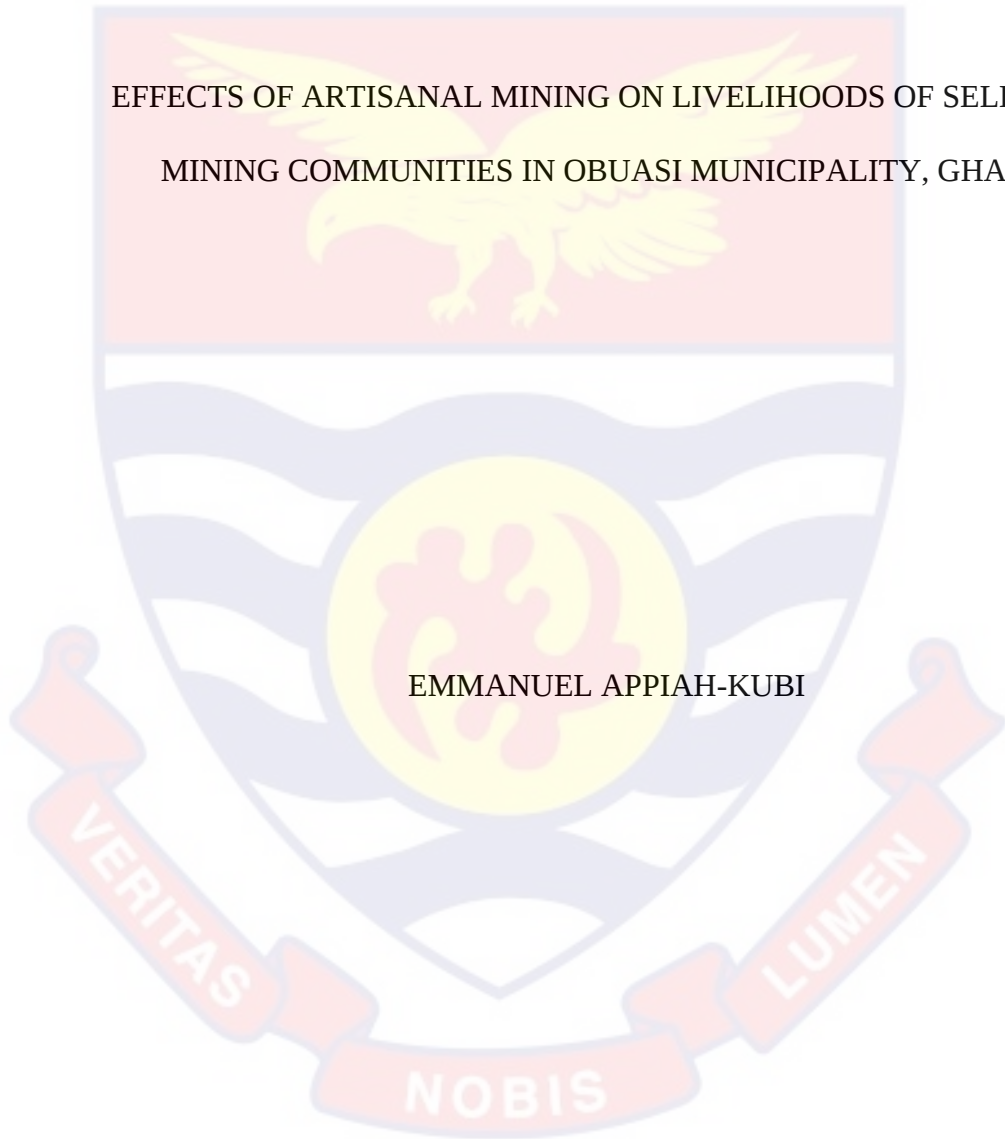


UNIVERSITY OF CAPE COAST

EFFECTS OF ARTISANAL MINING ON LIVELIHOODS OF SELECTED
MINING COMMUNITIES IN OBUASI MUNICIPALITY, GHANA

EMMANUEL APPIAH-KUBI



2022

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BY

EMMANUEL APPIAH-KUBI

Thesis submitted to the Department of Geography and Regional Planning of
the College of Humanities and Legal Studies, Faculty of Social Science,
University of Cape Coast, in partial fulfillment of the requirements for the
award of Master of Philosophy degree in Geography and Regional Planning

NOVEMBER 2022

DECLARATION

Candidate's Declaration

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

Candidate's Signature: Date:

Name: Emmanuel Appiah-Kubi

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised following the guidelines on supervision of the thesis laid down by the University of Cape Coast.

Supervisor's Signature: Date:

Supervisor's Name: Dr Eric Kojo Aikins

ABSTRACT

Artisanal gold mining is the oldest form of mining in Ghana and is mostly practised by rural dwellers living in poor socioeconomic conditions. Poverty among other factors pushes people into illegal artisanal mining which negatively affects their livelihood, well-being, communities and the environment. This study analysed the effects of artisanal gold mining on livelihoods of residents of mining communities within the Obuasi Municipality. Specifically, the study sought to identify the factors that influence residents of the mining community's engagement in artisanal mining and assess the effects of artisanal mining activities on the livelihoods of residents in the Obuasi Municipality. Additionally, it sought to examine the coping strategies of residents whose livelihood had been affected by artisanal mining activities within the Obuasi Municipality. The study used a concurrent triangulation design and a sample of 428 respondents. In general, the study found that artisanal gold mining is plagued with conspicuous negative social and environmental consequences that affect the livelihood and well-being of members of affected communities in the study area as a lot of negative consequences. Additionally, the study discovered that illegal mining is one of the primary sources of income for the majority of Obuasi residents, even though some individuals continue to work in agriculture or engage in both unlawful mining and farming activities. The study recommends that more severe punitive measures should be adopted to serve as a deterrent to persons who are engaged in or may consider engaging in illegal artisanal mining activities.

KEYWORDS

Artisanal Mining

Livelihood



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DEDICATION

To my family and all my loved ones for supporting me throughout my thesis journey.



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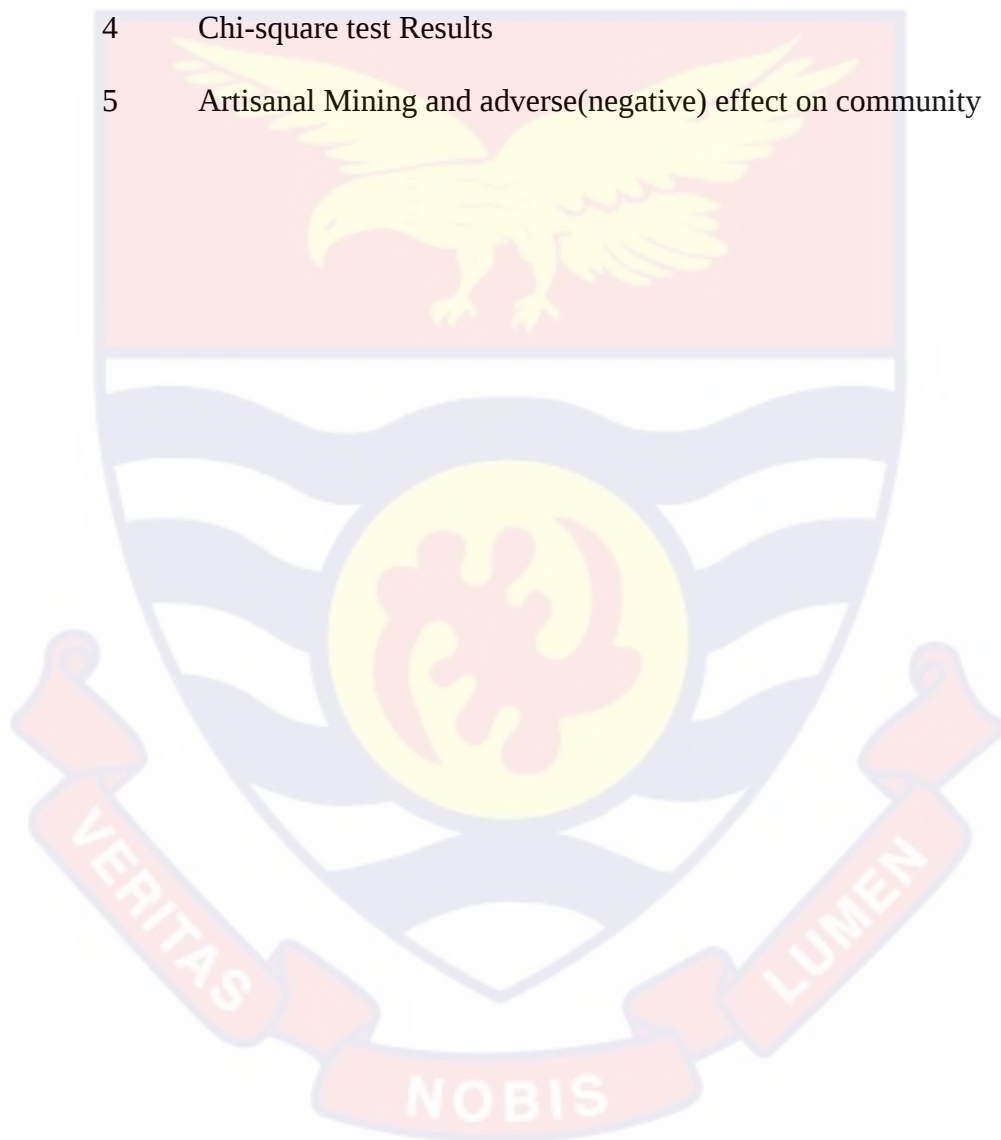
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CHAPTER ONE

INTRODUCTION

Background of the Study

Through the evolution of human civilisation, populations have been surrounded by fauna and flora that serves as raw materials or end products in itself for the populace. To that end, countries that are endowed with mineral resources such as gold, bauxite, aluminium and diamond extract utilize them for the betterment and progression of their economies (Arthur et al, 2016). Therefore, mining has become an essential component and contributor to the development of many countries across the globe. Specifically, gold mining has been the most pervasive mining activity that contributes significantly to the socio-economic development of countries (Owusu, Bansah & Mensah, 2019).

The literature is replete with information and evidence that shows that mining activities have a significant influence on socioeconomic development both at the micro and macro levels. First, mining activities have been posited to contribute substantially to socioeconomic development by providing raw materials that are needed for secondary manufacturing services (Arthur et al., 2016). For instance, gold extracted through mining activities is refined and used for the manufacture of watches, bracelets, and aesthetic needs among others. Likewise, the World Gold Council (2015) reports that in 2014, gold mining companies contributed over US\$171.6 billion to the global economy through their production activities and expenditure on goods and services. Secondly, the mining industry is quintessential to the alleviation of poverty and the improvement of livelihoods across different geographical boundaries.

In the mining arena, artisanal mining is considered the oldest and is mostly practised by rural dwellers who are usually living in poor socio-economic conditions (Owusu, Bansah & Mensah, 2019). Artisanal mining could be viewed as informal, unlicensed, unregulated, undercapitalised and underequipped for which the dealers lack technical and management skills and expertise (Awatey, 2014; Baffour-Kyei, Mensah & Owusu, 2018). Alternatively, Laari (2018) referred to artisanal mining as any form of mining that is characterised by no or little mechanisation. Although artisanal mining is usually informal and under-resourced capital-wise it is well-patronised by, many people worldwide (Hentschel, Hruschka, & Priester, 2003). For instance, it is estimated that more than 13 million people across 30 countries are engaged directly in artisanal mining with about 80 million people benefitting circuitously through the artisanal mining value/supply chain (Laari, 2018). It is therefore worth noting that artisanal mining plays a critical role in the socioeconomic development of nations and states.

In Africa, artisanal mining is widespread and creates a foundation for economic growth as well as sustainable livelihoods and development (Angyobore, 2016; Chiomba, 2016; Hilson & Maconachie, 2020; McQuilken & Hilson, 2018). From the perspective of Buxton, Hebditch, Blackmore, Bellanca, Wilson, Docherty, and Robbins (2013), artisanal mining remains highly unregulated amongst most countries within the sub-Saharan African [SSA] region. Notwithstanding, it employs a significant proportion of the African working population. Beyond the benefit of job creation, artisanal mining is associated with foreign exchange revenue generation.

Within the context of Ghana, artisanal mining operations can be traced back to the pre-colonial period (Hilson, 2001). Per the laws of Ghana (PNDC Law 218 of 1998), artisanal mining denotes “*mining by any method not involving substantial expenditure by an individual or group not exceeding nine (9) in number or by co-operative society made up of ten (10) or more persons*” (Onyebuchi, 2014). It is also worth noting that artisanal mining is a major economic activity for many people in Ghana. According to Mensah and Okyere (2014), this mining activity has attracted about a million Ghanaians. Moreover, available literature shows that there are almost 4.5 million people in Ghana who depend directly on artisanal mining miners for survival and daily living (McQuilken & Hilson, 2016; Mensah & Okyere, 2014).

According to Hausermann and Ferring (2018), Ghana is amongst the first African countries to recognise the need to regularise and formalise artisanal mining. Nevertheless, artisanal mining in Ghana like many other SSA countries has been associated with a myriad of challenges and adverse effects on the environment. Extant studies have reported that artisanal mining in Ghana is associated with water pollution, degradation of land as well as mercury pollution (Amankwah, 2013; Clifford, 2017; Hilson, 2017; Hilson & Maconachie, 2020; Orleans-Boham et al., 2020; Zolnikov, 2020). Such negative associations have made artisanal mining unpopular, particularly within the legislative and regulatory environment wherein artisanal mining is operated.

Statement of the Problem

Assets such as natural, physical, human, social, and financial resources are crucial to a household's ability to combat hardship, hunger, unemployment, and achieve sustainable development, particularly in mining

communities (Baffour-Kyei, Mensah & Owusu, 2018; Baffour-Kyei, Mensah, Owusu & Horlu, 2021). Many communities in Ghana depend heavily on resources like farms and waterbodies to support their way of life. In Ghana, the majority of rural residents rely on farming for a living, and illicit artisanal mining (Galamsey) is seen as a means to an end in places where minerals are found (Yeboah, 2014).

Because there is a considerable detrimental influence on the environment, the safety of those involved in artisanal mining is in jeopardy (Armah, Luginaah, Taabazuing & Odoi, 2013). For example, the middle belt of Ghana's fertile farmland and the virgin forest are nearly entirely gone due to the mining of gold and other minerals. In terms of environmental problems and their effects on ecosystems, such as land degradation and mercury pollution, the sector presents significant challenges, particularly concerning artisanal surface mining in Ghana (Hilson, 2001).

Artisanal surface mining poses a serious threat to water bodies. As a source of water for their operations, illegal miners frequently work adjacent to water bodies. Hazardous chemicals are present in the wastewater that is produced and discharged into neighbouring bodies of water (Adjei, Oladejo, and Adetunde, 2012). Major rivers like Pra and Offin have been severely polluted by illegal mining operations. Illicit mining companies frequently engage in tax evasion, which is motivated by greed and, to some degree, ignorance. There are no effective policies in place to address the detrimental environmental effects of unlawful mining activity. As a result, artisanal mining continues to affect the environment, the health and the livelihood of people in mining communities in Ghana (Osumanu, 2020; Gyan, 2019; Asiama, 2019).

Concerning the impact of illegal artisanal mining on livelihood, several studies have been done in Ghana, such as that undertaken by, Osumanu (2020) in the Nabdam District, Laari (2018) and Onyebuchi (2014) in Amenfi-West district, Gyan (2019) in Prestea and Asiamah (2019) in the Akyem-East Municipality. However, few studies have been done in Ghana, especially in rural areas in Ghana that accesses the effects of artisanal mining on the livelihood of the residents, and the entire community and the coping strategies adopted by the residents to combat the consequences of artisanal mining. It is in this regard that this study sought to contribute significantly to the already existing literature by clearly zooming in on the impact of artisanal mining on the livelihood of the residents of the Obuasi Municipality.

Research Questions

The study provided answers to the following research questions:

1. What factors influence engagement in artisanal mining in the Obuasi Municipality?
2. How do artisanal mining activities affect the livelihoods of residents in the Obuasi Municipality?
3. What coping strategies do residents adopt to cope with artisanal mining operations in the Obuasi Municipality?

Purpose of the Study

The purpose of the study was to assess the effects of artisanal mining on the livelihoods of residents of mining communities within the Obuasi Municipality

Objectives of the Study

Specifically, the study sought to achieve the following objectives;

- a. Analyse the effects of artisanal mining on the livelihood of households and individuals in three selected communities (Koffikrom, Odumasi and Pomposo) in Obuasi Municipality.
- b. Assess the effects of artisanal mining activities on the Koffikrom, Odumasi and Pomposo Communities.
- c. Identify the major coping strategies adopted by residents whose livelihoods have been affected by artisanal mining activities within the Obuasi Municipality.
- d. Provide recommendations and strategies that could be employed by the government and Obuasi Municipality and other stakeholders to help curb the negative effects of artisanal mining on the livelihoods of residents of mining communities within the Obuasi Municipality.

Significance of the Study

The current study is significant for many reasons. First, as established from the review of available literature, there is little scholarly consensus about the effects of artisanal mining on the livelihoods of mining communities in Ghana, and by extension, sub-Saharan Africa. Therefore, this study is useful in articulating and contributing to the ongoing discourse on the effect of artisanal mining on the livelihood of affected mining communities. Given the fact that artisanal mining is the most pervasive mining activity in Ghana due to the use of simple mechanisms and more labour-intensive procedures, the current study could also be useful in identifying why people in the Obuasi Municipality engage in artisanal mining and how it can be improved to enhance their livelihoods.

Also, the study is pertinent because it provides the basis for the government, policymakers and interventionists to understand the nuances and dynamics relating to the effects of artisanal mining on the livelihoods of mining communities in Ghana, particularly within the Obuasi Municipality. Furthermore, the findings from this study can serve as a useful source of information or reference to inform policies and interventions that aim to capitalise on the potential of artisanal mining to improve livelihoods, and towards the realisation of the SDGs (SDG 1, 6, 9 and 10).

Delimitation of the Study

The study was delimited to three communities within the Obuasi Municipality. This was to help the researcher to complete the study in time as the research was to be completed in a stipulated period.

Limitations of the Study

Difficulty in finding key informants was a limiting factor in carrying out this study. Thus, getting the Deputy Director of the EPA to interview was difficult because of his schedule. Also, the language barrier was a limiting factor in carrying out this study as participants spoke other languages besides Twi. Therefore, the researcher had to seek the services of interpreters to be able to continue the survey.

In addition, time was a major limiting factor in carrying out this study. Thus, the period available for the work was relatively short, coupled with the demands of other academic work limited the study to a relatively small area than could have been covered.

Organisation of the Study

The study is organised into five chapters. Chapter One entails an introduction to the study. It comprises the background of the study, problem statement, objectives, research questions, as well as the significance of the study. Chapter Two forms the review of available literature that are related and relevant to the study. The literature review is based on empirical studies conducted by other researchers that are relevant and related to the objectives of this study, in addition to theoretical and conceptual issues and frameworks.

Chapter Three focuses on the research methodology. It encapsulates the research and study designs, study area, data sources, methods of data collection, instruments for data collection, sampling procedures, data processing and analysis, ethical considerations, as well as COVID-19 strategies in the data collection process. Chapter Four, on the other hand, presents the results of the analysis and its concomitant discussions. The results of the quantitative data analysis are presented in tables and charts with their respective inferential statistics where applicable while the results of the qualitative data analysis are presented in themes and sub-themes. Chapter Five presents the key findings of the study, conclusions and recommendations necessary for policy implementation.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter covers the review of related and relevant literature on the effects of artisanal gold mining on the livelihoods of selected communities in Obuasi Municipality, Ghana. The chapter is thematically categorized into three sections: the conceptual, empirical and theoretical review sections.

Additionally, the chapter discusses the theoretical framework of the study. In respect of the conceptual review, the various concepts in this study were reviewed to provide relevant information on the study concepts and scope. Some of the relevant concepts reviewed in this section include the nature of artisanal mining, livelihood strategies adopted by miners, and sustainable livelihood practices. Also, the empirical review section discussed the evidence from the literature across the globe, within the context of Africa and Ghana on the effects of artisanal mining on livelihoods.

The concept of Livelihoods

The concept of livelihoods is reported to have first appeared in the 1990s following the publication of Chambers and Conway's report (1990) entitled: *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century* (Hilson, & Banchirigah, 2009). The authors contend that livelihood comprises "the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels

and in the long and short term” (Chambers & Conway, 1990 as cited in Abbiw, 2020, p. 45). Thus, the concept of livelihood has been used to describe the various activities that people undertake for their daily living (Adato & Meinzen-Dick, 2002; Mazibuko, 2012).

Krantz (2001) refers to livelihoods as the various household activities, assets and capabilities that are used to generate resources for making a living. Specifically, household activities include the search for water, food, shelter and other necessities essential for survival (Mphande, 2016). Similarly, assets that constitute livelihoods include human capital, natural capital, physical capital, social capital, and financial capital (Baffour-Kyei, Mensah & Owusu, 2018). In the end, specific concepts work together to define the general concept of livelihood

Conceptualising Artisanal Mining

Artisanal mining is an everyday concept used in the mineral extraction industry. Although it is widely known as Small-Scale Mining, in some jurisdictions including Ghana, the concept of SSM has also been referred to as artisanal mining (Onyebuchi, 2014). Nevertheless, different societies and cultures conceptualize artisanal mining in their peculiar way based on the nature of their environment and the circumstances surrounding mining activities in their communities. Therefore, the conceptualisation of artisanal mining has rather become equivocal in the prevailing discourse of sustainable mining activities. To arrive at a consensus about what constitutes artisanal mining, different countries and scholars have used different parameters to conceptualise artisanal mining.

These parameters that have been used in conceptualising artisanal mining include the kind of tools used for mining (Onyebuchi, 2014). as well as the quantum of production that comes out of mining activities (Aryee, 2003). For instance, according to the United Nations, as cited in Aryee (2003), mining activity can be categorised as artisanal mining if in a single mining operation unit, yields an unprocessed material measuring 50,000 tonnes or less per annum. However, Onyebuchi (2014), and Laari (2018) posit that artisanal mining represents a type of mining activity where unsophisticated tools (for example shovels, diggers, etc.) are used for mining mineral resources.

The aforementioned conceptualisations are limited in their scope. Therefore, other researchers have come out with a much more detailed, and more encompassing conceptualisation of artisanal mining, otherwise known as Small-scale mining. The growing understanding of artisanal mining in contemporary times is that it is an informal, unlicensed, unregulated, undercapitalised and underequipped mining activity for which its dealers lack technical and management skills and expertise (Awatey, 2014; Baffour-Kyei, Mensah & Owusu, 2018). This is further iterated by Buxton (2013) who states:

“...many artisanal producers in the resources sector operate informally and often this is the norm. Such informality dominates because of formidable barriers to formalisation, where processes are overly complicated and bureaucratic, centrally determined and managed, reliant on the state for regulation and lacking social relevance (Buxton, 2013)”.

