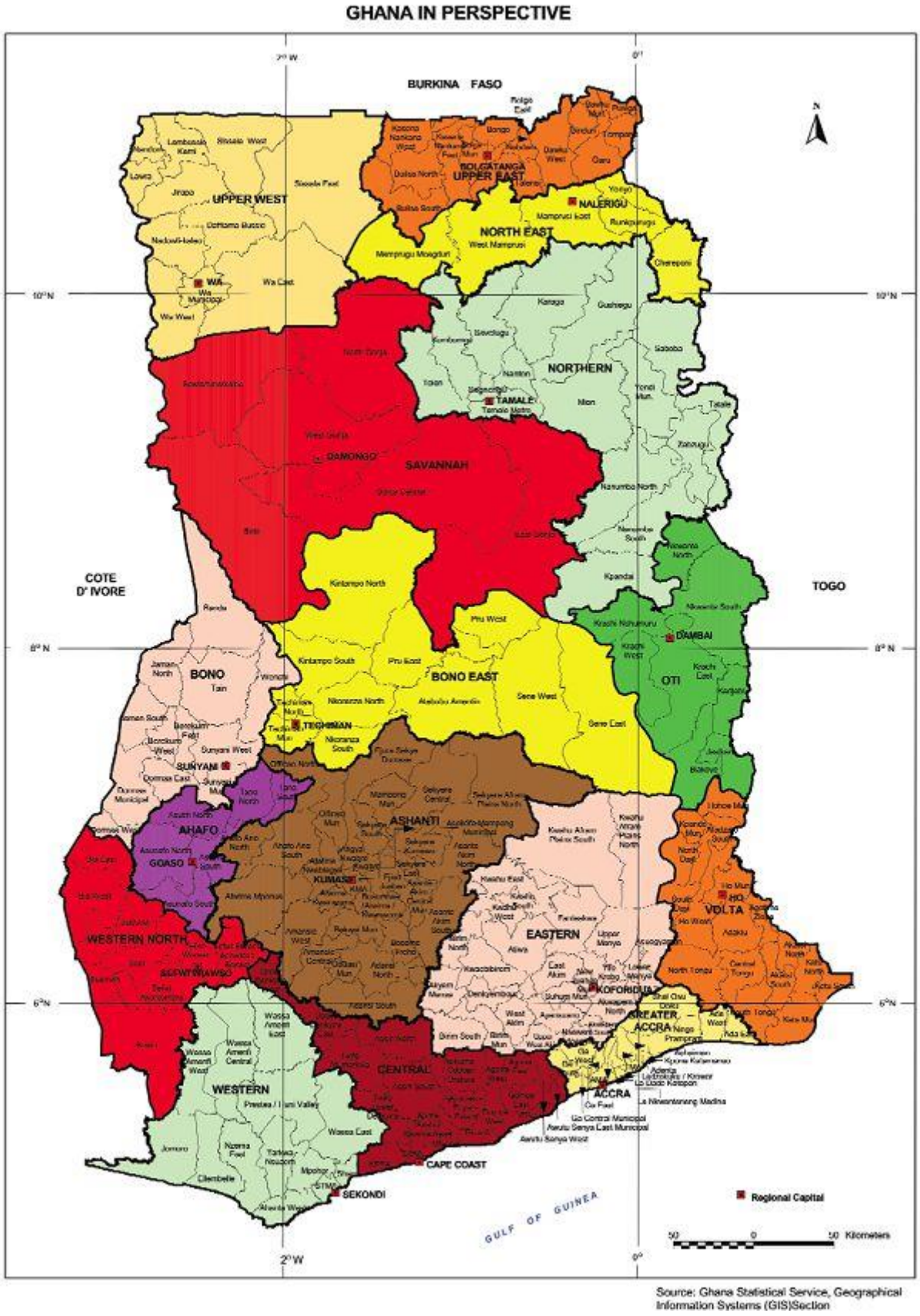
Appendix 3

Map of Prestea Huni-Valley district



Source: (Google)
https://www.google.com/search?q=prestea+ghana+map&tbm=isch&source=iu&ictx=1&fir=_JEvSYs#imgrc=gcF05kZ73L1u4M

Appendix 4: ***The map of Ghana***



Source: (Graphic Online) https://www.graphic.com.gh/news/general-news/new-ghana-map-with-16-regional-capitals.html

Wenche Dageid
Christiesgt. 13
5015 BERGEN

Vår dato: 02.07.2018 Vår ref: 61104 / 3 / EPA Deres dato: Deres ref:

Tilrådning fra NSD Personvernombudet for forskning § 7-27

Personvernombudet for forskning viser til meldeskjema mottatt 13.06.2018 for prosjektet:

61104	*Small-Scale Mining, Health and Rural Livelihoods in Prestea, Ghana.*
Behandlingsansvarlig	*Universitetet i Bergen, ved institusjonens øverste leder*
Daglig ansvarlig	*Wenche Dageid*
Student	*Augustine Gyan*

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er unntatt konsesjonsplikt og at personopplysningene som blir samlet inn i dette prosjektet er regulert av § 7-27 i personopplysningsforskriften. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:

- opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
- vår prosjektvurdering, se side 2
- eventuell korrespondanse med oss

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Ved prosjektslutt 24.08.2018 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Vennlig hilsen

Dag Kiberg

Eva J. B. Payne

Kontaktperson: Eva J. B. Payne tlf: 55 58 27 97 / eva.payne@nsd.no
Vedlegg: Prosjektvurdering
Kopi: Augustine Gyan, augustine.gyan@student.uib.no

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 61104

PURPOSE
The purpose of the project is to examine the direct and indirect implications of mining activities on the health and livelihood of small-scale miners and their communities in Prestea, Ghana.

INFORMATION AND CONSENT
The sample consists of small scale miners, community members in Prestea, the Lands and Mineral Commission, and health centre personnel in Prestea. According to your notification form the sample will receive written and oral information and will give their consent to participate. The information letter we have received is well formulated, but we ask that the following points are added:
- that the end date of the project is 24.08.2018 and that the collected data will be made anonymous by this date
- that the project has been notified to the Data Protection Official for Research at NSD - Norwegian Centre for Research Data AS

SENSITIVE PERSONAL DATA
Based on the purpose of the project, and interview questions for small-scale miners, you will be collecting sensitive personal data about participants' health. We have therefore taken into account that sensitive data will be processed in the project.

DUTY OF CONFIDENTIALITY
We remind you that health centre personnel are bound by a duty of confidentiality. It is therefore important that the interviews are conducted in such a way that confidential information about individual patients is not gathered. Please note that it is not just names, but also background information such as age, gender, date/time, diagnosis and specific events that can identify a person. It is the joint responsibility of both student and informant to make sure that the duty of confidentiality is upheld.

DATA SECURITY
The Data Protection Official presupposes that you will process all data according to the University of Bergen's internal guidelines/routines for information security. We presuppose that the use of a personal computer/mobile storage device is in accordance with these guidelines.

END OF PROJECT AND ANONYMISATION
The estimated end date of the project is 24.08.2018. According to your notification form you intend to anonymise the collected data by this date.

Making the data anonymous entails processing it in such a way that no individuals can be identified. This is done by:
- deleting all direct personal data (such as names/lists of reference numbers)

- deleting/rewriting indirectly identifiable personal data (i.e. an identifying combination of background variables, such as residence/work place, age and gender)
- deleting audio recordings