In Ghana, the law regulating mining (PNDC Law 218 of 1998), states that artisanal mining includes “mining by any method not involving substantial

expenditure by an individual or group not exceeding nine (9) in number or by co-operative society made up of ten (10) or more persons” (Onyebuchi, 2014). Based on this law, artisanal mining could be categorised from the perspective of staff strength and the amount of capital needed to run the mining operation. Notwithstanding, according to Hentschel, Hruschka and Priester (2002), artisanal mining may be categorised from the perspective of the duration of the mining cycle, the staff strength, size of the concession, the sales volume, production volume, continuity, labour productivity, and organisational reliability.

Empirical Review

Artisanal gold mining

Globally, the exploitation of natural resources provides a primary source of income for people in developing and underdeveloped countries (Spiegel & Viega, 2006). According to Hilton (2006) and the United Nations Environment Programme (2006), artisanal mining is on the rise in many low- and middle-income nations, owing to the rising price of gold and widespread poverty.

Artisanal mining refers to mining with minimal or no mechanization often in the informal sector (Sidorenko et al., 2020). There are three different types of artisanal gold mining in Ghana: washing or "panning" for alluvial gold along the banks of streams, rivers, and ocean shores, especially those close to river estuaries; shallow-pit surface mining on the crests, sides, or in the sedimented valleys of old river beds; and deep-shaft mining for reef gold. However, the indigenous miner prospected for and mined gold alongside family members and community members. The number of the labour force necessary for artisanal or artisanal mining varied depending on the nature and scope of

activities. Mining was viewed as an addition to craftwork and subsistence cultivation. Thus, despite being prevalent, indigenous mining enterprises were fairly small in scale and used straightforward methods that required little capital and no specialized knowledge (Ofosu-Mensah, 2011).

Artisanal mining in Ghana dates back more than two millennia. Precious metals collected through regional artisan activities attracted Arab traders to specific sections of the country as early as the 7th and 8th centuries AD, and relics of alluvial gold extraction and winning activities have been uncovered that date back to the 6th century. The wealth and strength of large ancient Ghanaian empires and cultures can be attributed in large part to the rich gold deposits of the western Sahara (Botchway, 1995), and by the 15th and 16th centuries, at the height of European colonial exploration, Ghana has aptly dubbed the 'Gold Coast.'

Like in most developing nations, Ghana has long regarded artisanal mining as an unregulated, unmonitored, and mostly uncontrolled economic sector that employs thousands of people (Hilson, 2001). Artisanal mining operations in Ghana were mainly uncontrolled and had little to no backing from the government until the 1980s. The National Economic Recovery Plan (ERP), which was finally implemented in the middle of the 1980s after years of careful planning, changed this, though. The former Provincial National Defence Council (PRDC) government recruited experts from the World Bank and International Monetary Fund (IMF) to help with the creation of national economic plans and strategies in a last-ditch effort to revive a stagnant economy. In 1989, the government saw the need for formalising this business venture. Hence, the law regarding artisanal mining (PNDC Law 218) was passed to help

control the activities of artisanal operators (Laari, 2018). Kuma et al (2010) alluded that the government has realised the contribution of artisanal mining, and decided to capture and regulate the activities and benefits of artisanal mining operations under the Minerals and Mining Law Act 703. Before the Minerals and Mining Law Act 703 was passed, artisanal mining activities were regulated by two main laws: Minerals and Mining Law (PNDCL 153) and Artisanal Gold Mining Law (PNDCL 218) (Osei-Kojo & Andrews, 2016).

Ghana's mining industry was heavily targeted because there had been significant declines in mineral output between 1960 and 1980. For example, gold production had dropped from 900,000 ounces in 1960 to 232,000 ounces in 1982; manganese production had decreased from 600,000 t in 1960 to 160,000 t in 1982; bauxite production had decreased from 407,000 t in 1974 to 64,700 t in 1982; and diamond production had decreased from 2,340,000 carats in 1975 to 683,000 (Minerals Commission, 2000). Foreign firms looking to get mineral prospecting permits in Ghana were given tax rebates and other incentives, and foreign investment was encouraged.

The industry's artisanal mining sector was also aggressively targeted. The Ghanaian government considered plans to legalize the industry for the first time in history after spotting the profit potential in the sector, which under an informal organizational framework is mostly lost through smuggling and other channels of illegal commerce. Through many rules and regulations, the government completely legalized the artisanal mining industry by the end of the 1980s.

In Ghana, artisanal mining is operated in two ways: the legal way (regulated) and the illegal way (unregulated), popularly known as “Galamsey” (Bansah, 2017; Doudu, 2013). Although there is a significant difference between mainstream artisanal mining and Galamsey, most people in Ghana conflict between the two due to the extensive deleterious consequences of the latter on the environment as well as the livelihoods of individuals (Adda, 2014). Unlike Galamsey operators, regulated artisanal miners have registered their plots and are therefore able to demand some legal rights that come from the registration process (Teschner, 2012).

Concerning the dominant mineral extracted, studies have shown that gold mining dominates the artisanal mining industry, with about two-thirds of artisanal mining operators engaging in gold mining and the remainder engaging in diamond extraction (Hilson, 2001). Collaboratively, Kuma and Yendaw (2010) report that about 15% of gold production in Ghana comes directly from artisanal gold mining activities. Notwithstanding, the artisanal mining industry in Ghana is beset with some spatial, social and economic challenges. For instance, about 85% of artisanal mining miners are unregistered (Teschner, 2012). This situation is further deepened by the huge influx of foreigners, particularly the Chinese who are constantly reported to be leaving a devastating ecological footprint in mining communities (Osei-Kojo & Andrews, 2016).

Why do people engage in Artisanal mining?

There are several reasons why individuals and households engage in artisanal mining. One such motivation is income generation which leads to poverty reduction. The review of available empirical studies suggests that most of the people who engaged in artisanal mining were either living below the

poverty line or had no prior sources of livelihood (Antwi, Boakye-Danquah, Asabere, Takeuchi, & Wiegleb, 2014; Gyan, 2019; Mactaggart, McDermott, Tynan, & Gericke, 2016; Opoku-Ware, 2010). The vast majority of people involved in artisanal mining or mineral extraction are impoverished (Ghana Action Aid, 2006; World Bank, 2013). These are persons who are poor and have no other paid employment or source of income. Scholars have also looked into why people engage in artisanal unlawful mining (Antwi, 2010; Mactaggart et al 2016; Opoku-Ware, 2010; WHO, 2013a:2013b) and have found that poverty drives people to engage in unlawful artisanal mining. Therefore, residents in mining communities perceive artisanal mining as a conduit to escape poverty and/or mitigate its effects (Hilson, 2016; Kelly, 2014). This observation is consistent with the findings of a study by Gyan (2019) that shows that poverty is the primary motivation for people's engagement in artisanal mining in Ghana.

Beyond the perspective of poverty reduction, individuals engage in artisanal mining as a result of the high unemployment rate in Ghana (Danyo et al., 2016; Gyan, 2019). As a result, most unemployed persons, particularly in the rural areas where artisanal mining activities dominate get attracted to engage in artisanal mining as a means to escape unemployment and poverty in the long run. According to Danyo and Osei-Bonsu (2016), in communities where agricultural production and employment have become somewhat problematic, farmers are forced to divert into artisanal mining. Similar findings were reported by Amponsah-Tawiah and Dartey-Baah (2011). For example, Hilson and Clifford (2010) reported that unemployment was among the major reasons why miners engaged in artisanal mining in Akwatia, in the Eastern region. Also, Gyan (2019) in a qualitative study to examine the rationale behind people's

engagement in artisanal mining revealed that unemployment was among the major reasons.

Loss of farmlands has also been cited to be one of the reasons why people engage in artisanal mining (Danyo et al., 2016). Loss of farmlands due to the overuse of land, and the easy acquisition of farmlands for large-scale mining activities have compelled many people to move into artisanal mining (Gyan, 2019). Gilbert and Osei-Bonsu (2016) contend that in most mining communities in Ghana, farming used to be the major economic activity. However, mining activities have negatively impacted farmlands, hence, through the loss of fertile farmlands, which is a major source of livelihood for rural dwellers. Therefore, for economic survival, most affected rural dwellers, particularly the youth, get engage in artisanal mining to provide them with a new source of livelihood (Gilbert & Osei-Bonsu, 2016).

Similarly, Gyan (2019) observed that in some parts of Ghana, relatively large parcels of farmlands have been converted into mining sites. In identifying the culprits, Gilbert and Osei-Bonsu (2016) found that traditional and government authorities have leased-out farmlands to mining companies. Consequently, young and energetic rural people that used to have access to farmlands no longer have that access to available farmlands in affected communities (Amponsah-Tawiah & Dartey-Baah, 2011). According to Amponsah-Tawiah and Dartey-Baah (2011), most farmers in mining communities are settler farmers, and for that reason, they lack total rights over the lands they cultivate. Therefore, as and when the owner of the farms deems fit, they lease out the farmland to mining companies without due consideration of the needs of the farmers that operate on these lands. In such circumstances,

the farmer is faced with no option but to find an alternative source of livelihood or divert from farming to get engaged in artisanal mining.

In a study conducted by Hilson and Clifford (2010) in Akwatia in Ghana's eastern region on the subject of 'once a miner, always a miner,' the researchers concluded that the fact that there are several risks associated with illegal artisanal mining and yet people continue to do it indicates that they do it out of necessity. They go on to say that even though people are aware of the dangers of artisanal mining, they have no choice because they do not have any other options or paid work (Hilson & Clifford, 2010). Unemployment was cited by the majority of their respondents as the primary motivator for engaging in unlawful artisanal mining.

Poor company performance is another reason why people participate in illicit artisanal mining. People operate minor trading businesses with success in mining settlements and their environs (Hilson et al 2010). Success is defined as a situation in which people can earn more money. However, this is not always the case for certain people. Hilson (2001) discovered that persons with low or poor business performance rely on illegal mining operations to help raise revenue to assist them to grow their companies. He did add, however, that the bulk of these people are migrants living in mining communities, with a smaller minority being locals. The reasons for migrating are due to a lack of job opportunities in their own countries.

Another reason for illicit mining operations is the refusal to provide a mining concession by the government authorities. According to Awumbila and Tsikata (2004), certain artisanal miners in Ghana are hampered by the procedures for obtaining mining permits. Thus, they employ tactics to cut

corners to engage in mining while abiding by the country's mining rules and regulations. It has been stated that the methods and processes involved in the granting of mining concessions are 'problematic' (Awumbila & Tsikata, 2004). People abandon the process and engage in illegal mining because of the large sums of money and time required, as well as the procedures to follow to be given mining concessions. The Mineral Commission lays forth the procedures and rules that must be followed to get a concession in Ghana.

Effects of artisanal gold mining

Artisanal gold mining is fraught with several effects. Broadly, the literature categorises these effects based on the level or area that is affected. Therefore, the effects of artisanal mining can be seen from the perspective of the community, health, social impact, environment, and livelihoods. As a result, the ensuing section discusses the effects of artisanal mining based on the thematic perspectives indicated above.

Artisanal gold mining's impact on local communities

While there are significant economic benefits to artisanal gold mining, the environmental and societal consequences are a big concern. These effects are mostly related to the processes and techniques used by gold miners to extract gold. Mercury is commonly used by artisanal and artisanal gold miners to amalgamate and concentrate gold since it is less expensive and easier than other mineral extraction procedures, such as using arsenic to dissolve the mineral ore. Because mercury emissions from these operations are likely to bioaccumulate and interact with many biological and non-biological processes, the amalgamation approach poses major environmental hazards (Watts et. al., 2003). When soil is degraded as a result of mining activities, it takes longer for

that soil to recover its fertility for agricultural production. The artisanal gold mining industry is beset by a slew of environmental and social issues.

Degradation of the environment

Deforestation, topographic alterations, slope instability, increased erosion, drainage pattern changes, and soil degradation are all examples of the negative impacts of artisanal mining. Mining operations are an important element of local livelihoods in Ghana, particularly in locations where cash and food crops are grown. Miners clear the forest and excavate land parcels for their operations before gold amalgamation. Because of the poor legal structures that oversee these operations, miners often abandon open pits without reinforcing them with wood and soil elements after their operations. As a result, large tracts of land have been stripped of their forest cover, causing ecological disturbances that have resulted in the loss of farms, animal habitats, and freshwater ecosystems (Smith, Ali, Bonfiger & Collins, 2016).

Water pollution

Contamination of surface and groundwater sources has been particularly prevalent in gold mining villages in Ghana (Adetunde et al. 2014). Chemical processing contamination occurs when chemicals used in ore processing, such as sulphuric acid (H_2SO_4) or cyanide (CN^-), leak, spill, or leach into neighbouring water bodies. These substances have the potential to harm humans, aquatic life, and wildlife in general. The bulk of Ghana's artisanal surface miners washes waste products from the ore into rivers and other bodies of water, which serve as supplies of safe, portable drinking water for the mining communities (Obiri et al. 2010).

Others discharge mining tailings straight into rivers, introducing vast quantities of suspended particles and pollutants into aquatic ecosystems (Serfor-Armah et al. 2006). Mine tailings are frequently poisonous, posing major health risks to humans, animals, and plants (Hayford et al. 2009). According to a recent study conducted by Ghana's Council for Scientific and Industrial Research (CSIR), several mining villages in the Western Region are in danger of health problems as a result of significantly polluted water bodies caused by artisanal mining activity in the region (Yeboah 2014).

Dispossession, displacement and resettlement of people

Displacement, dispossession and relocation caused by mining operations can occur either directly or indirectly in a given geographic area. People are displaced from their homes due to encroachment or pollution caused by mining activities. Furthermore, people who lose their source of income are forced to relocate. The effects of these, such as displacement and dispossession, manifest themselves in a variety of ways:

- landlessness;
- joblessness;
- homelessness;
- marginalization;
- higher sickness and mortality;
- food security difficulties;
- loss of access to common property,
- social disarticulation, and;
- community disintegration, and cultural insecurity (Terminski, 2012).

Women's rights are also violated as a result of mining-induced displacement. Usually, the consequences of displacement leave women in a worse situation. Women lose land that is needed for food production, which is a vital source of income for them to support their families. The land loss also has an impact on women's regular functioning, such as undermining their economic standing, as well as starvation, health issues, and a lack of fundamental supplies (Terminski, 2012).

In his book "Resource Wars Against Native Peoples," Gedicks (2005) argues that harming one's source of food is a violation of human rights. He went on to say that indigenous peoples face violence all around the world because their territory contains precious natural resources needed for industrial manufacturing. Mining companies, both multinational and non-state, intrude on rural communities' resource borders, causing systematic displacement, dispossession, and, in some cases, destruction of local communities. Unfortunately, because local people are often characterized as fighting a losing war against the devastating invasion of industrial society, most of these issues faced by local communities are not captured in the dominant media.

Another aspect of the problem is the portrayal of state and corporate efforts to allow the extraction of communities' resources in the name of addressing such communities' economic challenges. The Ghanaian government, with the help of the IMF and the World Bank, introduced the Minerals and Mining Law (PNDCL 153) in 1989 as part of the Mining Sector Reform Program, to create a more appealing investment climate for international mineral extraction and exploration businesses (Maconachie et al, 2011). Efforts and attempts have been made to build a clear legal structure for artisanal gold

mining, similar to what is done in large-scale mining. There is a legally recognized sort of gold mining known as artisanal mining, which follows a regulated process. Any Ghanaian citizen over the age of 18 can apply for an artisanal mining permit for a piece of land (Ghana Government 1989a).

Even though the system for obtaining a permit exists, about 85% of Ghana's artisanal miners do not register for these licences (Hilson and Potter, 2003). Registered "legal" mines in Ghana are classified as "artisanal mines," while unregistered mines are known as "Galamsey" mines. In reality, the many names and legal distinctions suggest two distinct types of mining activities, but there is no such separation. There is no differentiation between "artisanal" and "Galamsey" mines in reality. As a result, many Ghanaians, especially academics, refer to all types of artisanal mining businesses as "Galamsey." The procedure of formally registering a mine is considered time-consuming and inefficient, which discourages miners from doing so.

According to the International Labour Organization (ILO), bureaucratic licensing procedures are a barrier to formalizing artisanal gold mining. In Ghana, the licensing process is beset by an unusual number of laws, most of which are meant to restrain and are overseen by only a few inspectors. For instance, most miners have complained that the procedure involves a lot of paperwork and attracts a lot of fees. According to a study by (the Ghana Government 1989a; Hilson et al, 2003), a slew of documents that applicants must fill out is particularly burdensome because they are frequently illiterate. As a result, formalizing artisanal gold mining in Ghana has gained less value to the point where the reality of formalizing artisanal mining regulations is no longer considered in the sector's activities. The monitoring of the state's

informal mining problems is ignored by regulatory bodies (World Bank, 2008; Hilson et al, 2003). As a result, the artisanal gold system's operations have increased under poor government control.

Displacements of communities

Many communities in Ghana have been completely uprooted as a result of mineral reserves discovered nearby. According to Antwi-Boasiako (2003), mining activity and investment in Tarkwa and its environs in the Western Region resulted in the total displacement of fourteen (14) communities with approximately 30,000 residents between 1990 and 1998. Some members of the afflicted communities were forced to migrate in pursuit of farmland, while others were relocated by the mining firms to new communities. Communities are relocated, resulting in the loss of social bonds, psychological issues, and disruption of communal life (Yirenkyi 2008). The massive influx of individuals from the impacted communities into Tarkwa township had several negative implications for the community. There was a surge in the number of unemployed young who turned to illicit mining as a result of the increased demand for housing. Teenage pregnancy, high levels of absenteeism, drug trafficking, prostitution, a high school dropout rate, and youth disrespect are all examples of social problems that might arise from such a scenario (Owusu 2012; Antwi-Boasiako 2003).

Effects of Artisanal mining on health

In the domain of health, artisanal mining is seen as a hazardous occupation (Smith et al 2016). Vingård and Elfstrand (2013) posit that artisanal mining ranks among the top three causes of morbidity and mortality. Smith et al. (2016) report in their study that miners involved in artisanal mining are at

higher risk of being exposed to mercury, which is deleterious to their health. Mercury exposure has several adverse effects on humans. These effects include “irritability, nervousness or excitability, insomnia, dysarthria (motor speech disorder), incoordination, and hallucinations as well as having damaging effects on eyes, kidneys, and lungs (Basu et al., 2015; Haile, Hussein, and Haile, 2017; Basu et al., 2015; Onyebuchi, 2014; Gilbert & Osei-Bonsu, 2016).

Additionally, individuals engaged in artisanal mining activities are often exposed to the likelihood of accidents and injuries (Smith et al., 2016). Relatedly, the results of other similar studies have shown that most artisanal mining workers have limited access to personal protective equipment (PPE) like steel-toed boots, and gloves (Paruchuri et al 2010). Evidence from the Democratic Republic of Congo reveals that about 72% of artisanal mining miners have experienced at least one accident in the year preceding the survey (Elenge et al, 2013). Specifically, in Ghana, artisanal gold miners have been found to experience accidents and fatalities aggravated by collapsed mining tunnels, drowning, violence (clash and shooting) and falling into mining pits (Botchwey & Crawford, 2018).

Also, uncovered mining pits have resulted in many accidents and injuries to residents of mining communities (Opoku-Ware, 2010). These adverse health effects are expected to further increase if efforts are not made to control the situation (Basu et al., 2015).

Besides the effects of artisanal mining on the health of miners, artisanal mining has serious effects on the health of residents of mining communities. For instance, the heavy metals used in the extraction and processing of gold usually contaminate water bodies in mining communities, thereby increasing the levels

of arsenic concentration in affected water bodies (Basu et al., 2015; Gilbert & Osei-Bonsu, 2016).

According to Basu et al., 2015), observed increases in arsenic concentration levels of some affected water bodies could be linked to the risk of “cardiovascular diseases, blood pressure, anaemia in pregnancy, obstructive lung diseases, mortality from respiratory diseases, and diabetes in adults; and neurodevelopment problems, skin lesions, cancer, and respiratory diseases in children”. As a result of the contamination of water bodies due to the activities of artisanal mining, there is a high rate of water-borne disease in mining communities. Some diseases such as Buruli Ulcer have become endemic to artisanal gold mining communities (Basu et al., 2015).

Effects of Artisanal mining on the environment

The effects of the artisanal mining operation on the environment have been well documented (Laari, 2018; Persaud, Telmer, Costa, & Moore, 2017). These effects include a variety of measured and observed negative outcomes on the environment in artisanal mining communities. The review of the negative impact of artisanal mining revealed that deforestation, loss of farmlands, water pollution and contamination, noise pollution, and erosion form the most common environmental consequences of artisanal mining in developing countries including Ghana (Armah et al, 2013; Baffour-Kyei et al, 2018; Dupuy, 2014; Gyan, 2019).

Eftimie et al. (2012) report that the effects of artisanal mining on the environment can be manifested in different ways, which include unrehabilitated excavations, acid mines, river siltation, and dust emission. Similarly, artisanal mining's impact on the environment could create awareness for adopting

sustainable environmental practices (Baah-Ennumh et al 2017). Also, the government and its agencies in charge of a mining operation are compelled by the prevailing conditions to engage in advocacy for better and sustainable artisanal mining practices (Baah-Ennumh et al 2017).

Effects of Artisanal mining on the livelihoods of miners and mining

communities

Artisanal gold mining has a pluralistic effect on the livelihoods of miners and mining communities. On one hand, it has significant positive effects on livelihoods. On the other hand, it is recognised to have some negative effects on the livelihoods of miners and mining communities. On the positive side, artisanal mining is a major source of livelihood in mining communities (Laari, 2018). Hillson (2011) argues that whether legal or illegal, artisanal mining activities serve as an alternative source of livelihood for smallholder farmers to finance their farming activities. The author emphasised that artisanal gold miners are often in remote areas where farming is the main occupation. Therefore, artisanal mining provides them with additional revenue to purchase agro-chemicals for their farms (Hillson, 2011).

Similarly, Onyebuchi (2014) reports that artisanal mining employs a substantial proportion of Ghanaians, and helps them generate revenue for themselves and their households, as well as improve the economic status of mining communities. Furthermore, Onyebuchi (2014) indicated over 80,000 people rely directly on artisanal gold miners for their livelihood. Thus, artisanal mining does not only improve the livelihoods of miners but also caters for the wellbeing of their dependents and the wider mining community (Agyemang, 2012; Gyan, 2019).

In a study by Arthur et al (2015), the authors found that artisanal mining activities contributed to improving the livelihoods of miners and residents in Prestea through reduced vulnerabilities and empowerment. Also, the authors reported that through artisanal mining activities, miners can acquire assets (e.g., technological gadgets and trucks for their farms), which contribute substantially to improving their livelihoods.

Notwithstanding this positive effect of artisanal mining on the livelihoods of miners and mining communities, the existing literature identifies several negative effects of artisanal mining on miners' and mining communities' livelihoods.

One of the major negative effects of artisanal mining on the livelihoods of miners and residents of mining communities is the high cost of living (Laari, 2018; Yakovleva, 2007). Traditionally, artisanal gold mining activities attract migrants to affected communities. Hence, there is usually disequilibrium in the demand and supply of necessities such as clothing, food, and housing (Burrow & Bird, 2017). This excess demand over supply creates an artificial shortage that leads to increases in prices (laari, 2018). Burrow and Bird's (2017), and Gilbert and Osei-Bonsu (2016) reported that communities engaged in intensive artisanal mining activities had high consumer price indices compared to the national average. In practice, such situations exacerbate poverty and relative deprivation, and thus, negatively affect the livelihoods of miners and mining communities.

Another effect of artisanal mining activities is that it tends to destroy the sources of livelihood for mining communities which lead to unsustainable livelihoods in affected communities (Laari, 2018). For instance, a study by

Egyir, Baffoe-bonnie, Otchere, Asante, and Oku-Afari (2015) revealed that a 20% deterioration in the health of miners is bound to occur when they engaged in artisanal mining. Relatedly, gilbert and Osei-Bonsu (2016) found that farmlands which are the major source of livelihood of rural communities were destroyed by artisanal mining activities. This corroborates evidence from ghana (Onyebuchi, 2014) and zimbabwe (Madzimore, 2015).

Adjei (2007) in a study conducted in the Wassa mining areas found that farmers are often compensated for the claim of their lands, hence, providing them with the financial capital to acquire alternative lands to farm on. The author also added that although farmers are compensated for their lands, such situations create an agricultural land shortage. Thus, facilitating unfavourable agricultural land tenure

Livelihood Coping Strategies for Artisanal mining implications in Ghana

Usually, coping strategies are employed by miners and mining communities to be able to escape livelihood uncertainties (Brottem & Ba, 2019). In the words of Baffour-Kyei, Mensah, and Owusu (2018), livelihood coping strategies may take the forms of changing consumption patterns like livelihood diversification, petty trading, migration, reducing the number and quality of foods or meals, and postponing entertainments. Relatedly, Mabe, Owusu-Sekyere and Adeosun (2021) observed that in Ghana, many of the miners resorted to farming as the main coping strategy with other coping strategies being their engagement in petty trading and the supply of labour services. Measures such as training in skill acquisition for various trades have also been expressed by the Ghana government as a way of ensuring the youth cope with

the effects of artisanal mining and reduce unemployment (MESTI NEWS, 2018).

However, Abbiw (2020) reported that many miners in Ghana find it difficult to identify livelihood coping strategies. For instance, in a qualitative study of 26 participants, conducted by Gyan (2019) to examine the reasons why people engage in artisanal mining and how artisanal mining impacts the livelihoods of miners at Prestea, it was found that a combination of social and economic factors explained why people engaged in artisanal mining at Prestea. Economic-wise, the author found that the reasons for engaging in artisanal mining activities were poverty and unemployment whereas the social factors that influenced artisanal mining activities were loss of farmlands, and lack of skills to engage in alternative livelihoods. The study articulates that artisanal mining activities improved the livelihoods of miners through an improvement in their standard of living. The findings are in agreement with earlier findings by Onyebuchi (2014). Notwithstanding, artisanal mining activities are fraught with negative effects on the environment and health of miners.

According to Levin Sources, the National Committee of the Netherlands and the Ministry of Foreign Affairs (2020), people receive help from civil society groups to cope with the aftermath effects of Artisanal or Small Scale mining. The help usually comes in the form of advocating for better laws, organising peer learning events and training and acting as an intermediary between the affected artisanal miners, the affected people and the government.

Baffour-Kyei et al (2018) in their study aimed to assess the impact of artisanal mining activities on the livelihood assets of households in the Bekwai Municipal, Ghana. The authors used a sample size of 400 households and

applied the Propensity Score Matching (PSM) method to estimate the effects of AM on the livelihoods of households. The study found that artisanal mining activities impacted positively household finances. However, the effect of AM activities on the social, human and natural capital was all negative. This implies that ARTISANAL MINING has a positive effect in terms of the economic or financial component of livelihoods. However, its effect on the environment and social capital remains negative. With regards to coping strategies, the authors found that almost half (42%) of the respondents reported that they did nothing as a coping strategy. Meanwhile, those who reported using a coping strategy coped through community self-help, compensation, and forced compliance.

Artisanal surface mining's contribution to the Ghanaian economy

It is crucial to highlight that artisanal surface mining has a substantial impact on the overall contribution of the mining sector to the national economy. Between 2000 and 2008, it generated around 12% of overall gold production and 90% of total diamond production. More than half a million people are believed to be directly employed in the artisanal surface mining industry, and almost the same number of people profit directly or indirectly from the operations of artisanal surface mining. This means that Ghana's artisanal surface mining business has a considerable positive impact on the country's mining sector and economy.

Ghana's mining industry is credited with having a significant impact on the country's economy. Ghana, behind South Africa, is Africa's second-largest gold producer, with gold exports accounting for more than 40% of overall export revenues (Tschakert & Singha 2007). Many Ghanaians and international citizens have found work in the area, both formally and informally. Royalties,

corporation taxes from mine firms, and income taxes from mine operations have all been key revenue sources for Ghana's Internal Revenue Service (IRS). Ghana's mineral production increased significantly in 2005, with gold replacing cocoa as the country's top foreign exchange earner. Mineral resource revenues increased by 197 million dollars between 2004 and 2005, accounting for nearly 13% of the Internal Revenue Service's overall collection. Gold production increased by 63%, with export earnings increasing by nearly \$173 million (Salifu et al. 2013). Payments of royalties, income taxes, and corporation taxes on wages, salaries, and dividends were also key contributions of the industry to the Ghanaian economy (Ghana Chamber of Mines annual report 2012). For the past decade, the industry has been the major contributor of royalties, accounting for 98 % of all royalties paid to the Ghanaian government.

Formal employment increased from a little over 15,000 in 1987 to around 22,500 in 1995 (Ghana Minerals Commission 2000), even though informal employment in artisanal surface mining was roughly twice that of the formal industry at the same time (Akabzaa et al. 2001). As of the end of 2004, there were 10,624 formal direct employees employed by producing members of the Ghana Chamber of Mines, with 1.4 % of total employees being expatriates and the remainder being Ghanaians. Employees in exploration, and mining support service firms, as well as suppliers to large-scale mining enterprises, contractors, and companies not registered with the Chamber of Mines, are not included in these data (Salifu et al. 2013).

Regulatory issues in artisanal surface mining

In Ghana, the Mineral and Mining Act of 2006, also known as Act 703, recognises artisanal mining and defines it as "mining by any means not

involving large expenditure by an individual or group of persons" (Aryee 2003). People who engage in artisanal mining must get a license from the Minerals Commission or a mining corporation with a concession right in the mining area (Yelpaala 2004). An artisanal operator or miner will be awarded a license to mine a specific plot of land not exceeding 25 acres for a term of three to five years (Hilson 2001), and the license will be provided to Ghanaians aged 18 and up (Aryee 2003).

The law, on the other hand, requires a licensed operator to produce an environmental impact assessment for his activities, which must demonstrate how the mining activities have been planned in an environmentally sensitive manner and that appropriate environmental safeguards have been incorporated into the design. This should be followed by a high-quality reclamation plan those details how topsoil will be protected, slopes will be stabilized and repaired, progressive reclamation will be carried out, and re-vegetation will be affected (Yelpaala 2004).

To cover the expense of any environmental damage, the concessioner will be required to deposit a pre-mining financial assurance or security in the form of cash, letters of credit, surety bonds, or a trust fund (Tetteh 2010). In the event of default, this sum is used to reclaim the mined site. On the hand, if the community or regulatory authority is satisfied that the reclamation has been completed successfully, a closure certificate is provided, allowing a refund of the amount awarded for reclamation.

Institutional roles in policy and practice for sustainable livelihoods

According to Davies (1997), "Institutions are the social cement that connects stakeholders to access to money of various sorts to means of exercising

power and hence define the gateways through which they pass on the route to positive or negative livelihood adaptation,". Because formal and informal institutions, such as tenure regimes, labour-sharing systems, market networks, and credit arrangements, mediate access to livelihood resources and, as a result, affect the composition of portfolios of livelihood strategies, a thorough understanding of institutions and organizations is essential for developing interventions that improve long-term livelihood outcomes.

The social dynamics that underpin livelihood sustainability are illuminated by an institutional approach. At every point, contestations, compromises, and trade-offs are obvious in the pursuit of sustainable livelihoods. It is crucial to understand social interactions, their institutional forms (both formal and informal), and the power dynamics that underpin them. If appropriate institutional entry points are to be established, interventions in support of sustainable livelihoods must be responsive to such complexity (Scoones, 1998).

The key regulatory institutions in the mining industry

Several regulatory entities are responsible for enforcing regulations and monitoring compliance in the artisanal mining sector. Six important regulatory authorities in Ghana that ensure compliance in the mining sector are given below.

The Minerals Commission

The Mineral Commission is in charge of regulating and managing all of Ghana's mineral resources. It also coordinates and implements policy in the mining industry. The Mineral Commission is a government-advisory body that advises the government on mineral problems. Apart from the Commission's

supervisory responsibilities, the Inspectorate Division is responsible for enforcing all mining regulations (Minerals Commission of Ghana, 2021).

The inspectorate division of the mineral commission was created to implement all mining regulations to safeguard the health and safety of all mining activities. Before a mineral right holder may begin mining, the Inspectorate Division must first approve the proposed project before issuing an operational license. The Chief Inspector of Mines leads the Inspectorate Division, which is responsible for inspecting all mining operations and ensuring that all rules and regulations governing the industry are followed (Minerals Commission of Ghana, 2021).

Forestry Commission

The Forestry Commission's responsibilities include regulating the use of forest and wildlife resources, conserving and managing such resources, and coordinating all policies connected to these resources (Forestry Commission, 2022). The mining Act 703, mandates that a mineral right holder get a license from the Forestry Commission before engaging in any activity (Adu-Baffour et al., 2021). The operations of holders of mineral rights who have been granted a permit in any forest reserve are monitored by a committee comprised of the Forestry Commission, Minerals Commission, Environmental Protection Agency, District Assembly, and Ministry of Lands and Natural Resources. The committee expects mineral rights holders to submit feasibility reports. Mineral rights holders that act outside of the framework risk losing their rights and may be sanctioned.

Water Resources Commission

Act 522 of 1996, also known as the Water Resources Commission Act, established the Water Resource Commission. The commission's principal responsibilities include the control and management of the use of water resources. Also, it guarantees that any policy relating to these resources is coordinated. The commission is required by section 17 of Act 703 to grant water rights to any mineral right holder. A holder of a mineral right may obtain, divert, impound, convey, and use water from a river, stream, underground reservoir, or watercourse within the land subject to the mineral right, subject to obtaining the necessary approvals or licenses under Act 522, for or ancillary to the mineral operations (Act 703 section 17) (Government of Ghana, 2006:2012a:2014).

Because of flaws under this clause of Act 703, mining firms have been able to damage water bodies. The right to a water body does not extend beyond the boundaries of the mining right-owned land. As a result, any operation that will have an impact on the quality of the water downstream should be carefully scrutinized. The law is silent on how these water resources should be used to ensure that water quality is preserved (Government of Ghana, 1999: 2012, 2014). This has resulted in an increase in water pollution in practically all of Ghana's mining villages

Environmental Protection Agency (EPA)

The Environmental Protection Agency (EPA) is in charge of implementing environmental regulations. A mineral right holder must get an environmental permit from the EPA under Section 18 of Act 703 and the Environmental Assessment Regulations (L.I. 1652) of 1999 of the EPA before engaging in any mining activity (Government of Ghana, 1999:2006). The EPA

frequently examines mineral rights holders' operations to ensure that they are complying with the terms and circumstances under which they were awarded. The EPA has the authority to cancel, suspend, or revoke a permit or certificate, as well as impose penalties on violators. Although the EPA has been given all of these powers, the agency's lack of resources has rendered it less effective.

Lands Commission

The Land Commission is the regulatory authority in charge of ensuring that the nation's lands and resources are managed responsibly. The Land Valuation Board, which is part of the Land Commission, is in charge of valuing lands and other land-related properties when mining firms compensate individuals. Despite any right or title, a person may have to land in, on, or under which minerals are located, a person shall not conduct activities on or over land in Ghana for the search, reconnaissance, prospecting, exploration, or mining for a mineral unless the person has been granted a mineral right following Act 703:9 Act (1) (Government of Ghana, 1999:2006:2012a:2014:2017).

Meanwhile, some traditional mining community leaders have granted land parcels to individuals and groups, including foreign nationals, in their capacity, and exploration has taken place without the Minerals Commission's knowledge. This is another legislative flaw on the part of the Land Commission, which is responsible for overseeing all mining activities in Ghanaian territories.

Ways to address problems created by artisanal mining

The following are some of the factors that will aid in the resolution of problems caused by artisanal surface mining:

i. Resourcing the regulatory bodies

Due to a lack of resources and the widely dispersed and inaccessible nature of artisanal mining, monitoring environmental infractions and executing the policies that prevent such crimes has proven challenging (Anane-Acheampong-Osisiadan et al., 2013). As a result, complete compliance in the mining industry necessitates competent and well-resourced regulatory agencies.

All regulatory bodies, like all other governmental institutions in Ghana, rely on insufficient government subventions. This makes monitoring extremely difficult because the majority of illegal mining activities take place in distant areas of society, necessitating a large number of resources to adequately monitor. Other security organizations, including the Ghana police and the army, have had to assist in the monitoring effort in recent years, as some of the illegal miners are armed with sophisticated weapons.

ii. **Streamline the license application procedure**

The Artisanal mining subsector is not immune to bureaucratic culture, especially in its license acquisition process, which is a typical obstacle to the reform of the public sector in general (Birner and Anderson, 2007). Traditionally seen as an indigenous activity, the sector usually provides a livelihood strategy for relatively poor rural groups who are known to use rudimentary tools (Crawford et al., 2015).

Highly centralized bureaucratic licensing structures mean that miners must go through lengthy, demanding and expensive processes before formalizing their operations which creates a disincentive for most of them to register their businesses (Van Bockstael, 2014; Hilson, 2020).

These presented failures of the state encourage an informal artisanal mining sector by streamlining the process of license acquisition, attracting opportunistic but well-resourced illegal foreign and local entrepreneurs who usually operate using heavy earth moving machinery with devastating environmental impacts (Van Bockstael, 2014; Hilson et al., 2014).

iii. Harsher penalties for offenders

According to the Mining Act, a license for an artisanal mining business cannot be granted to someone who is not a Ghanaian citizen, has reached the age of eighteen, and is registered with the Mineral Commission's office. Meanwhile, some traditional leaders have sold their land rights to foreigners involved in unlawful artisanal surface mining. Since 2005, around 50 000 gold prospectors have left China alone for Ghana, according to Hilson et al. (2014). The majority of these Chinese immigrants work in illegal artisanal mining, which is solely open to Ghanaians.

Other traditional leaders will be deterred from engaging in such illegal activities by a prison sentence or perhaps a heavier punishment. Other foreign nationals will be deterred from engaging in illegal artisanal surface mining by large fines and repatriation to their home country.

Non-compliant mining businesses, or companies that diverged from the initial environmental impact assessment on which the license was awarded, must also lose their mining rights after being penalized to fix the problem they created. Even though there have been reports of

environmental damage as a result of mining corporations' non-compliance, it is uncommon for companies' mining licenses to be revoked in Ghana.

iv. Make the informal sector more official

Although legislative tools have been put in place to regulate the actions of artisanal miners, much more has to be done to get all participants on board. Even though the informal sector of artisanal mining (locally known as Galamsey) is not acknowledged in any part of decision-making due to a lack of political interest to create an adequate legal framework (Adu-Baffour et al., 2021), they make up a significant portion of the mining sector's players. Their actions have a broader impact than the rest of the industry.

Artisanal mining has been accused of the majority of the harmful effects of mining in Ghana as a result of its unregulated actions. To control this scenario, it would be good for the country to regulate the activities of these miners so that they can be monitored. As a result, the government must develop policy frameworks to regulate the operations of artisanal surface miners so that they can be monitored.

v. Environmentally friendly equipment should be made available

River bodies are the next most damaged ecosystem after degraded farmland. Surface mining has significantly polluted the majority of rivers that provide drinking water to populations. The cost of purifying such water by Ghana Water Company Limited has risen considerably, sparking a public discussion about our country's future ability to obtain affordable drinkable water. Rather than using water

from river bodies, the government, through district assemblies, should build mechanized bore holes and vast basins into which water from these bore holes would flow for use by gold miners(Arah, 2015).

The miners should be charged on a pay-per-use basis. This type of innovation will provide revenue for district assemblies while also helping to protect the water bodies that provide drinking water to the majority of the people. In brief, the artisanal mining industry in Ghana can only contribute meaningfully to the country's socio-economic development in terms of employment and social infrastructure if the sector's social and environmental challenges are properly handled. By addressing these issues, mining communities in Ghana would be able to benefit from the mineral deposits that have been discovered in their area.

Other Studies on Artisanal mining and livelihood

Artisanal mining activities have a beneficial and negative impact on people's life. According to Onyebuchi's (2014) research in Ghana's Wassa Amenfi East Local, the impact of illicit artisanal mining is of great concern to government officials, district authorities, and the general public. This is because ARTISANAL MINING has devastated countless farmlands that provide people with a source of income. Chemical miners discharge into fields or chemicals that run through their farms when it rains owing to mine operations have also harmed the vegetation and rendered the grounds unfertile for agricultural purposes.

Madzimore, (2015) in Zimbabwe made a similar discovery, finding that illicit gold miners' actions have resulted in severe environmental concerns such as the destruction of farmlands and the creation of trenches that serve as death traps for people. The merits and downsides of illicit mining were examined by

Onyebuchi (2014). While most people focus on the negative effects of illegal mining, the researcher believes it is equally important to highlight the beneficial effects. He mentioned that one of the positive effects or advantages of illicit mining is that it provides jobs for a significant number of people in Ghana.

According to Hilson (2001), an estimated 200,000 individuals are working in illicit artisanal mining, accounting for around 60% of the mining sector's labour force. Furthermore, the activity deters people from engaging in social vices such as armed robbery, prostitution, and so on to some level (Onyebuchi, 2014; Mactaggart et al, 2018). The reason for this is that people can now work in the sector and earn money to help them meet their fundamental necessities. Most importantly, the activity has provided a source of income not just for the miners, but also for those who rely on them for a living (Agyemang, 2012; Akabzaa et al, 2001; Awumbila et al, 2004; Hilson, 2001). More than 80,000 individuals rely on 'galamsey' operators to make a living (Onyebuchi, 2014). As a result, "Galamsey" has provided relief to several people who were unemployed or reliant on others. Several experts, however, have indicated that the disadvantages of artisanal mining much exceed the benefits (Agyemang, 2012; Akabzaa et al, 2001; Awumbila et al, 2004; Hilson, 2001). Artisanal mining has had an impact on the environment and many people's livelihood alternatives in mining communities (Ontoyin et al, 2014).

Even though the present Ghanaian government is working hard to regulate mining, media reports show increased unregulated mining activities and their resulting devastation of water bodies and farmlands in the country (Ghana Web, 2018). Chemicals used in mining activities end up in bodies of water that are utilized to provide drinking water to humans (Mactaggart et al.,

2018). According to Kwarteng (2012), “Galamsey” in Akwatia have had various type of environmental damage in the community. These environmental impacts include land and water pollution which provide sustenance for the people in the community.

Akabzaa et al (2001) noted that mining activities had destroyed almost 70% of the land area in Tarkwa in Ghana's western region, destroying farmlands that serve as a basic source of income for residents in such communities. A similar observation has been made in Mali and Zimbabwe, where artisanal mining has destroyed countless farmlands that provided people with a source of income (Belem, 2009; Madzimore, 2015).

Artisanal mining activities have also resulted in deforestation in mining areas. Surface mining is a danger to land and forest resources (Abdus-Saleque, 2008; Kwateng, 2012). The extent to which the removal of forest cover facilitates the drying up of rivers and streams at these mining sites/communities, thereby affecting people's overall livelihood and well-being. This is as important as the removal of forest cover which has often been overlooked by government authorities and community leaders. Kwateng (2012) questioned respondents if they consider deforestation to be a problem as a result of the region's mining activity. This was viewed as a difficult question by the majority of respondents (60 %). Based on his observations and the responses of the research participants, he concluded that mining activities in Akwatia are a threat to the environment and forest reserves.

Mining activity on a lower scale, according to Abdus-Saleque (2008), should be carefully planned and its impact thoroughly anticipated. That is to say, it is an action that results in the destruction of vegetation and the resulting

bareness of the vegetation. It has long-term consequences, and the magnitude of those consequences can be anticipated by the mining process (Gualnam, 2008). These different stages, for example, start with deposit prospecting and exploration, then move on to mine development and preparation, mine exploration, and mineral treatment, with each mine stage having its environmental impact.

According to Abdus-Saleque (2008), even establishing access routes to mine sites has an environmental impact because some forest reserves are cleared, resulting in deforestation. When it rains, this causes more land erosion (Opoku-Ware, 2010). The huge loss of arable lands, particularly in agro/ecological areas and zones where illicit artisanal gold mining persists.

According to Danyo et al (2016), illicit artisanal gold mining activities harm agricultural production in Ghana and hence affect food security. According to their findings, the country's key 'galamsey' mining regions and zones (Western, Brong Ahafo, Ashanti, Central, and Eastern regions) had higher consumer prices in 2016 with decreased food production, compared to the previous years. In the same year, the devastation of farmlands had an impact on the contribution of agricultural products to GDP. They concluded that by degrading vast lands, shifting labour from food crop farming to mining activities, polluting the air and contaminating water bodies, and, most importantly, displacing farmers as a result of 'Galamsey' activities, low food production is a threat to food security not only in the region of operation but nationwide.

When mining operators become victims of accidents at mine sites, dangers arise, compounding the detrimental impact on their livelihood. In Dunkwa On-Offin, a town in Ghana's central region, more than 100 'galamsey' operators died in 2010 when 'galamsey' pits caved in on them, killing them all (Teschner, 2012). A year later, in the Ashanti area, a similar tragedy occurred, this time killing roughly 12 people in the town of Attaso (Tschakert, 2009). Illegal artisanal mining is a common occurrence in Ghana, resulting in the death of miners.

Tschakert (2009) went on to say that this is not only sad news to hear but that the bulk of the miners is breadwinners in their families, putting a strain on their family's finances. Organizations such as the World Bank, the International Labour Organization (ILO), and the International Institute for Environment and Development have studied the social implications of 'galamsey' activities, with a focus on education and public health.

According to Danyo et al (2016), the activities have resulted in a significant number of young people in Ghana absenting themselves from school to engage in illegal mining to become wealthy overnight. As a result, there have been several school dropouts in Ghana's mining zones and regions. According to Danyo and Osei-Bonsu (2016), the temptation of gold money has led to many children pledging their future for fortune.

Although Danyo and Osei-Bonsu (2016) did not present data or evidence to show whether the children become wealthy or not, they did highlight that parents who reject their children's decision to drop out of school for illegal mining do not have their views respected. This is because such children can support themselves with their newfound employment (Danyo et al,

2016). As a result, some affected children have been taken from their parents' care, which is a major blow to mining communities.

Furthermore, social vices, criminal activities, and violent acts, such as drug misuse, prostitution, armed robbery, and teenage pregnancy, are more prevalent in mining towns than in other places (Danyo & Osei-Bonsu, 2016; Mactaggart et al., 2018). In mining areas, stagnant rivers are being left exposed. This is huge enough, according to Kwateng (2012) and Mensah et al (2014), to have formed a 'man-made' lake in the region. Streams and water bodies have been polluted, making it impossible for people to obtain safe and portable drinking water as well as perform basic domestic tasks. People have switched to sachet water (300ml distilled water packaged in a sachet) as a source of drinking water (Kwateng, 2012).

It has also been discovered that the Ghana government adopted a national environmental policy in 1991 to ensure that our environment and surroundings are safe and protected during and after the exploitation of various minerals resources, such implementation has done nothing to benefit the various mining communities because it is not effectively monitored and controlled (Yelpaala, 2004).

One of the health consequences of artisanal mining is that artisanal miners are frequently exposed to hazardous working circumstances, which can have a negative influence on their health. They participate in environmentally damaging practices like leaving pits exposed, which serve as death traps for people (Awumbila et al 2004) and breeding grounds for mosquitoes that spread malaria (Agyemang, 2012; de Santi et al., 2016; Kwateng, 2012). Kwateng (2012) polled community residents to see if mining has a negative influence on

their health. The majority of the respondents said they had contracted malaria as a result of open pits left behind by mining activities, which serve as a breeding ground for mosquitoes.

According to Yelapaala (2004), malaria was the main killer illness in Ghana that year, with 35 % of cases happening in the eastern region, which includes Akwatia. People complained of having cholera in the same study (Kwateng, 2012). Agyemang, (2012) and Onyebuchi, (2014) have also noted that polluted water bodies caused by mining activities and chemicals such as cyanide and mercury utilized in their operations cause people to become sick with cholera, even if they are aware of the risk. Diarrhoea and skin infections were among the health problems associated with mining in Tarkwa, Ghana's Western Region (Awudi, 2002).

Furthermore, according to Opoku-Ware (2010), increased pollution of water bodies by Galamsey operations in Ghana has created a significant problem for mining communities, increasing water-borne diseases such as bilharzia.

According to Opoku-Ware's research (2010) in Ghana, many individuals had broken their legs as a result of illegal artisanal mining operators' open pits, affecting their general health and wellness. Similarly, some people die as a result of falling into the uncovered pits (Aryee et al., 2003; Awudi, 2002). The nature of the machines and equipment used in the mining process also contributes to health risks. Occupational health risks are thus possible or widespread among persons who engage in mining activities, particularly those who do so illegally or informally with little or no technical knowledge (WHO, 2010, 2013). Mining operators are frequently exposed to physical hazards such

as accidents, explosions, falls from great heights, falls into pits, and boulders falling on them, while others suffer from hearing loss and other problems resulting from the drilling and blasting of rock materials (Hinton, 2006).

As a result, some researchers claim that hearing loss is frequent in the mining profession and poses a serious health risk to miners (Hinton, 2006; WHO, 2010, 2013). Furthermore, some of the machines employed in artisanal mining, particularly mobile equipment such as diggers, drilling machines, and trucks, cause miners' bodies to shake. Researchers have discovered that this can harm the miners' spinal cords and render them paralyzed (Hinton, 2006; WHO, 2010, 2013).

Drilling equipment can harm the arms, hands, and other essential body parts. Some miners work bare-chested and bare-footed, while others stand in mud that has been treated with chemicals. All of these practices harm miners' health (Hinton, 2006; WHO, 2009, 2013). Inhaling chemicals used in mining can harm the eyes, and lungs, and induce respiratory difficulties, kidney problems, and even mortality, according to studies (Haile et al, 2017). (Landrigan et al, 2013).

Also, Awudi's research (2002) on the impact of the Ash-Gold Mining Company's mining activities in Obuasi found that some companies' activities resulted in some community members contracting upper respiratory tract infections (URTI). Mining businesses' operations and accompanying pollutants, according to medical specialists in the region, are to blame for the spread of such diseases.

Dauda, Mariwah and Abane (2008) studied the changing livelihood of residents in the Asutifi district in response to mining. They found that there have been significant changes in the livelihoods of the people since the introduction of mining in the district. Prominent among these changes in livelihoods is the shift from agriculture to trading due to the loss of agricultural land to mining. The main reasons for the shift from farming to trading were reduced farm sizes and the high cost of farmland due to the introduction of large-scale surface mining by NGGL. They further discovered that stakeholders in the mining sector have not been able to provide livelihood security to the people due to constraints in the form of human resources, logistics and finance.

In a study of the effects of mining on the Environment and Well-being of residents in the Asutifi district, Ghana, Suleman, Mariwah and Mensah (2013) discovered that there was a widespread environmental injustice caused by mining that infringe on the lives of residents living in the Asutifi District. They discovered that the mining activities were polluting the water, the air, and the land through the release of grease and oils from other activities, cracks in buildings, land degradation and deforestation. Moreover, they discovered that there was a lack of legal protection against environmental risks caused by mining in the district

Although research has looked into the broad livelihood, development, and environmental impacts of mining operations (Horsley et al., 2015), the extent to which artisanal mining operations have direct or indirect effects on the health and livelihood of miners and community members in specific mining areas is not well documented. Given that artisanal mining in Ghana is the most basic form of mineral extraction, characterized by extremely labour-intensive

procedures, hazardous working environments, and repeated negative human and environmental impacts (Aubynn, 2015), it will be particularly interesting to investigate why and how people engage in such an activity, as well as how artisanal mining practices affect miners and the community.

The health-livelihood links relating to artisanal mining operations in specific areas have primarily been anecdotal, relying on media headlines, opinion surveys, and casual observations by government officials and pressure groups/NGOs. The migratory and 'clandestine' nature of artisanal mining operations, which are typically reliant on varied cross-community networks (Nyame & Grant, 2014), makes it difficult to trace these operators and assess the extent to which mining operations have impacted their livelihoods and health.

Theoretical Framework of the Study

Analysing the effects of artisanal mining on the livelihood of communities requires a multi-faceted approach. As a result, this study is grounded on the sustainable livelihood framework because it presents the model presents a better understanding of the relationship between artisanal mining and livelihood outcomes.

The Sustainability Livelihood Framework

Evolution and Development of the framework

The famines that were occurring in Africa and Asia in the 1970s alarmed many development professionals. A deliberate attempt was made to devote more funding to expanding the world's food supply. Crop research led to the creation of development centres and substantial improvements in food supplies. However, it was discovered in the 1980s that many households were still

struggling to get enough food for healthy living despite significant national surpluses (Frankenberger, 1996).

It was found that a large number of households lacked the necessary resources to exchange for food to meet their demands. The focus shifted as a result from national food security to household and individual food security and nutritional status. Research on farming systems also opened up a fresh method of looking at how households decide what to produce and consume. Then, researchers started to broaden their vision beyond food security to include a perspective on livelihood (Frankenberger, 1996).

The emphasis shifted to a social perspective that emphasizes improving people's abilities to provide for themselves. A significant portion of this thinking is generated from the participatory approaches that have been successfully included in the project diagnosis and design efforts of the various implementing agencies. The methods of sustainable living that are currently popular build on prior learning. They use techniques that have been developed through time rather than ones that are significantly new (Frankenberger, 1996). The framework was created as a tool to enhance knowledge of livelihood, especially for the underprivileged (Scoones, 1998).

Definition and Analysis of the Sustainable Livelihood Framework

Definitions of sustainable livelihoods are frequently ambiguous, contradictory, and rather limited, as Carswell et al. (1997) note. Without explanation, there is a danger of only adding to the conceptual confusion. The skills, resources (stores, resources, claims, and access), and activities necessary for a livelihood are together referred to as a livelihood. It is sustainable when it can withstand stress and shocks and recover from them, maintain or improve its

capabilities and assets, offer opportunities for sustainable livelihoods for the next generation, and make positive net contributions to other livelihoods both locally and globally, over the short and long terms (Chambers and Conway, 1992).

Referencing Chambers and Conway (1992), Scoones (1998) provided the following definition: The skills, resources (including financial and social resources), and activities necessary for a livelihood are together referred to as a livelihood. It is sustainable when it can withstand stresses and shocks, recover from them, and retain or even improve its capacities and resources without compromising the natural resource base. The sustainable livelihoods approach is an all-encompassing strategy that seeks to understand the root causes and dimensions of poverty without narrowing the attention to a select few elements (economic issues, food security, etc.). It aims to outline the connections between the various components (causes, expressions) of poverty, enabling more efficient operational prioritization of action (DFID, 1999). It is a technique of considering the goals, scope, and priorities for development to advance the fight against poverty. The strategy aims to assist people in achieving long-lasting livelihood gains assessed using indices of poverty that they, themselves, define.

According to the SLF, people's resource endowment, capability, and contact with the organizations and policies that influence their operating environment differ in many ways. Their options for a livelihood and the variations in welfare outcomes that result depend on how these variables interact. As a result, in the many applications of the SLF, the fundamental issue of individual and family endowments has received considerable attention. The Sustainable Livelihood Framework in figure 1 illustrates the points.

Scoones (1998), Ashley and Carney (1999), and DfID (1999) all assert that the SLF analysis is still primarily focused on individuals and households. These studies acknowledge that the major challenge in developing and implementing development interventions in the numerous applications and adaptations of the framework is the vulnerability of the underprivileged in society. In doing so, SLF offers five broad resource categories from which individuals can estimate their production potential, especially in light of the shocks, trends, seasonality, institutional structures, and processes that must be dealt with in their livelihood. These resource groups are:

1. Natural Resources, such as soil, water, biodiversity, and the services provided by them to the environment;
2. Social networks and affiliations are said to be represented by Social Capital;
3. Human Capital, including labour, skills, and knowledge;
4. Physical capital, such as building infrastructure and production equipment and machinery; and,
5. Financial Capital includes money, credit, debts, savings, and other economic assets.

Individuals construct and identify potential livelihood strategies that would produce the best welfare outcomes, such as increased income and well-being, decreased vulnerability to economic shocks and natural disasters, improved food security, and sustained use of available natural resources, depending on the endowment level in these resource groups. The institutional procedures and structures that determine the sequence of economic exchanges, however, do not have any independent influence on decisions about such

choices of livelihood options. Among these are laws and social norms, cultural and societal sensitivities, governmental structures, and standards for business transactions.

Beyond one's endowments, the framework notes that these institutional configurations, political structures, and power dynamics may result in varying degrees of access to these resources for sustaining one's livelihood, affecting the kinds of livelihood activities that should be pursued and the potential outcomes. Therefore, the critical function of institutional and policy elements in the framework is their impact on the creation of livelihood portfolios, the final determination of livelihood outcomes, and access to livelihood resources (Scoones, 1998). Accordingly, based on the SLF, it is hypothesised that household group welfare is a function of household assets, trends, circumstances, and context of processes for forming livelihoods, as well as the institutional and regulatory environment that influences economic and social exchanges.

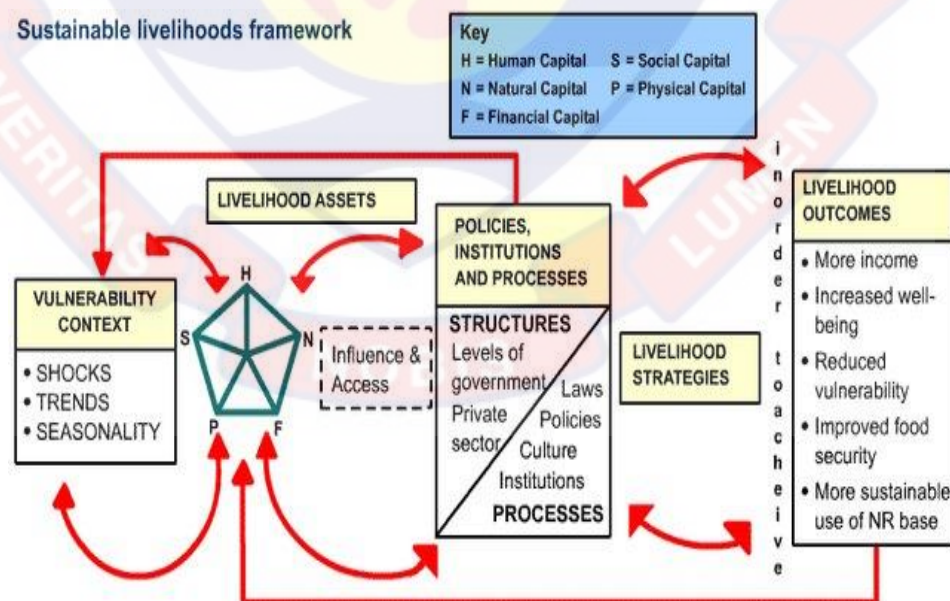


Figure 1: Sustainable livelihood framework

Source: Carney (1998) and Scoones (1998)

The framework's most basic representation shows stakeholders as acting in a context of vulnerability while having access to certain Assets. The current social, institutional, and organisational context gives this meaning and value (Transforming Structures and Processes). The livelihood strategies that are available to individuals in pursuit of their self-defined positive livelihood outcomes are significantly influenced by this setting. The framework outlines how these relate to one another while emphasising fundamental influences and processes and their many connections with lifestyles.

Vulnerability Context

The vulnerability context creates the outside environment in which people live and gives them meaning by having a direct influence on their asset status. It includes demographic trends, resource trends, and governance trends, as well as shocks (such as shocks to human, livestock, or crop health, natural disasters like floods or earthquakes, economic shocks, and national or international wars), and seasonality (like how prices, products, or job opportunities change with the seasons). This is the part of the framework that stakeholders have the least control over (Devereux, 2001).

Livelihood Assets

The approach is primarily focused on the needs of individuals. Therefore, it is essential to analyse how people attempt to transform their assets into favourable livelihood outcomes to determine their strengths (assets) accurately. To attain their goals, people need a variety of assets, yet no one asset endowment is adequate to produce the necessary results (Bebbington, 1999).

- Human Capital: It stands for the capabilities to work, knowledge, skills, and good health that allow people to pursue various modes of

subsistence and accomplish their subsistence goals. It changes at the household level depending on factors including household size, leadership potential, skill levels, and overall health, and it seems to be a deciding factor when using any other kind of asset (DFID, 2000).

- Social Capital: It refers to the social resources that people use to pursue their livelihoods, such as social networks and connections that foster cooperation and strengthen people's trust in one another or participating in more formalised groups with established systems of norms, regulations and consequences (DFID, 2000).
- Natural Capital: It refers to the natural resource stocks from which resource flows and services necessary for livelihoods (such as land, water, forests, air quality, erosion protection, biodiversity degree, and rate of change) are obtained (DFID, 2000).
- Physical Capital: It includes the essential producer commodities and infrastructure required to support livelihoods, such as access to inexpensive transportation, safe housing and buildings, sufficient water supply and sanitation, clean, affordable energy, and appropriate water supply and sanitation (DFID, 2000).
- Financial Capital: It refers to the financial resources people utilise to make a living and includes the crucial availability of currency or its equivalent, allowing people to choose from various livelihood methods (DFID, 2000).

Transforming Structures and Processes

Structures and processes that change show how institutions, groups, laws, and procedures affect people's lives. They are important because they

work on all levels and control access, exchange, and return on all ways of making a living. Structures are the private and public organizations that make and carry out policies and laws, provide services, make purchases, do business, and do anything else that affects people's lives (Shankland, 2000; DFID, 2000). The "processes" that control how structures and people behave and interact are made up of processes. Critical livelihood processes may motivate individuals to make decisions, be accountable for granting access to resources or allow stakeholders to change and replace one kind of resource with another (DFID, 2000).

Livelihood Strategies

People's actions, both alone and in combination, that help them make a living are called their "livelihood strategies." People mix activities in these dynamic processes to meet their different needs at different times, in different places, or on different economic or geographic levels. Their place in the framework makes it clear that they depend directly on the status of assets and the change of structures and processes. Changing the status of an asset can help or hurt other strategies, depending on how the institutions and rules are set up (Shankland, 2000; Keeley, 2001).

Livelihood Outcomes

Desirable livelihood outcomes include increased income (cash), improved well-being (in the form of intangibles like self-esteem, health status, access to services, and a sense of belonging), decreased vulnerability (better resilience from having more assets), improved food security (having more money to buy food), and more sustainable use of natural resources (appropriate property rights). The outcomes of a livelihood framework's configuration of

components assist us in comprehending the 'output' of that configuration. They show the priorities and drivers of many stakeholders. As a result, we may use them to predict how individuals would react to new possibilities and to determine which metrics should be utilised to evaluate the efficacy of our support efforts (DFID, 2000).

Strength of the sustainable livelihood framework

The SLF method demonstrates the multiplicity of means by which people make a living, most of which are employed in tandem. For the poor, who must often engage in a variety of economic activities to make ends meet, this is especially crucial, as it is not any individual activity but rather the sum of all of them that determines the household economy (Hussein and Nelson, 1998). The SLF method provides a complete picture of what resources, or a mix of resources, is crucial to the poor by emphasising the wide range of assets people draw on while building their livelihoods (Holland & Blackburn, 1998).

By zeroing in on the macro and micro circumstances that decide or constrain those living in poverty, this approach helps us better comprehend its origins "'s ability to gain access to various forms of wealth and support themselves. Such restraints may originate from locally rooted formal and informal institutional and social elements or be the product of macro-level policies, economic processes, and legislative frameworks (Frankenberger, 1996).

Also, the SLF approach lets us see that even the poor are active decision-makers and not passive victims when it comes to their livelihoods. It does this by focusing on how people develop their livelihood strategies (coping and adapting strategies) to get certain results in response to a certain "vulnerability

context." This is very important information for making sure that aid programs take advantage of the skills and resources of the poor (Frankenberger, 1996).

The Sustainable Livelihood Approach (SLA) works with every other method used to build modern infrastructure. Instead, it tries to make use of the interplay between the two. "Participatory Poverty Assessment (PPA), Participatory Rural Appraisal (PRA), and Good Governance Assessment (GGA)" are just a few of the common methods and tools that are used (Kollmair & Gamper, 2002). Livelihood gives a more realistic way to measure the direct and indirect effects on individuals. This makes it a better way to measure the social and economic effects of projects or programs that aim to reduce poverty, since "conditions of living" is at least one of their main goals (Frankenberger, 1996).

Its malleable structure and flexibility to modification make it suitable for use in a wide variety of local contexts, with its scope of implementation varying according to the specifics of the development research or project at hand. To better comprehend how a socially constructed environment functions and to locate prospective beneficiaries or partners in practice, the SLA could be used as an analytical tool for the identification of development priorities and new activities before any development activity is undertaken (Ellis, 2000).

Weakness of the Sustainability livelihood framework

There are several problems with the sustainable livelihood framework, starting with how it defines key ideas and ending with how it is used. Some of the rules are written down below.

First of all, the SL method needs a lot of background knowledge and a high level of analytical skills. Especially if the counterpart is a government extension organization, it may not put in as many resources as the strategy assumes to work with the local people as much as it wants to. They might not be able to use the technique (Mosse, 1994) well because they don't have the analytical skills or knowledge about poverty and issues related to making a living. Even though SLA is all about people, they are rarely shown in the designs. There are a lot of "capitals," "influences," "institutions," and "policies," but where are the people? The new household economics method, which SLA is based on, emphasizes groups of tasks. There's a chance that SLA will become a fairly mechanical and quantitative cataloguing exercise, which would give post-modernists broad criticisms more weight (Mosse, 1994).

Even though "culture" is an important part of communities, SLA gives surprisingly little information about it (Ashley, 2000). The SLA framework also leaves out important factors like leisure time that can have a big effect on the available resources. For example, Brinson et al. (2009), who did a study on commercial fishing of Atlantic billfish off the coast of West Africa, looked at the effect of recreational fishing on the stock and argued that it should be taken into account in the SLA along with the more traditional focus on fishing as a way to make a living.

As a final point, there is a problem with the "social relations of poverty," or how inequality and power relations keep people in poverty on a small and large scale. To improve the lives of the poor, the SLF method focuses on changing the systems and practices that give them a way to make a living (Department for International Development (DFID), 1999). This is hard to do,

though, because informal structures of social dominance and authority in communities affect how people get access to resources and economic opportunities. Also, these differences are rarely seen from the outside (Mosse, 1994).

Application of the SLF in livelihood studies

This section provides a concise overview of how the concept has been utilized by academics and development organizations (such as UNDP, CARE, and DFID) in their work in a variety of livelihood contexts. Each of these organizations for social change was selected because they put this method to work in unique ways.

Multiple organizations, including UNDP, CARE, and DFID, use this method to combat poverty. Additionally, they all use very similar definitions of "sustainable livelihoods," agree that people's "livelihood resources" should be conceptualized broadly to include not only material and monetary assets, but also human and social ones, and stress the importance of considering how dominant policies and economic structures affect the poor (Drinkwater and Rusinow, 1999; Carney et al., 1999; Frankenberger et al., 2000). The agencies' methods may vary in one respect. It is used by UNDP and CARE to aid in the formulation of actual programs and projects.

The approach is used to examine and revise ongoing projects and programmes to make them more sensitive and responsive to the situations and needs of the poor, and it is more of a basic framework for analysis than a procedure for programming. The degree of execution is another point of differentiation. CARE focuses mostly on community-level support for household livelihood security. Although the United Nations Development

Programme (UNDP) and the Department for International Development (DFID) focus on local initiatives to alleviate poverty, they also stress the importance of addressing enabling policy frameworks, macroeconomic reforms, and legislation. As a result, while DFID's research of people's livelihoods is typically conducted at the household (or community) level, the goal is not just to identify restrictions or opportunities that may be resolved at that level (Drinkwater and Rusinow, 1999; Carney et al., 1999; Frankenberger et al., 2000).

Equally crucial is learning how local livelihoods are affected by national and international policies and other institutional elements that must be addressed at higher, policy levels. Considerations of the surrounding environment and the nature of the expert's work are two other considerations. While the United Nations Development Programme (UNDP) and the Department for International Development (DFID) both include environmental criteria in their definitions, CARE places a greater emphasis on "household livelihood security" than "sustainable livelihoods" and is more concerned with meeting basic needs than with the environmental impacts of development. To better people's lives, UNDP often looks to the areas of technology advancement and social and economic investment (Drinkwater and Rusinow, 1999; Carney et al., 1999; Frankenberger et al., 2000).

Aside from the organizations, other academics have also used the Sustainable livelihood framework to evaluate the effects of mining on people's livelihoods. To understand the relationship between artisanal small-scale mining and rural livelihood in Ghana's far northeast, Osumanu (2020) applied the sustainable livelihood framework. He found that many subsistence farmers

in rural areas are forced to engage in artisanal small-scale mining to raise their revenue and alleviate poverty. He also discovered that the threats to agricultural productivity, such as land degradation, are the primary concerns of rural subsistence farmers. SLF was used by Arhin, Erdiaw-Kwasie, and Abunyewah (2022) to investigate uprooting and resiliency in Ghana's mining industry. They found that, except for physical capital, livelihood capitals have a positive effect on the outcomes of livelihood resilience, while relocation has a negative effect. But how well people who have been uprooted manage their lives determines how strong these bonds become.

Korah et al. (2019) used the sustainable livelihood framework to examine livelihood difficulties in Ghanaian mining villages that have been affected by the relocation. High food prices, water and electricity bills, exposure to various illnesses, and loss of farmlands were found to be among the unanticipated economic problems revealed in the affected towns. The vulnerable are further marginalized, inequality is further entrenched, and progress towards the Sustainable Development Goals (SDGs), especially objectives 4 and 5 of Goal 1 for land access and usage in Ghana, is hampered by the country's institutional framework.

Horsley et al. (2015) analysed sustainable livelihoods and regional development indicators in mining economies and applied the Sustainable livelihood framework to better comprehend the relationship between mining and development. The research team found that the capital framework can support a variety of development conceptualizations depending on the local context, the goal, and the interest of specific stakeholder groups, all of which

influence which of the five dimensions of the sustainable livelihood framework are prioritized.

Relevance of the sustainable livelihood framework to the study

The theory is relevant to the study because of the indicators for monitoring and evaluation of a livelihood outcome are linked to the problem analysis and the objectives. Thus, the theory was used in the work to help in explaining the factors that influence the people to engage in artisanal mining (whether natural, physical, financial, social or human), how it impacts people's assets status (vulnerability) and the livelihood outcome and livelihood coping strategies that people adopt to minimize the impacts of artisanal mining.

Chapter Summary

The study-related literature on artisanal mining was reviewed in this chapter. The conceptual, theoretical and empirical reviews made up its primary divisions. The Sustainable livelihood framework formed the underpinning of the theoretical framework. The framework is essential in assessing the impacts of artisanal mining as well as the coping strategies for the livelihood of people. There were similarities and variations between the reviewed works and other essential comments. These reviewed works would be extremely useful to the thesis since they would allow the researcher to determine whether the thesis conclusions aligned with the results of the literature reviewed and any necessary discussions.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter provides details of the research methods used in this study. It covers the research design, study area, data sources, methods of data collection, instruments for data collection, sampling procedures, data processing and analysis, ethical considerations, as well as COVID-19 strategies employed in the data collection process.

Research Philosophy

"A collection of shared views, values, and practices among members of a scientific community that acts as a guide for selecting the sorts of research challenges scientists should address and the types of investigations, they are willing to undertake" is the definition of research philosophy (Boateng, 2014). Finding philosophical concepts in research is quite essential. Although it is mostly hidden, it might have an impact on research.

The positivist and interpretive philosophies were used in the study. Positive paradigm studies are founded on facts and the assumption that the world is objective and external (Wilson, 2010). Positivism asserts that real knowledge is authentic information and that such types of knowledge result from the positive affirmation of hypotheses constructed by rigorously scientific processes. Furthermore, interpretivism holds that there is no singular, observable reality. Rather, numerous realities, or interpretations, of the same event exist (Merriam & Tisdell, 2016).

According to Hennink, Hutter, and Bailey (2020), interpretative researchers attempt to comprehend people's experiences from their viewpoints. The researchers accept that people's perceptions and experiences of reality are subjectively determined. Because of their respective ideologies, positivists are more inclined to employ quantitative research techniques such as surveys, whereas interpretivism prefers qualitative research methods such as in-depth interviews (Daymon & Holloway, 2010; Merriam & Tisdell, 2016)

Research Design

Generally, research approaches are seen in two folds: quantitative and qualitative. Usually, the former deals with having statistical power to be able to generalise the results whereas the latter is concerned with gaining an in-depth understanding and interpretations of a given phenomenon (Creswell et al, 2017). The use of a mixed method allows the strength of one research method to complement the weakness of the other. Thus, to make up for the shortcomings of the individual approaches, the study employed a combined approach that utilises the benefits of both the quantitative and qualitative approaches.

In this study, the concurrent triangulation (mixed method) design was used. The choice of the concurrent mixed method design is premised on the philosophical underpinnings of the study. The study employed the concurrent triangulation (mixed method) design. The purpose of concurrent triangulation design is to use both qualitative and quantitative data to more accurately define relationships among variables of interest (Castro et al., 2011). The concurrent triangulation design was used in collecting quantitative and qualitative data from the residents at the same time. The purpose of this was to validate the findings generated by each method through evidence produced by the other.

Additionally, the study also employed a cross-sectional research design as both qualitative and quantitative data were collected during a single phase of the study. The purpose of the qualitative inquiry was to provide a complementary and deeper understanding of the effects of artisanal gold mining on the livelihoods of miners and residents of the selected study mining communities, whereas the quantitative inquiry was basically to collect data that could be tested for statistical associations between selected explanatory variables and the outcome variable.

Study Area

This study was situated in three selected mining communities within the Obuasi Municipality. The Obuasi Municipality is located in the Ashanti region of Ghana. It lies between latitudes 5°35'N and 5°65'N, and longitudes 6°35'W and 6°90'W, sharing boundaries with Adansi North District to the North, Adansi South to the East and South and Amansie Central District to the West (Angyobore, 2017). According to Mensah and Okyere (2014), this Municipality covers a land area of 162square kilometres and is about 64 kilometres from the regional capital, that is, Kumasi. In addition, statistics from the 2010 Population and Housing Census also indicate that the Obuasi Municipality has a total population of 168,641, with a sex ratio of 92.5 and a total dependency ratio of 63.8 (Ghana Statistical Service, 2013).

Economic-wise, about 63.7 % of the population aged 15 years and older are economically active (Ghana Statistical Service, 2013), with agriculture and mining constituting the primary occupation within the Obuasi Municipality. For instance, the mining industry provides a total of 35% of employment opportunities within the Obuasi Municipality (Angyobore, 2017). The Obuasi

Municipality represents one of the oldest mining areas in Ghana with concessions that date as far back as over a century ago (Mensah & Okyere, 2014). Currently, AngloGold Ashanti Limited dominates mining activities in the Obuasi Municipality. Although the study is situated in the Obuasi Municipality, it is specifically based on three communities: Koffikrom, Pomposo and Odumase. Figure 2 shows a map of the Obuasi mining community highlighting the three selected communities wherein this study was conducted.

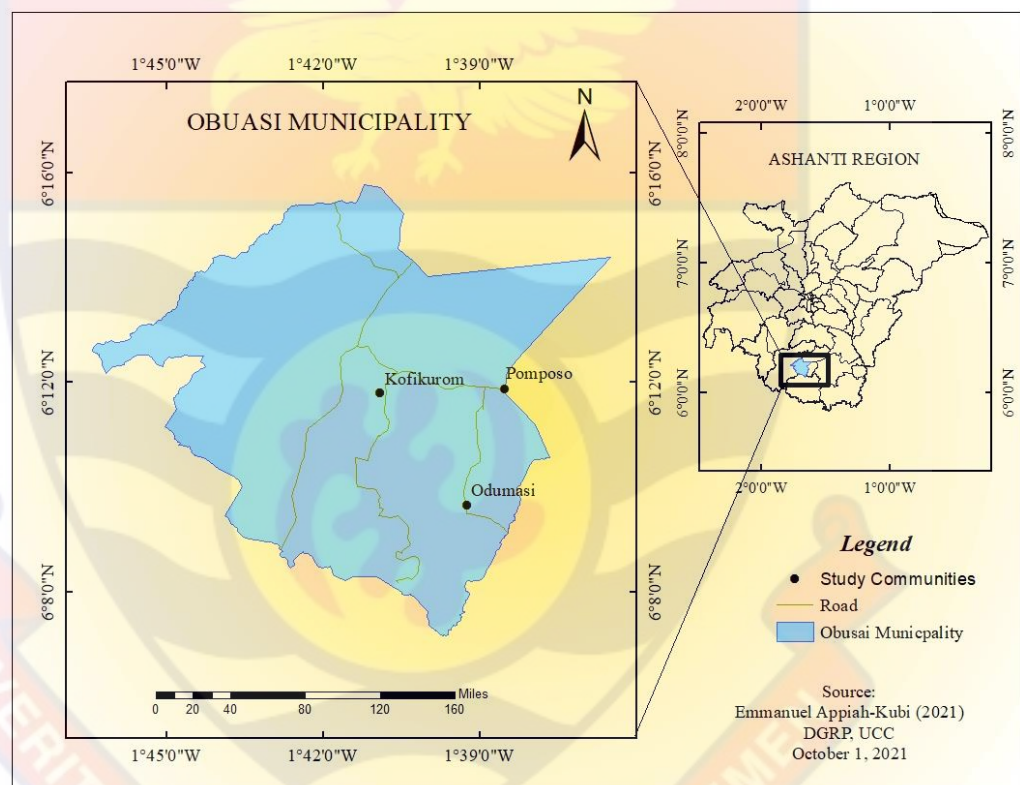


Figure 2: Map of Obuasi Municipality Showing study mining communities
Source: Appiah-Kubi (2021)

Population

The target population for the study was residents of Koffikrom, Pomposo and Odumase and stakeholders involved in the Artisanal Mining activity. The stakeholders include the officials from the Environmental Protection Agency and the Assembly members of the three communities.

Inclusion criteria

Residents in the three communities above 18 years who are willing to participate in the study were all included.

Sampling size and Procedures

Selection of respondents for the survey (quantitative)

Based on the GSS (2010) population census, the total population of Odumasi is 2,510, Pomposo is 4,842 and Koffikrom was 3,236. The total combined population of these three communities is 10,588. Based on aggregation, Odumasi represents 23.7%, Pomposo 45.7% and Koffikrom represents 30.6% of the total population.

Therefore, using the Yamane (1967) sample size formula;

$$n = \frac{N}{(1 + Ne^2)}$$

Where:

n= Number of samples

N= Total population = 10588

e= confidence level = 0.05

$$n = \frac{10588}{1 + 10588(0.05)^2}$$

$$n = 385.4$$

$$n = 406 \text{ respondents}$$

Thus, the sample size is 385 plus 21 to cater for non-respondents and improperly completed questionnaires, totalling 406.

Moreover, in allocating the samples to the three communities, the total %age aggregation of each of the communities were multiplied by the sample size.

- a. Odumasi = $\frac{2510}{10588} * 100 = 23.7\% \text{ of } 410 = 96$
- b. Pomposo = $\frac{4842}{10588} * 100 = 45.7\% \text{ of } 410 = 186$
- c. Koffikrom = $\frac{3236}{10588} * 100 = 30.6\% \text{ of } 410 = 124$

Hence, the total sample of the three communities, which is stated above represents the number of samples that were been taken from each community for the study. Moreover, a simple random sampling method will then be applied in selecting the participants from these communities for the study.

In selecting the 406 respondents in the communities to be interviewed for the study, a simple random sampling technique was used. This was done by first listing the house numbers in each of the communities to develop a sampling frame. Afterwards, random numbers were generated using the simple random table to select a participant from each household to be selected and interviewed for the study.

Selection of Key informants for the study

The purposive sampling technique was used in the selection of key informants for the study. The selection was based on the following criteria;

- a. Knowledge and expertise of the person in artisanal mining,
- b. The number of years the individual has stayed in the community, and
- c. The position the person holds in the community.

As a result, four (4) people were selected and interviewed. They are;

- a. The Assemblyman of Koffikrom,
- b. The Assemblyman of Pomposo
- c. The Assemblyman of Odumasi, and
- d. The Deputy EPA Director of the Obuasi Municipal Assembly.

Selection of respondents for the Focus Group Discussion

Purposive sampling techniques were used in the selection of participants for the focus group discussions that were held on Pomposo, Koffikrom and Odumasi. The criteria used in the selection of the participants were;

- a. Knowledge of artisanal mining,
- b. Involvement in the artisanal mining
- c. Number of years residing in the community

The participants that were chosen included miners, traders and the residents of the three communities. These individuals were selected because they have the knowledge and have engaged in artisanal mining activity so they will be able to give accurate information. In all, three (3) focus groups were formed containing six (6) members with one in each of the three communities. Three focus groups were formed because it will help in getting different perspectives of individuals on the problem of artisanal mining in each community. Therefore, eighteen (18) respondents were selected for the focus group discussion.

In all four-hundred and twenty-eight (428) respondents were selected and interviewed for the study.

Sources of Data

Primary and secondary data were used in this study. The primary data sources were obtained from the questionnaires, interviews, and focus group discussions while the secondary sources of data were obtained from journals, theses, newspapers, dissertations, and others

Data Collection Instruments

A questionnaire, an interview schedule and a focus group discussion guide (moderators guide) were used in the collection of data. These instruments were selected because they were most suitable for collecting data to address the study objectives.

The questionnaires were used to solicit participants' responses for the quantitative survey. It constituted four main sections. Section A collected data on the socio-demographic characteristics (age, marital status, educational status, length of stay in the community, religion, and ethnicity) of the study respondents. Section B asked questions about the factors that influence residents of mining communities to engage in ARTISANAL MINING. Section C solicited responses about the effects ARTISANAL MINING activities have on the livelihoods of residents while Section D asked questions about the coping strategies used as well as recommendations for ensuring that artisanal mining has positive effects on the livelihoods of residents.

Moreover, the interview guide and focus group or moderators guide was also used in the study to collect data from the respondents. The questions centred on the effects of artisanal mining on the people, the community and the actions taken by the government and other agencies to address the problems associated with artisanal mining operations.

Recruitment and Training of field Assistants

Considering the sample size and the study area, five (5) field assistants will be recruited and trained for this study. The field assistants who will be recruited would be Undergraduate students from the Faculty of Social Science, University of Cape Coast, who are from the Obuasi Municipality or have resided

in any of the communities in the district for more than ten years. The field assistants will be purposely chosen to be from communities in the Obuasi Municipality so that they can have a strong command of the Twi (local dialect) and can easily help in the translation of English to Twi during the data collection. The training of the field assistants will take a maximum of five (2) days, thus Monday and Tuesday. Assistants were trained on the study purpose and objectives, data collection procedures, asking questions, ethics, and culture of the study area to ensure that the concept of the work would be grasped and smooth data collection process.

Data Collection Procedures

Before the data collection, permission was sought from the Assemblymen of Odumasi, Pomposo, and Koffikrom through which the study was introduced to them. The researcher further sought permission to engage with the residents of the communities. The respondents were then reached by their various residents with the permission of the Assemblyman for the collection of the data. Moreover, the letter was sent to the EPA Office in Obuasi Municipal Assembly and by which appointments were made for the interview of the Deputy EPA Director for the Obuasi Municipality.

Data were collected using interviews and surveys. The surveys were used to collect quantitative data whereas in-depth interviews were used to collect qualitative data. Audio recorders and notebooks were used as tools for aiding the qualitative data collection exercise. Before the survey and interviews, the researcher read out the study protocols to the respondents. This was done to brief the study respondents about the aims and objectives of the study as well as seek the consent of the study respondents. The study interviews were conducted

at the household level. Also, both the survey and interviews were conducted in a language (mainly English and Twi) that the study respondents felt most comfortable with.

Moreover, data was also collected using focus group discussions. Focus group discussions were held in Odumasi, Pomposo and Koffikrom. The focus group discussion was guided by a focus group guide or moderator guide. The focus group discussion did not exceed 30 mins. The discussion offered more information on the impact and effects of artisanal mining on livelihood.

Data Processing and Analysis

The questionnaires will be coded and entered into the computer for analysis using Microsoft Excel and SPSS v.26. Descriptive and inferential analysis (chi-square) methods were used to summarise data to describe the distribution of scores. The quantitative data from the questionnaire were analysed using SPSS version 25. The qualitative data obtained from the interviews and focus group discussion was manually transcribed and analysed using Maxqda. Analysis that will be done using the qualitative data will be mainly thematic.

Ethical Considerations

This section covers all ethical guidelines that researchers should follow at all times throughout the course of their work. First, the University of Cape Coast Institutional Review Board's ethical approval was requested. After receiving clearance, the research was conducted while adhering to all ethical considerations, including the right to participate, informed consent, confidentiality, data protection, and anonymity.

First, the agreement of the participants was obtained, and they were informed that their participation was entirely optional. It was completely up to each participant whether or not they wanted to take part in the study. The participant's signature or thumbprint in the designated area on the respondent's consent form served as additional confirmation of their permission to participate.

In addition, the researchers or research assistants were available to answer any questions the participants had about the study, and they were encouraged to do so. Participants were also given serial numbers to identify them to maintain their anonymity and confidentiality. This way, any information they submitted was inaccessible to unauthorized parties and could not be used to identify them.

Finally, participants were given the assurance that their data was shielded from prying eyes by the researcher, who kept it on a private drive that was password-protected.

Chapter Summary

This chapter provided a thorough justification for the study's research methodology as well as a step-by-step breakdown of the methods used to collect data. The mixed-method study design, philosophy, and methods used for the study were initially covered in the chapter. Population, sampling, instruments, ethical considerations, the method of data analysis, and other pertinent factors were also carefully taken into account. Ethics were taken into account

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the results and discussions of the study. This section contains the respondent's information and the primary findings of the study. The study findings presented in this section focus on the objectives that guide the study. The findings are presented under each heading about the objective of the study that it addresses.

Background Information of the Respondents

This section presents the socio-demographic characteristics of the participants of the study. These include gender, age, level of education, and marital status (Table 1).

The total number of respondents who participated in the study was 428. Males constituted the dominant group (53.7%) in the three communities as against 46.3% females. Most of the participants were within the age group of 20 to 29 years. Considering the predominant age group are youthful, it implies that most of the residents who moved to the communities were often young adults who are attracted by the employment opportunities that come along with the operation of artisanal mining.

In terms of education level, the majority (77%) of the respondents have some form of formal education while about 23% of them had no formal education. In Ghana, places where mining activities often take place are characterised by limited access to education (Abane, 2008; Suleman, Mariwah & Mensah, 2013), however, the findings of this study present entirely different

results as most of the residents in these mining communities have some form of formal education.

Concerning the marital status of the residents in Koffikrom, Pomposo and Odumasi, most of the respondents were married followed by those who are single, cohabiting, separated, widowed, and divorced.

Table 1: Socio-demographic characteristics of Respondents

Variable	Frequency (n=406)	Percentage (%)
Gender		
Male	217	53.7
Female	189	46.3
Age Group		
Less than 20	93	25
20 – 29	140	34
30 – 39	100	25
40 – 49	49	12
50- 59	24	6
Education Level		
None	93	23
Primary	78	19
Secondary	195	48
Tertiary	40	10
Marital Status		
Cohabitation	32	7.9
Married	225	55.4
Separated	23	5.7
Single	94	23.2
Widowed	17	4.2
Divorced	15	3.7

Source: Fieldwork (2021)

Effects of Artisanal Mining on the livelihood of households and individuals

This section focuses on research objective one, which sought to analyse the effects of artisanal mining on the livelihood of households and individuals in Koffikrom, Odumasi and Pomposo. According to Scoones (2009), livelihood comprises the capabilities, assets and activities for a means of living. In assessing whether artisanal mining had affected the livelihood and household of the respondents, most of them indicated that their livelihood is affected as a result of the Artisanal Mining activities in the communities. This further echoes the observation made by Horsley et al. (2015) that artisanal mining operations in communities affect the health and livelihood of miners and community members.

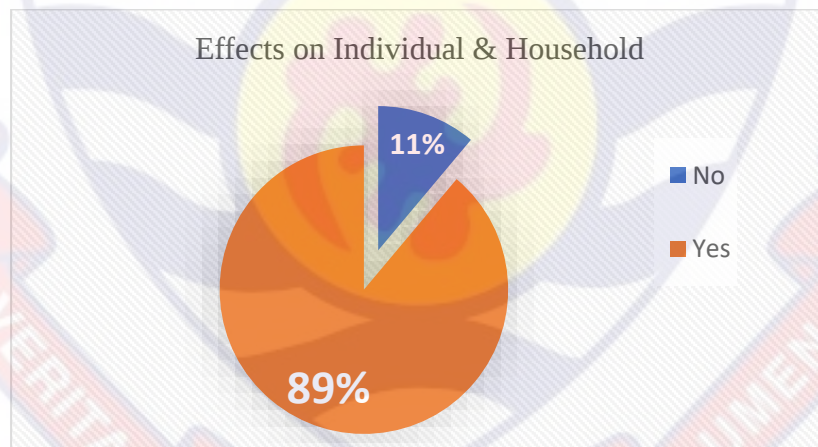


Figure 3: Effects of Artisanal Mining on individuals and Household
Source: Fieldwork (2021)

Effects of Artisanal Mining on Household Employment

In any mining community, artisanal mining provides benefits to the residents of the community. Table 2 shows that about 43% of the respondents indicated that artisanal mining has provided some form of employment in their

household. Whilst about 56 % indicated that there has not been any form of employment in their household associated with artisanal mining.

Table 2: Employment in Household due to Artisanal Mining

Employment in the household due to artisanal mining		
	Frequency	Percent
No	228	56.44
Yes	176	43.56
Total	404	100.00

Source: Fieldwork (2021)

Usually, in mining communities, there is a surge in employment as most people are engaged in mining activity, petty trading and other commercial activities (Spiegel &Viega,2006). However, in Koffikrom, Odumasi and Pomposo, it was most of the people were unemployed. It was further discovered that these communities' main source of employment was agriculture activities but the expansion of the artisanal mining activities in the area has destroyed farmlands causing most people to be unemployed (Danyo & Osei-Bonsu, 2016).

Moreover, some of the respondents indicated that there has been some form of employment in their household as a result of the artisanal mining activities in the communities. They further indicated the number of people that have been employed in artisanal mining operations or any other activities in figure 4.

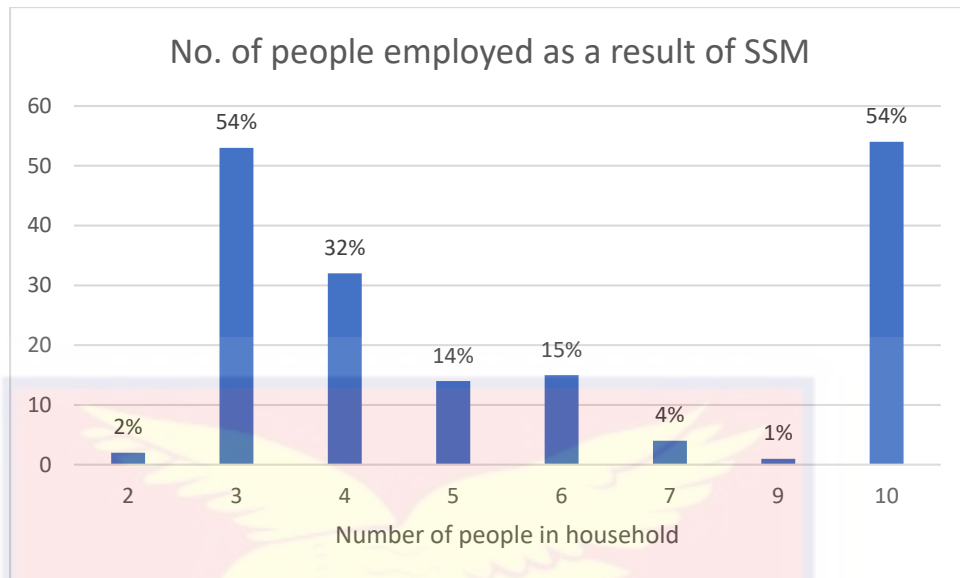


Figure 4: Number of people employed as a result of Artisanal Mining activities

Source: Fieldwork (2021)

When asked whether the findings in Table 2 coincides with the expectation of the people in the communities, the Assemblyman of Gauso/Koffikrom stated that;

There is no job in the area aside from mining, so many people in the community have engaged in the artisanal mining activity”. Due to unemployment, most people have no other option than to engage themselves in it. Also, many people who are not employed directly in the artisanal mining activity, sell things on the sites. So, in a way it has created employment both directly and indirectly.

The statement of the Assemblyman of Koffikrom indicates that there is unemployment in the community. Because of that most people are forced to engage in artisanal mining or other economic activities that are tied to artisanal mining operations. This is in line with the findings of Hilson and Clifford (2010), that many people engage in artisanal mining because of unemployment.

Skills and Knowledge Acquisition through Artisanal Mining

Skills and knowledge acquisition play an important role in the development of any community. According to Gyan (2019), in communities where artisanal mining operations take place, the inhabitants lack the skills to engage in alternative livelihood activities. The findings of the study back the assertion of Gyan (2019) as most of the respondents (76%) were found to have not acquired any skills and knowledge to engage in any other livelihood activity. However, 24% of the respondents indicated that they have acquired some form of skills and knowledge as a result of artisanal mining operations in the community.

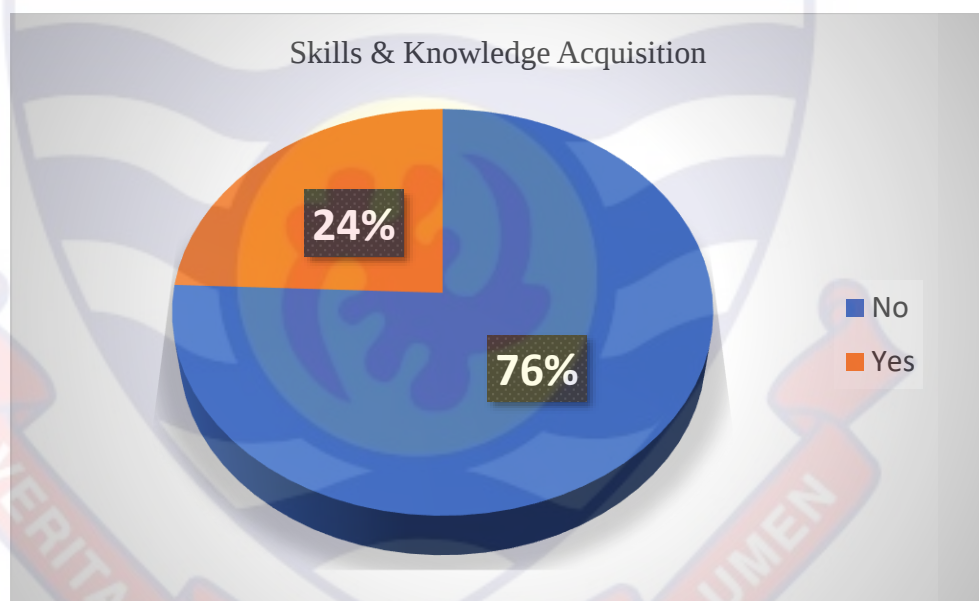


Figure 5: Skills and Knowledge acquisition as a result of artisanal mining
Source: Fieldwork (2021)

In identifying with the respondents who indicated that they have acquired some form of knowledge and skills, they further indicated that they have acquired skills and knowledge in Plumbing, Carpentry, driving, tailoring, trading and welding (figure 6).

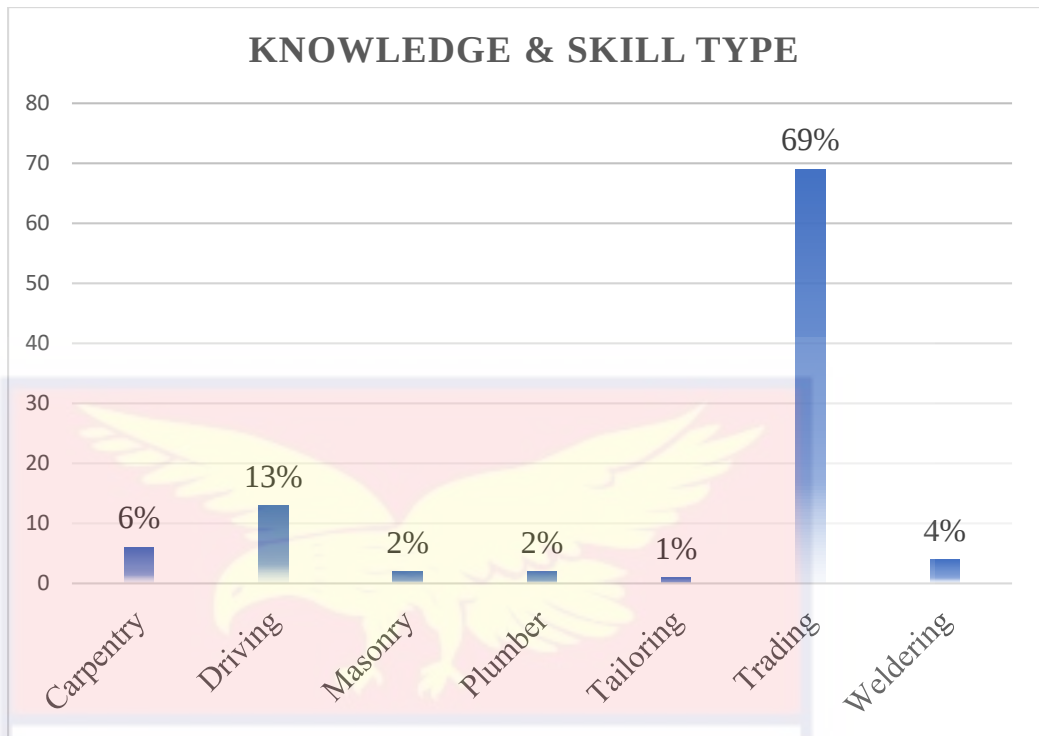


Figure 6: Type of knowledge and skill acquired

Source: Fieldwork (2021)

Adverse effect of artisanal mining on livelihood and locality

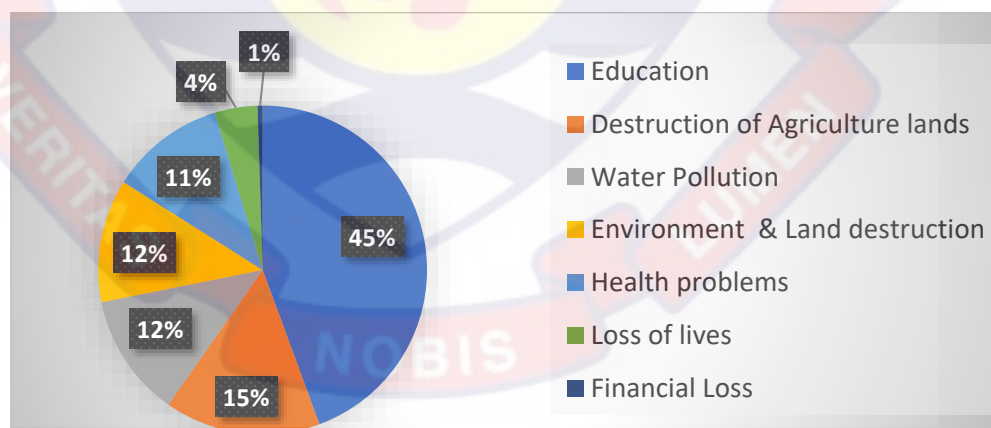
Artisanal mining affects both the livelihood of residents and the mining community. Artisanal mining can harm communities' livelihoods by destroying farmlands, polluting waters, and creating land shortages (Madzimore, 2015; Gilbert & Osei-Bonsu, 2016). From Table 3 about 47% of the respondents indicated that artisanal mining had an adverse effect on their livelihood. However, the majority (52.1%) of the respondents indicated that activities of artisanal mining had no negative effects on their livelihood.

Table 3: Adverse effects of Artisanal Mining on livelihood and locality

Artisanal Mining adverse effects on your livelihood and locality?		
	Frequency	Percent
No	211	52.1
Yes	191	47.1
Total	402	100

Source: Fieldwork (2021)

In the exploration of how artisanal mining operations adversely affects the livelihood and locality of the 191 respondents (Table 3), 45% of them indicated that it has negatively affected the educational system of the youth in their community (Figure 7). Additionally, 15% of the respondents indicated that it has destroyed agricultural lands while 12% indicated that artisanal mining has caused water pollution, environmental pollution and land destruction. Only 4% and 1% of them indicated that it has caused them financial loss respectively.

*Figure 7: Effects of Artisanal Mining on livelihood*

Source: Fieldwork (2021)

From the focus group discussion, it emerged that;

Artisanal mining operations are very dangerous but because of unemployment, most people involve themselves in it. People lose their lives because of this operation. It has rendered many widows. I will not recommend it to anyone. Sometimes human blood is even involved before they get a certain amount of mineral. So, it all boils down to poverty and unemployment. We lose farmlands usually as a result of artisanal mining activity, sometimes the chiefs are behind it, they pull down acres of cocoa trees and crops.

In a discussion with the Assistant Director of EPA about the effects of livelihood on the inhabitants of the mining communities, it emerged that:

People are denied farmlands or agricultural lands by the chiefs and elders of the community. Sometimes, the miners encroached on the farmlands of others that are close to the mining site. They destroy these lands without caring about the consequences it may have on those whose land they are destroying.

On account of the effects of artisanal mining on the livelihood of the people, the Assemblyman of Pomposo stated:

The chemicals they use in the operations damage crops and kill animals. The pits they leave uncovered after digging also pose a danger to people living around. Living conditions in Obuasi are not very high as compared to the mining sites. People tend to increase the prices of their items, twice what is sold at the main Obuasi market. Education in mining sectors is not encouraging at all, due to the returns they get from artisanal mining. Artisanal mining also poses a threat to most men and women here, especially the elderly. It changes the physical appearance

of the younger ones too due to the nature of the job. It sometimes has effects on their health.

These findings are in line with the observations made in Ghana, that artisanal mining activity destroys agricultural land which is the major source of livelihood for many communities, causes health problems and loss of lives causing unsustainable livelihood challenges (Egyir, Baffoe-Bonnie, Otchere, Asante, and Oku-Afari, 2015; Madzimore, 2015; Gilbert & Osei-Bonsu, 2016).

Moreover, from figure 8, 30% of the respondents confirmed that they have lost livelihood assets such as land and farms as a result of artisanal mining. On the other hand, the majority of the participants (70%) indicated that they have not lost any form of livelihood assets due to artisanal mining. Livelihood assets according to Baffour-Kyei et al. (2018) are often affected by artisanal mining activities. People lose their lands and farms are destroyed in the process. As a result, people experience hardship and poverty as a result of their loss of livelihood assets

Generally, the effects of artisanal mining on the livelihood of the people of the mining communities in Obuasi figure 9 reveals that the negative effects far outweigh the positive effect. It was, therefore, not surprising that the data revealed that some socio-economic problems including health-related problems, education, pollution and safety persist in selected mining communities in Obuasi.

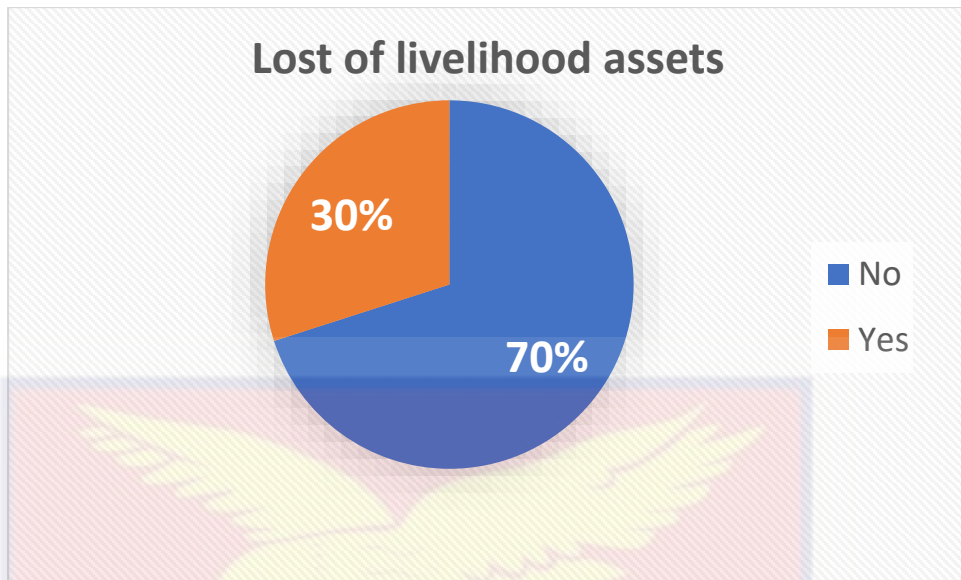


Figure 8: Loss of livelihood assets

Source: Fieldwork (2021)

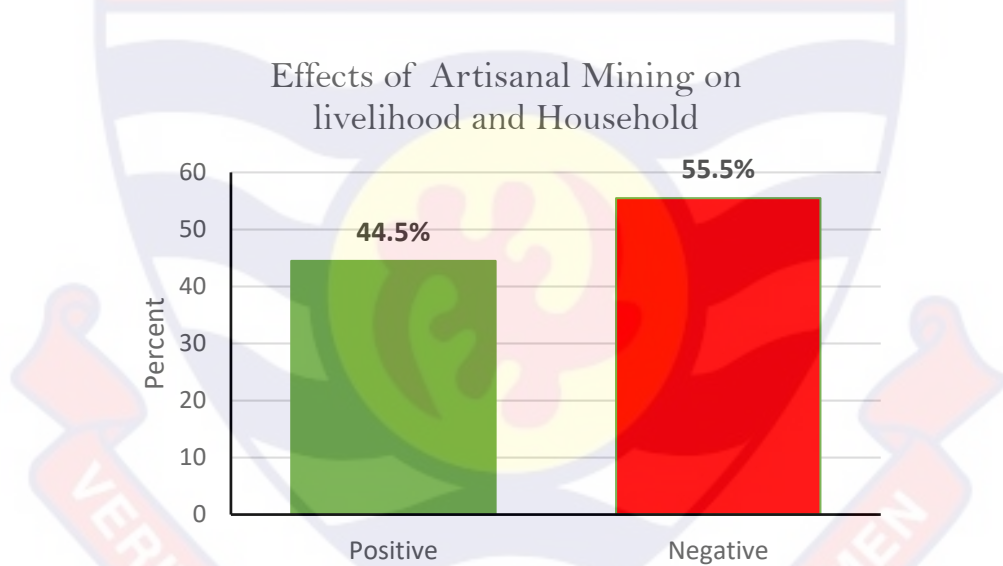


Figure 9: Effects of Artisanal Mining on the livelihood and household of Respondents

Source: Fieldwork (2021)

Effects of Artisanal Mining Activities on Koffikrom, Odumasi and Pomposo Communities

This section deals with objective two of the study which assessed the effects of Artisanal Mining activities on the mining communities, thus

Koffikrom, Odumasi and Pomposo. Irrespective of the economic gains, artisanal mining has detrimental consequences on society and the environment.

Figure 10 shows that artisanal mining has a diverse impact on the mining localities. According to the respondents, artisanal mining has major effects on waterbodies of affected localities through the pollution that renders affected water bodies unsafe to drink. 80 respondents indicated that there has been vegetation loss in the communities. Artisanal mining activities cause vegetational losses through environmental degradation (Smith, Ali, Bonfiger & Collins, 2016). As a result of the artisanal mining operations, large tracts of land have been stripped of their forest cover, causing ecological disturbances that have resulted in the loss of farms, animal habitats, and freshwater ecosystems (Smith, Ali, Bonfiger & Collins, 2016).

Furthermore, 76 respondents indicated that communities had to be displaced as a result of artisanal mining because artisanal mining sometimes takes place in existing established communities. This is in line with the observations by Terminski (2012) and Antwi-Bosiako (2003) that people are often displaced from their homes due to encroachment and pollution from mining activities. The displacement of people from their homes usually leads to issues such as landlessness, homelessness, and marginalization (Antwi-Bosiako, 2003; Terminski, 2012).

Moreover, 69 respondents indicated that lives are lost as a result of artisanal mining since the miners sometimes use old and traditional methods of mining, which can cause the collapse of the pit.

Additionally, 56 respondents indicated that it endangers the health of the people and the ecosystem since both are sometimes exposed to harmful chemicals. And lastly, 26 participants indicated that it causes a loss of Biodiversity.

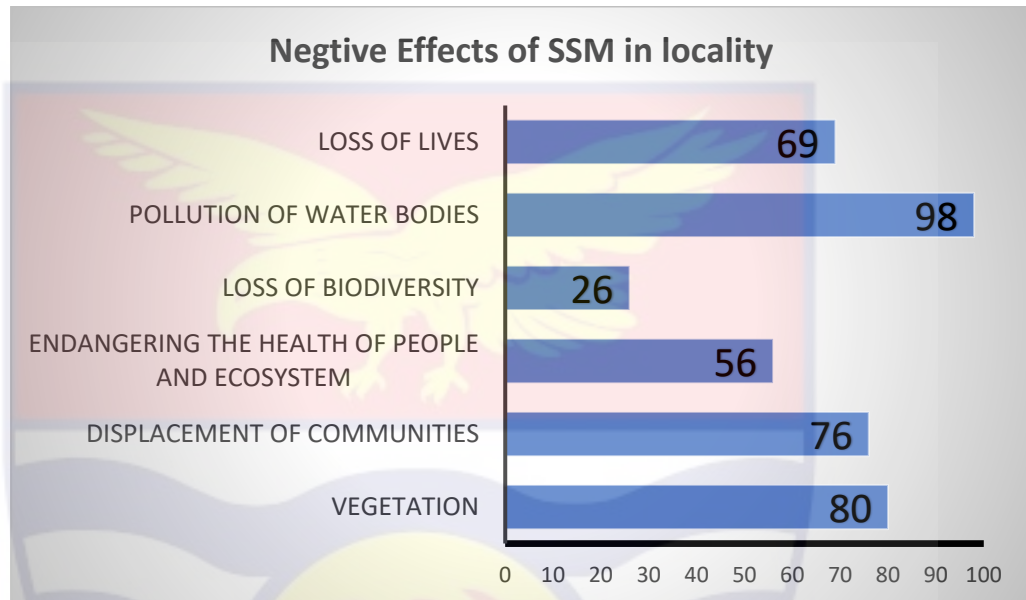


Figure 10: Negative effects of Artisanal Mining in the communities

Source: Fieldwork (2021)

In addition, the Assemblyman of Koffikrom also made the following assertion on the negative impact of artisanal mining in the community;

There is a continuous increase in the price of items and foodstuffs, which increases the cost of living in the locality. Education in mining sectors is not encouraging at all, due to the returns they get from artisanal mining. The youth usually drop out of school and focus on artisanal mining to get money to feed themselves and their families which in the long run increases the level of illiteracy in the community.

Also, from the focus group discussion, the following negative effects of artisanal mining on the selected study communities were documented;

Artisanal mining activities have made living conditions in the communities difficult. Miners often leave the pits open which endanger the lives of people and also release dirty water into the Akaporiso river, which kills the fishes in the river. This reduces the number of fish yields. There are instances where the miners engage in ritualistic killings without any consequences. People also fall into the pit and get hurt to the extent that we sometimes do not even find some parts of their bodies due to how their bodies tear apart and so they pack them in sacks and take them out.

The above assertion conforms to the findings of Egyir et al. (2015) and Laari (2018) that Artisanal Mining activities not only affect the livelihood of the communities negatively but also lead to unsustainable livelihoods.

To test whether artisanal mining activities in the communities do have a negative (adverse) implication on the communities, a cross-tabulation and chi-square analysis were performed. From Table 4, a chi-square test was performed to examine the relationship between the presence of artisanal mining operations and its negative impact on the mining communities. There was a significant relationship between the two variables. Thus, the artisanal mining operations in the communities are more likely to hurt the communities, $X^2(1, N=406) = 9.429$, $p < .05$. In this case, since the p-value is smaller than the standard alpha value of 0.05, we'd reject the null hypothesis and conclude that two variables are associated with each other.

Table 4: Chi-square test Results

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Significance (2-sided)	Exact Significance (1-sided)
Pearson Chi-Square	9.429 ^a	1	.002		
Continuity Correction ^b	8.225	1	.004		
Likelihood Ratio	8.144	1	.004		
Fisher's Exact Test				.004	.003
Linear-by-Linear Association	9.405	1	.002		
N of Valid Cases	406				

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 8.42.

b. Computed only for a 2x2 table

Source: Fieldwork (2021)

Moreover, Table 5 shows the crosstabulation of the responses of participants regarding the existence of artisanal mining activities in their communities and their negative impact. The proportionate of respondents who indicated that there are artisanal mining activities in the communities consider artisanal mining to hurt the community is 83.4%. Also, the proportionate of respondents who were of the view that despite the presence of artisanal mining activity in the communities, it did not have any adverse effects on the community was 16.6%.

Table 5: Artisanal Mining and adverse(negative) effect on community

			Negative effects of artisanal		
			mining		Total
			No	Yes	
Artisanal	No	Count	16	29	45
mining		% Within	35.6%	64.4%	100.0%
	Yes	Count	60	301	361
		% Within	16.6%	83.4%	100.0%
Total		Count	76	330	406
		%	18.7%	81.3%	100.0%

Source: Fieldwork (2021)

Coping Strategies adopted by Residents affected by Artisanal Mining**Activities**

This section deals with objective three of the study which sought to identify the major coping strategies adopted by residents whose livelihoods have been affected by artisanal mining activities within the Obuasi Municipality. Usually, coping strategies are employed by those affected by the artisanal mining activities through seeking help from the government, and relatives, NGOs or engaging in alternative livelihood activities such as petty trading (Baffour-Kyei et al., 2019; Mabe, Owusu-Sekyere & Adeosun, 2021).

Support from Relatives

Artisanal mining activities have a detrimental effect on the people in the mining communities in Obuasi. It destroys their farms and main source of livelihood leaving them in deep economic crises. As a result, people may tend to rely on relatives for economic support. Figure 11 shows that 97% of the

respondents do not receive support from any relatives when they are in crisis. However, 3% of the respondents indicated that they had support from relatives when artisanal mining activities destroys their farms and sources of livelihood.

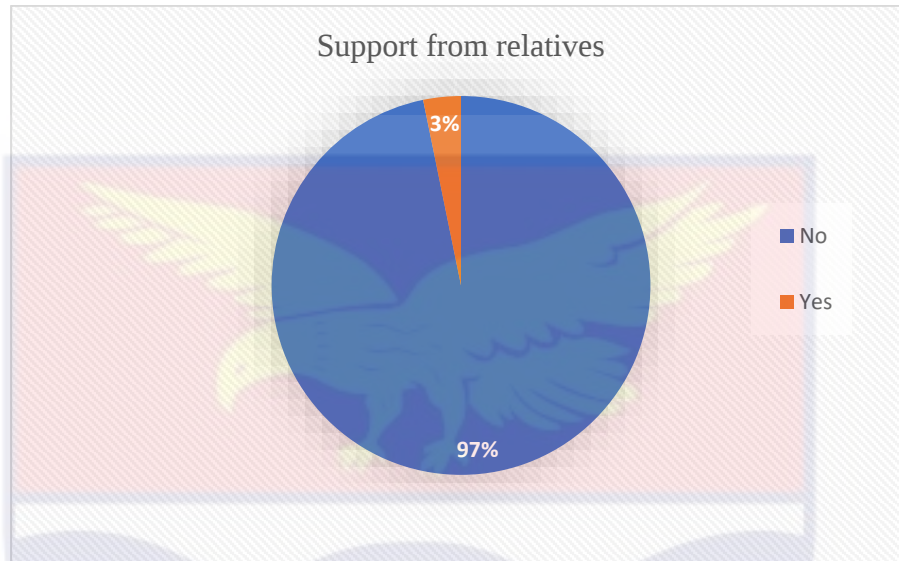


Figure 11: Support from relatives

Source: Fieldwork (2021)

Support from NGOs

Figure 12 shows that the majority of the respondents (98%) intimated that they do not receive any form of support from any NGO whiles a few of them (2%) indicated that they get support from NGOs and other sources. It was discovered that the NGOs usually educate the people on the negative consequences of artisanal mining but in no part provide financial assistance to the people. According to Gyan (2019), NGOs usually spend huge sums of money to support the people and the affected communities by providing portable drinking water for the people by drilling boreholes.

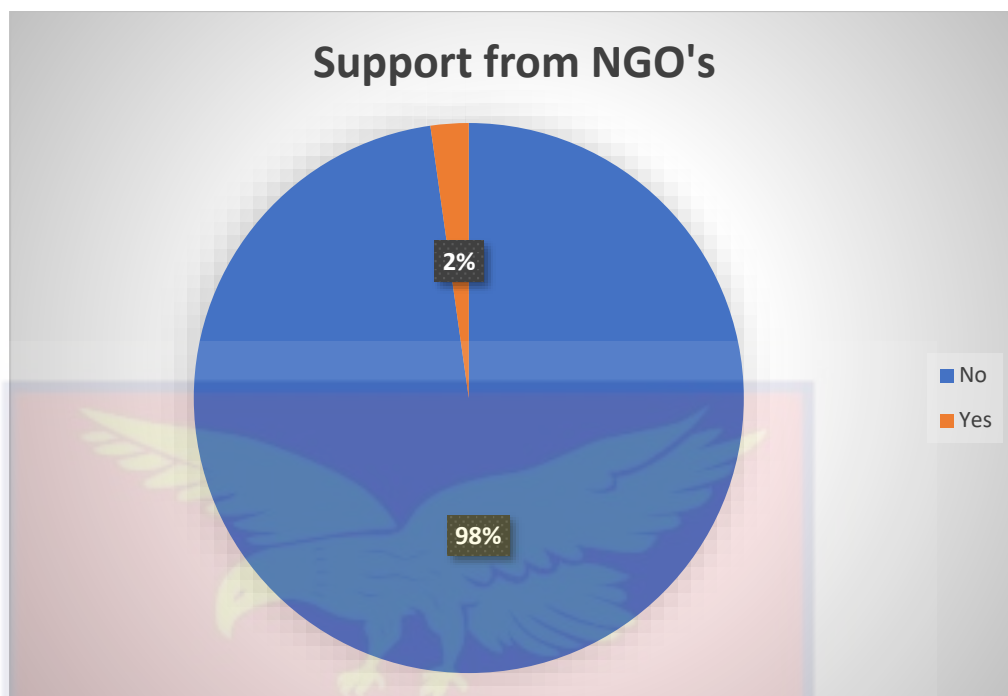


Figure 12: Support from NGOs

Source: Fieldwork (2021)

On the people receiving support from the NGOs, the Assemblyman of Koffikrom, Pomposo and Odumasi stated that,

The NGOs sometimes come to the community to talk to the people about the mining activity and how it will affect their lives. But they do not provide any financial support to those who have lost their lands as a result of artisanal mining.

Relatedly, when asked about the involvement of NGOs in compensating victims of artisanal mining, the Obuasi Municipal Assembly EPA Assistant Director stated that;

The NGOs do not support the affected people in the community from the artisanal mining activity. The NGOs only focus on sensitization and capacity building. They only focus on educating the people on the effects and benefits of artisanal mining. “He further indicated that, “the NGOs

are not required by law to compensate the people affected by artisanal mining.

4.4.2 Support from Civil society groups

Civil society groups usually engage with government and artisanal mining operators to bring artisanal mining into the formal, legal system and through that address the problems and issues connected with it (Levin Sources et al., 2020). Figure 13 shows that respondents did not receive any form of support from civil society groups in times of crisis. However, 8% of the respondents indicated that they did receive some form of support from community-based civil society groups.

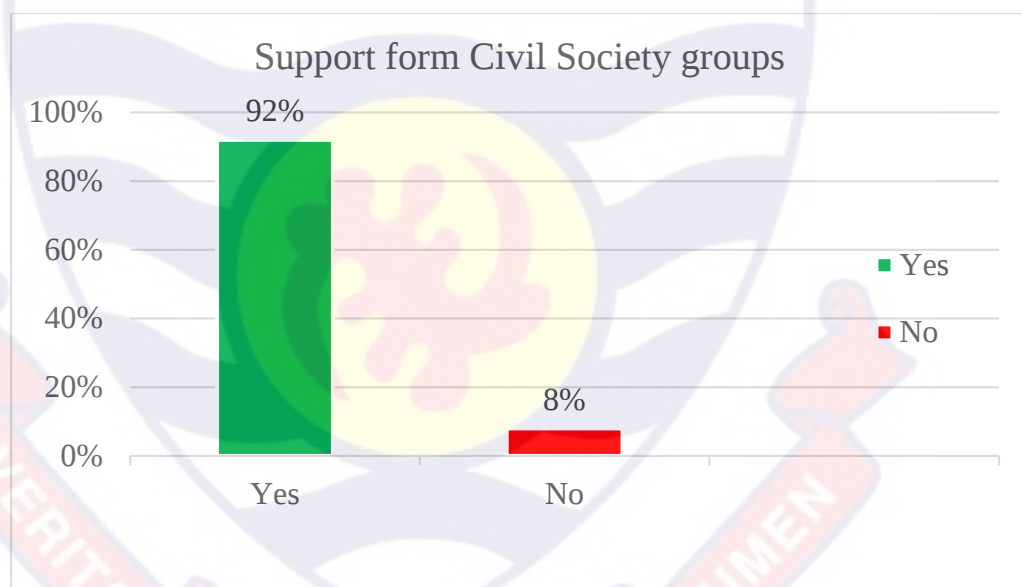


Figure 13: Support from civil society groups in time of crisis

Source Fieldwork (2021)

From the focus group discussion held at Pomposo, it was discovered that some civil society groups decided to advocate for the enforcement of laws on the behalf of the victims affected by the artisanal mining operations, organise learning events and act as an intermediary between the people and the

government officials of the Obuasi Municipal Assembly (Levin Sources et al., 2020).

Support from Private and Community based Organisations

Figure 14 shows that the majority of the respondents (98%) in the study communities indicated that they did not receive any form of support from any private or community organisation. Only 2% of them indicated that they did receive help from private organisations.

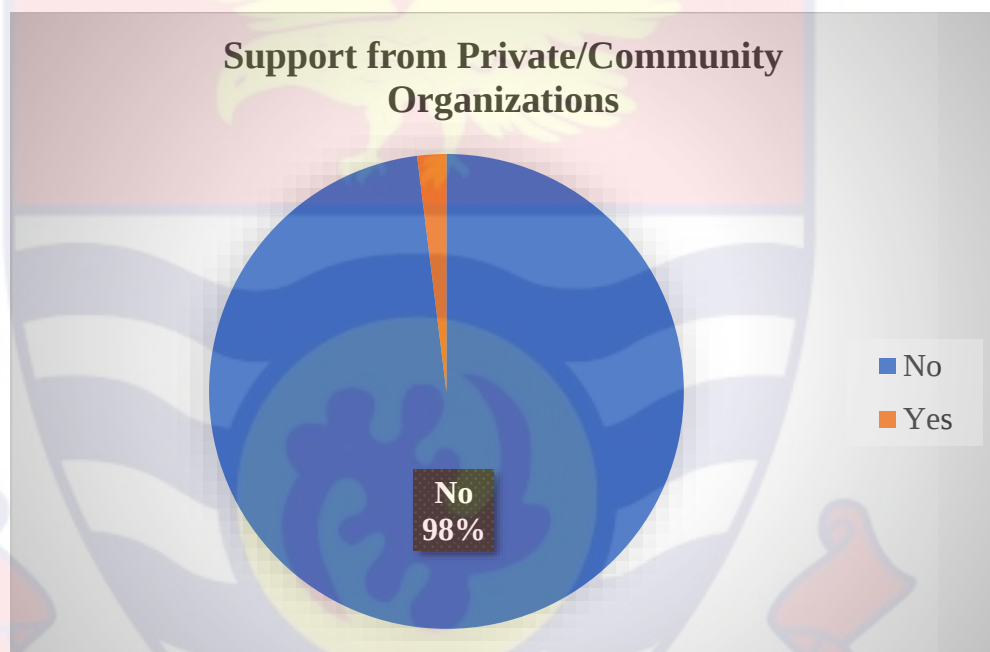


Figure 14: Support from private/community organisations

Source: Fieldwork (2021)

The help from private and community-based organisations usually comes in the form of support for the injured and the sick, according to the Assembly-Man of Koffikrom. However, the community and private organisations extend their help only in extreme cases like the death of people as was discovered during the study.

Support from the Government Agencies

Government agencies usually provide compensation and training for the people and communities affected by Artisanal mining to reduce unemployment and increase their standard of living (MESTI NEWS, 2018). However, from figure 15, about 94% of the respondents indicated that they have not received any form of support from the government in dealing with the negative consequences of artisanal mining.

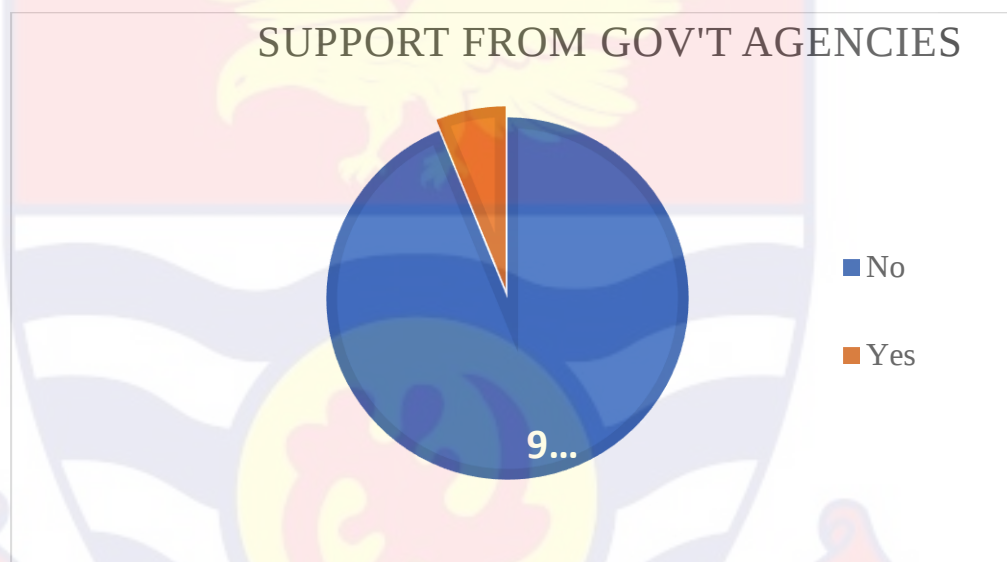


Figure 15: Support from government agencies
Source Fieldwork (2021)

Concerning support from government agencies, it was discovered during the focus group session in Pomposo that:

The government does not help us, the municipal does not help us, and we need lots of help but nobody helps us. Due to corruption and political interference, our municipal assembly and the enforcement agencies cannot even work independently and so arresting deviants has become a major challenge.

Additionally, the assemblymen of Koffikrom, Odumasi and Pomposo of the study communities noted that government do not compensate any of the artisanal mining victims. He explained that:

The Municipal cannot help the people unless the affected persons report their problems to them. However, they do not provide any compensation.

They only come in with NADMO when the problem is regarding fire and water, to support the victims.

Further, the EPA Assistant Director of Obuasi Municipal Assembly made the following remarks when asked whether the government provide compensation to the people affected as a result of artisanal mining;

Government do not provide any compensation or support to the victims. However, if a person reports that they face challenges with artisanal mining, there is a negotiation concerning the damages between both parties. If an agreement is reached the case is forwarded to the Municipal Assembly and to the Ghana Valuation Board to handle the issue. But the government will not pay any individual compensation but provide you with an agency to make sure that a fair agreement is reached between both parties when issues arise from artisanal mining.

These findings prove interesting as most of the affected individuals of the artisanal mining operations are left to find their way without help and support from the government, relatives, NGOs, Civil Society groups and Private organisations. Regardless of the circumstance, most respondents have resorted to some alternative means of livelihood. Figure 16 shows that about 51% of the respondents have resorted to other alternative livelihood activities such as

driving, petty trading and other activities since artisanal mining destroyed their farmlands.

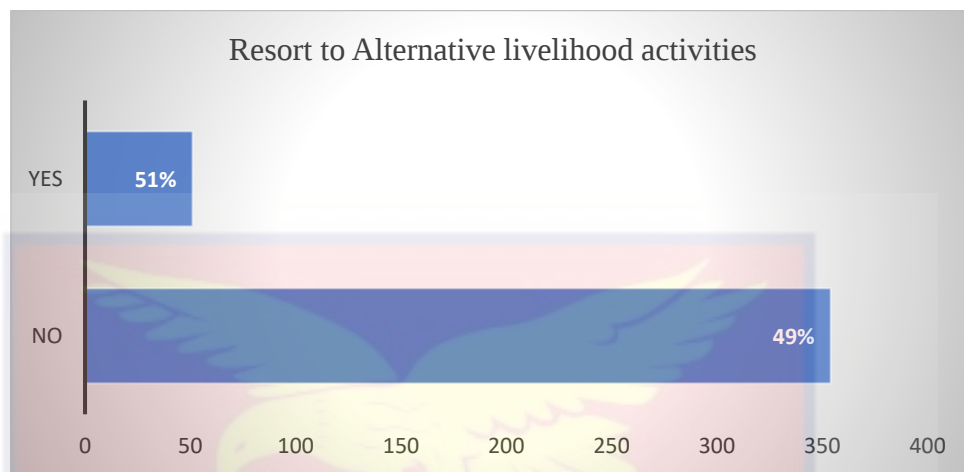


Figure 16: Resort to alternative Livelihood activities

Source: Fieldwork (2021)

Regardless of some of the respondents engaging in alternative livelihood activities, it was observed that the respondents were facing economic hardships such as high cost of living, unemployment and an increase in poverty due to the negative effects of artisanal mining.

Recommendations and Strategies to Curb the Negative Effects of Artisanal Mining

This section deals with the objective fourth objective of the study, which seeks to provide recommendations and strategies that could be employed by the government and Obuasi Municipality and other stakeholders to help curb the negative effects of artisanal mining on the livelihoods of residents of mining communities within the Obuasi Municipality.

Eradicating the negative effects require a multi-level approach from the government to the residents of the mining communities. From figure 17, the respondents recommended some strategies that could help reduce the negative impact of Artisanal Mining. The strategies include the provision of adequate

funding for better equipment and processes, support from the government, public education on artisanal mining activities, regulation of artisanal mining and the enforcement of laws on artisanal mining. These strategies are in line with the recommendations made by Hilson et al. (2014) and Anane-Acheampong (2013) as a way of combating artisanal and artisanal mining.

Moreover, regarding the measures to combat the negative effects of Artisanal mining activities in the communities, participants of the focus group discussions stated that:

The government should enforce laws on artisanal mining and also prevent people to stop using machinery such as excavators in the mining operation.

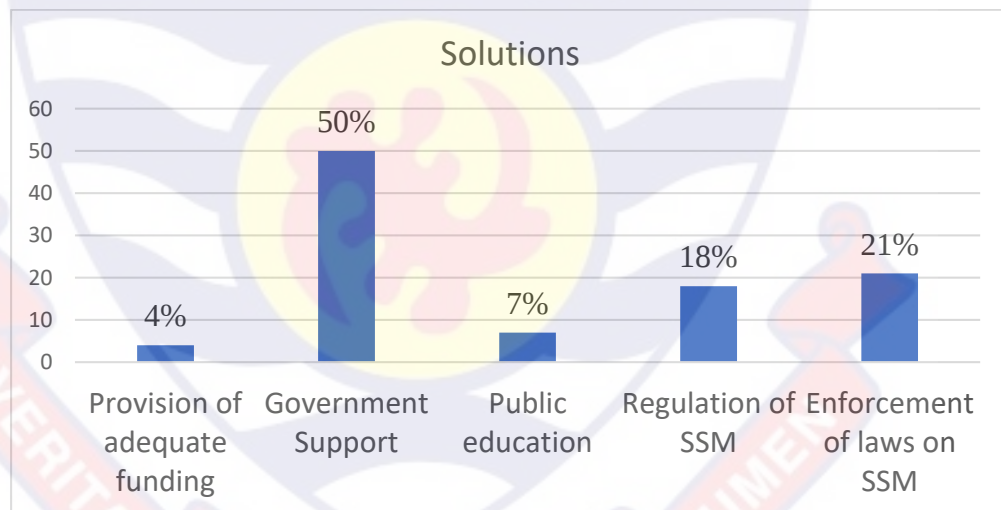


Figure 17: Solution to ensure Artisanal Mining results in a positive outcome

Source: Fieldwork (2021)

On the same issue, the Assemblyman of Odumasi made the following remarks:

I believe that if the public is sensitized about “Galamsey” operations, they will operate legally for peace to prevail but because they don’t operate legally, they are always on the run. If the government can find ways of allowing artisanal mining more suitably, it will help the

country to develop. Operations must only be allowed legally by taking permits, if that happens those who operate illegally will be made to face the law. Only three places have permits to operate in Obuasi here, Adaase, Ammemerewa and Dekyiwa. Those who have permits operate within the dimensions given to them to preserve water bodies.

In ensuring adherence to mining ethics, the Assistant Director of EPA in Obuasi Municipal Assembly stated that:

We are developing a bond for the people to sign to ensure they mine responsibly. And also, there is a joint security action to check mining activities and their challenges. I believe what can help us is for Ghanaians to be honest and truthful about the operations of artisanal mining so that we can reduce the risk associated with it.

Chapter Summary

This chapter discussed both the socio-demographic characteristics of the study and the findings of the study based on the objectives that guide the study. Generally, most of the respondents were males. The population of the mining communities were youthful as most of the participants fall within the age group of 20 – 29. More than half of the respondents had some form of education.

Moreover, artisanal mining was identified to have affected the livelihood and household of the respondents. The majority of the respondents indicated that they were affected by their livelihood. Regardless, it did provide some form of employment for the residents through engagement in artisanal mining activity or other forms of economic activity such as petty trading, with household employment levels ranging from about one to ten people. Others did acquire skills and knowledge in other forms of trade such as carpentry, driving,

masonry and tailoring. Regardless of its positive influences, artisanal mining did harm the respondents in the communities. These negative effects include health problems, destruction of agricultural lands, pollution of water bodies, land degradation, loss of lives, and loss of livelihood assets. In general, artisanal mining had a negative impact on livelihood and households.

Furthermore, the operations of artisanal mining negatively affected Koffikrom, Pomposo and Gauso communities. The artisanal mining activities have polluted the water bodies, caused people to lose their lives in the communities, endangered the health of the people residing in the communities, displaced many people as a result of the artisanal mining operations, loss of vegetation and biodiversity. It was also discovered that the artisanal mining operations in the community negatively affect the community as there was a relationship found between the presence of artisanal mining activities in the community and negative impact variables.

Nevertheless, it was discovered that most of the residents did not receive any form of support from the government, relatives, NGOs, civil society groups and private organisations to cope with the negative effects of artisanal mining. Regardless, some indicated that they did receive legal aid, sensitization and capacity building from these agencies. Moreover, it was discovered that the Ghana government do not provide any compensation to the vulnerable but helps negotiate damages and with the help of NADMO aids the communities in cases regarding water and fire. As a result, most of the people opted to engage in other forms of alternative livelihood activities such as petty trading to overcome the hardships as they have lost their farmland which was their main source of livelihood.

Lastly, the study recommended strategies and solutions to combat the negative impacts of artisanal mining and ensure that it results in positive impacts. The recommended solutions were the provision of adequate funding for equipment and better mining processes, the support of the government, public education on artisanal mining activities, regulation of artisanal mining and the enforcement of laws on artisanal mining.



CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATIONS

Introduction

The chapter provides a summary of the study including a summary of major findings, conclusions and recommendations made based on the findings of the study. Also, the chapter makes recommendations for policy implementation and suggests new areas for further study.

The main objective of this study was to analyse the effects of artisanal mining on the livelihoods of residents of mining communities within the Obuasi Municipality. Specifically, the study sought to identify the factors that influence residents of the mining community's engagement in artisanal mining, assess the effects of artisanal mining activities on the livelihoods of residents in the Obuasi Municipality, and examine the coping strategies of residents whose livelihood had been affected by artisanal mining activities within the Obuasi Municipality. The study used a concurrent triangulation design and a cross-sectional design with a sample of 428 respondents.

Summary of the Findings

Identifying the effects of artisanal mining on the livelihood of mining communities in Obuasi Municipality will help address the environmental challenges and improve their living standards. A mixed-method approach was used for the study, and 428 participants were interviewed for the study. The study's principal findings are summarised below.

Generally, it was discovered that most of the respondents in the mining communities were males. The population of the mining communities were youthful as most of the participants fall within the age group of 20 – 29. The

youthfulness of the residents in the mining communities was discovered to be because the youth are attracted to the prospects such as employment and income that artisanal mining provides. More than half of the respondents had some form of education.

Moreover, artisanal mining was identified to have affected the livelihood and household of the respondents. The majority of the respondents indicated that they were affected by their livelihood. Regardless, it did provide some form of employment for the residents through engagement in artisanal mining activity or other forms of economic activity such as petty trading, with household employment levels ranging from about one to ten people. Others did acquire skills and knowledge in other forms of trade such as carpentry, driving, masonry and tailoring.

Regardless of its positive influences, artisanal mining did negatively affect the communities. These negative effects include health problems, destruction of agricultural lands, pollution of water bodies, land degradation, loss of lives, and loss of livelihood assets. In general, artisanal mining had a negative impact on livelihood and households.

Furthermore, the operations of artisanal mining negatively affected Koffikrom, Pomposo and Gauso communities. The artisanal mining activities have polluted the water bodies, caused people to lose their lives in the communities, endangered the health of the people residing in the communities, displaced many people as a result of the artisanal mining operations, loss of vegetation and biodiversity. It was also discovered that the artisanal mining operations in the community negatively affect the community as there was a

relationship found between the presence of artisanal mining activities in the community and negative impact variables.

Nevertheless, it was discovered that most of the residents did not receive any form of support from the government, relatives, NGOs, civil society groups and private organisations to cope with the negative effects of artisanal mining.

Regardless, there were some respondents indicated that they did receive legal aid, sensitization and capacity building from these agencies. Moreover, it was discovered that the Ghana government do not provide any compensation to the vulnerable but helps negotiate damages and with the help of NADMO comes to the aid of the communities in cases regarding water and fire. As a result, most of the people opted to engage in other forms of alternative livelihood activities such as petty trading to overcome the hardships as they have lost their farmland which was their main source of livelihood.

Lastly, the study recommended strategies and solutions to combat the negative impacts of artisanal mining and ensure that it results in positive impacts. The recommended solutions were the provision of adequate funding for equipment and better mining processes, the support of the government, public education on artisanal mining activities, regulation of artisanal mining and the enforcement of laws on artisanal mining.

Conclusion

Based on the findings of the study, the study concludes that artisanal mining activities have a tremendous effect on the livelihoods of miners and their households in the Obuasi Municipality. This effect is pluralistic as it has both positive and negative effects on the livelihoods of miners and their households.

However, the adverse effects outstrip the positive effects of artisanal mining activities. The study revealed that though people who engage in artisanal mining make money to support themselves and their household thereby improving their living standard, the practice leaves a lot of negative outcomes in its wake. These negative outcomes include loss of farmlands, land degradation, unemployment as a result of people losing their farmlands, and water pollution, which presents a lot of health risks.

Recommendations

Based on the findings of the study, the following recommendations are made for effective policy implementation and practice and further studies.

- a. The residents of the mining communities should be encouraged to be trained on other alternative sources of livelihood by the government, civil societies and NGOs to reduce their engagement in artisanal mining and the environmental and health impacts on the people and the community.
- b. There should be an Effective involvement of people in the mining communities in decision-making about the environment, which will help to address the level at which the environment is polluted. When the community are consulted on the environmental issue about their localities, they feel part of it and strictly adhere to any by-laws that will be made. Chiefs and opinion leaders must be asked to help address the environmental degradation caused by artisanal and illegal mining because they are the custodian of the land under their jurisdiction.

- c. More severe punitive measures should be adopted to serve as a deterrent to persons who are engaged in or may consider engaging in illegal artisanal mining activities.
- d. The government should enforce the Minerals and Mining Act (Act 703), and regulation which allows the stakeholders involved in artisanal mining to apply for concessions and licenses. This will help in monitoring the processes and chemicals used in the activity to prevent water pollution and endangering the health of residents in Koffikrom, Pomposo and Odumasi.
- e. Landowners should be careful in giving land out for mining since the negative effects of artisanal mining affect just one person but the whole community.
- f. The NGOs and other stakeholders could also modernize their public education avenues to consider new and more effective ways of informing the public of laws and complaint procedures so that it is easier to report certain behaviours of persons in the society which may lead to illegal mining activities.
- g. The government of Ghana and the Obuasi Municipal Assembly together should employ strategies to safeguard the farmlands of residents of the mining communities in the Obuasi Municipality and ensure that those whose farmlands are encroached on and destroyed are compensated by the Artisanal miners. This will help reduce the poverty and unemployment rate in the communities.

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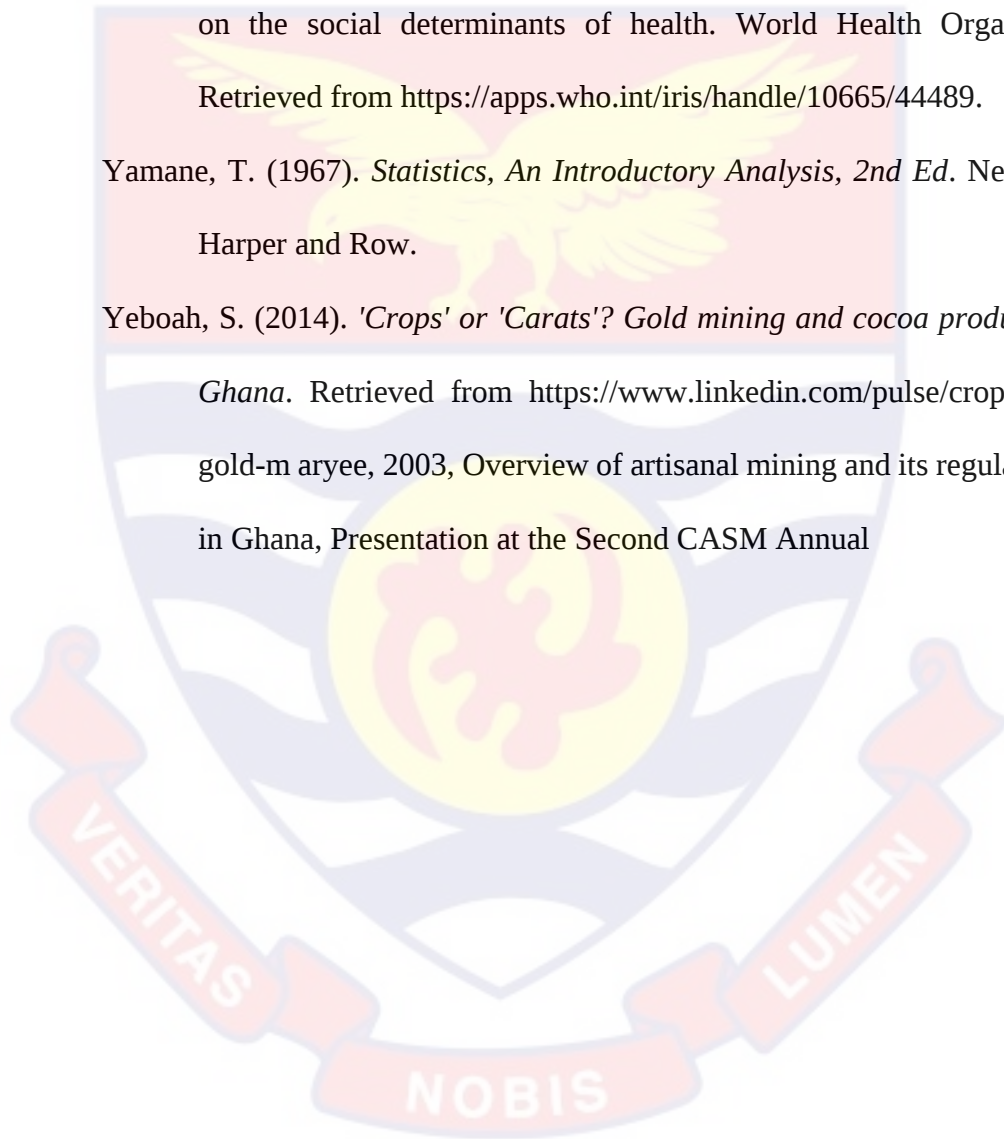
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APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

QUESTIONNAIRE FOR RESPONDENTS

Title: Effects of Artisanal Mining on Livelihoods of Selected Mining Communities in Obuasi Municipality, Ghana

Dear Sir/Madam, I am Emmanuel Appiah, a postgraduate student at the Department of Geography and Regional Planning, University of Cape Coast. The purpose of this interview guide is to gather information for a study on the effects of artisanal mining on the livelihood of mining communities in the Obuasi Municipality. I humbly want to seek your consent to participate in this study. Your participation is voluntary, and you may refuse to participate in or withdraw from this study. However, your participation in this study is relevant since the intention is to aid in policy drafting and implementation. The interview would last between 30 and 40 minutes to complete. I appreciate your cooperation.

EFFECTS OF artisanal mining ON LIVELIHOODS OF SELECTED MINING COMMUNITIES IN OBUASI MUNICIPAL ASSEMBLY, GHANA

ID.		Response (please tick ✓)
Section A: Background characteristics		
A1	Sex	☐ Male ☐ Female

A2	Age (in completed years)	
A3	Educational attainment	☐ No formal education ☐ Primary ☐ Secondary ☐ Tertiary
A4	Marital status	☐ Never married ☐ Married ☐ Cohabiting ☐ Separated ☐ Divorced ☐ Widowed
A5	Occupation	
A6	Number of years in current occupation	
A7	Do you know about small-scale gold mining?	☐ Yes ☐ No
Section B: Factors that motivate residents to engage in small-scale gold mining		
B1	Are you engaged in small-scale gold mining?	☐ Yes ☐ No If No skip Q B2 & B3
B2	What occupation were you engaged in before going into small-scale gold mining activity?	

B3	Comparing the previous jobs available to small-scale mining now, how will you describe your livelihood?	☐ satisfied ☐ Not satisfied ☐ Very bad ☐ Very satisfied
B4	How many members of your household are engaged in small-scale gold mining?	
B5	Is any member of your household engaged in small-scale gold mining?	☐ Yes ☐ No
Section C: Effects of small-scale gold mining on livelihoods		
C1	Would you say small-scale gold mining has affected your livelihood?	☐ Yes ☐ No
C2	Would you say small-scale gold mining has affected the livelihood of your household?	☐ Yes ☐ No
C3	Has any member of your household directly/indirectly gained employment from small-scale gold mining in this community?	☐ Yes ☐ No
C4	Has the operation of Small-Scale gold mining in this community enhance your use of certain skills, knowledge etc. to secure an additional or alternative livelihood?	☐ Yes ☐ No

C5	Has small-scale gold mining had adverse effects on your livelihood?	☐ Yes ☐ No
C6	Has small-scale gold mining had adverse effects on the livelihood of members of your households?	☐ Yes ☐ No
C7	Did you lose any livelihood assets (e.g., land, physical structures etc.) as a result of the activities of small-scale gold mining?	☐ Yes ☐ No
C8	Indicate among the following: the most important impact of small-scale gold mining in your locality	☐ pollution of water bodies ☐ destroy of pristine environment ☐ endangering the health of people and the ecosystem ☐ loss of biodiversity ☐ Displacement of communities
Section D: Coping strategies and recommendations		
D1	When in livelihood crises as a result of small-scale mining activities, do you receive support from relatives outside this community?	☐ Yes ☐ No
D2	If yes to D1 , what type of support do you receive from them?	☐ Financial support ☐ Emotional support ☐ Social support

		☐ Psychological support
D3	When in livelihood crises as a result of small-scale gold mining activities, do you receive support from NGOs?	☐ Yes ☐ No
D4	When in livelihood crises as a result of small-scale mining activities, do you receive support from civil society groups?	☐ Yes ☐ No
D5	When in livelihood crises as a result of small-scale gold mining activities, do you receive support from private and community-based organisations?	☐ Yes ☐ No
D6	When in livelihood crises as a result of small-scale mining activities, do you receive support from governmental agencies?	☐ Yes ☐ No
D7	When in livelihood crises as a result of small-scale mining activities, do you resort to alternative livelihood activities?	☐ Yes ☐ No
D8	What do you think can be done to ensure that small-scale gold mining results in positive effects on the livelihoods of residents and miners of mining communities?	☐ Governmental support ☐ Regulation of SSM ☐ Strict enforcement of laws on SSM

	<i>TICK ALL THAT APPLY</i>	☐ Provision of adequate funding ☐ Public education ☐ Others.....
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APPENDIX B
UNIVERSITY OF CAPE COAST
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING
INTERVIEW GUIDE FOR KEY INFORMANTS

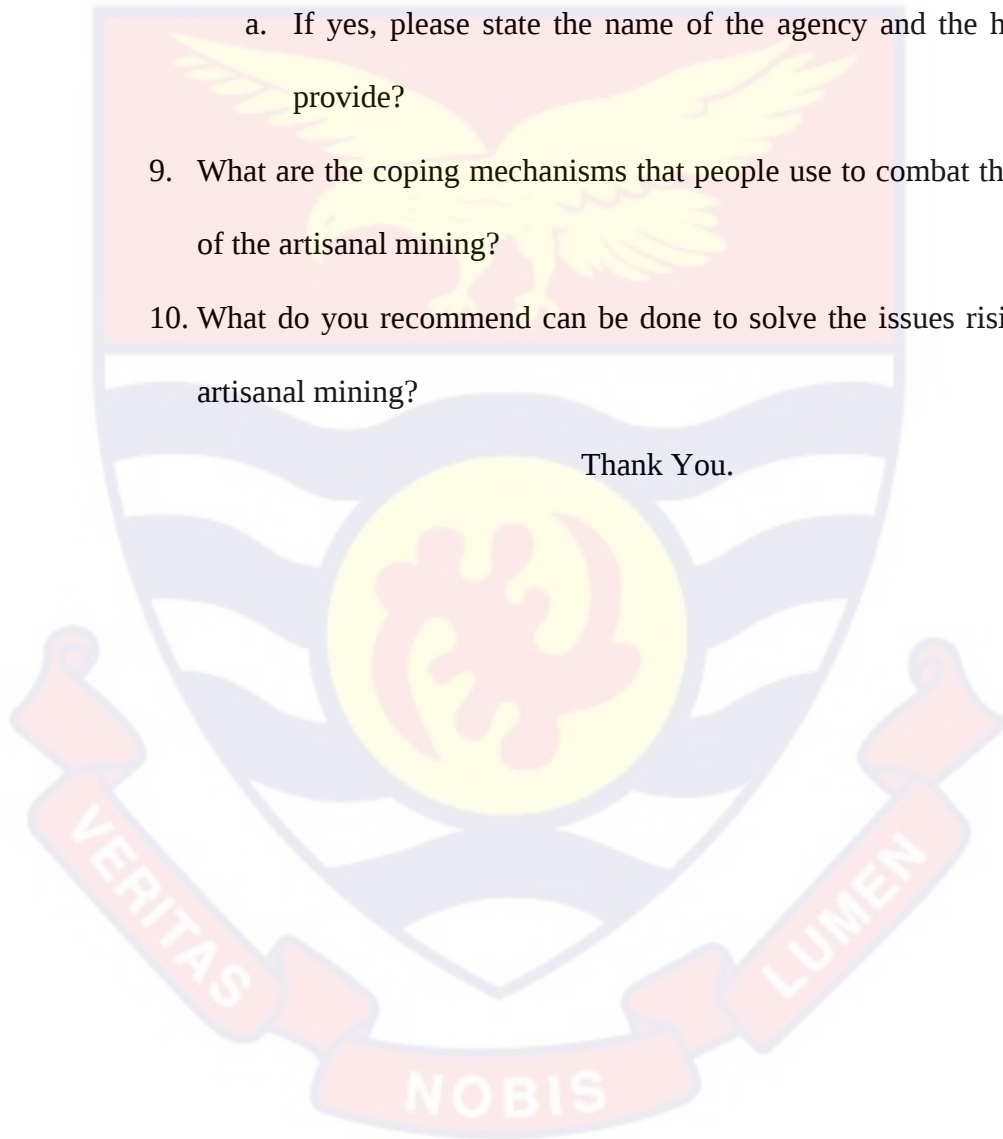
Title: Effects of Artisanal Mining on Livelihoods of Selected Mining Communities in Obuasi Municipality, Ghana

Dear Sir/Madam, I am Emmanuel Appiah, a postgraduate student at the Department of Geography and Regional Planning, University of Cape Coast. The purpose of this interview guide is to gather information for a study on the effects of artisanal mining on the livelihood of mining communities in the Obuasi Municipality. I humbly want to seek your consent to participate in this study. Your participation is voluntary, and you may refuse to participate in or withdraw from this study. However, your participation in this study is relevant since the intention is to aid in policy drafting and implementation. The interview would last between 30 and 40 minutes to complete. I appreciate your cooperation.

1. Brief introduction of the respondent.
2. What is your position in the community/organisation?
3. In your understanding, what is artisanal mining?
4. Are there benefits that individual to people engage in Small-scale mining? Please explain?
5. Does engagement in artisanal mining have any negative effect on the individuals?
 - a. If yes, how does it affect them?

6. How does the community benefit from the artisanal mining activity?
7. Are there any negative side effects to the community?
 - a. If yes, please explain?
8. Are there agencies that help victims or community members affected by the artisanal mining?
 - a. If yes, please state the name of the agency and the help they provide?
9. What are the coping mechanisms that people use to combat the effects of the artisanal mining?
10. What do you recommend can be done to solve the issues rising from artisanal mining?

Thank You.



APPENDIX C
UNIVERSITY OF CAPE COAST
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING
FOCUS GROUP DISCUSSION GUIDE

Title: Effects of Artisanal Mining on Livelihoods of Selected Mining Communities in Obuasi Municipality, Ghana

Dear Sir/Madam, I am Emmanuel Appiah, a postgraduate student at the Department of Geography and Regional Planning, University of Cape Coast. The purpose of this interview guide is to gather information for a study on the effects of artisanal mining on the livelihood of mining communities in the Obuasi Municipality. I humbly want to seek your consent to participate in this study. Your participation is voluntary, and you may refuse to participate in or withdraw from this study. However, your participation in this study is relevant since the intention is to aid in policy drafting and implementation. The interview would last between 30 and 40 minutes to complete. I appreciate your cooperation.

1. Brief introduction of the participants?
2. How long have you resided in this community?
3. How do you understand artisanal mining?
 - a. The general concept
 - b. The activities involved
4. Is the artisanal mining operation beneficial to you and your household?
 - a. If yes, can you please explain?
 - b. If no, can you please explain?

5. Are there any positive outcomes from artisanal mining activities to the community? Please explain?
6. What are some of the negative impacts of artisanal mining on the community? Please explain?
7. Is the source of livelihood of the community residents affected because of artisanal mining?
 - a. Please explain into details highlighting on the type of livelihood and how artisanal mining have affected it?
8. How do you cope with the negative impacts of artisanal mining as an individual and the community as a whole?
9. Do you engage in any other alternative livelihood or economic activity?
 - a. If yes, please explain in detail.
10. In general, has artisanal mining have a negative or positive on individuals and household in the community?
11. In your view, how can we combat the negative impacts of artisanal mining?

Thank you.

APPENDIX D

ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF GEOGRAPHY & REGIONAL PLANNING



UNIVERSITY POST OFFICE
CAPE COAST, GHANA
WEST AFRICA

Our Ref:

Your Ref: GRP/G.4^A/20/V.3/83

18th May, 2021.

Obuasi Municipal Assembly Ghana,
Ghana Education Service,
Cape Coast.

Dear Sir,

ETHICAL CLEARANCE FOR CONDUCT OF RESEARCH: EMMANUEL APPIAH KUBI – STUDENT IDENTITY NUMBER: SS/GEP/19/0001

We write to introduce **Mr. Emmanuel Appiah Kubi**, who is pursuing a Master of philosophy Degree at the Department of Geography and Regional Planning, University of Cape Coast. He requires ethical clearance to proceed with his data collection for thesis titled, *“Effects of Small-Scale Gold Mining on Livelihoods of Selected Mining Communities in Obuasi Municipal Assembly, Ghana”*.

By this letter, we confirm that the Department has approved Mr. Appiah Kubi's proposal and has granted him permission to conduct and complete his thesis as part of the requirements for obtaining a M.Phil. degree.

We would therefore be most grateful if his thesis proposal could be reviewed to enable him carry out the research.

Thank you.

Yours faithfully

Dr. (Mrs.) Regina Obilie Amoako-Sakyi
HEAD

Telephone: (Head) 03321-30681, (General Office) 03321-30680

Fax: 03321-34072 E-mail: geography@ucc.edu.gh

APPENDIX E

APPLICATION FOR ETHICAL CLEARANCE

Department of Geography and Regional Planning
University of Cape Coast
Cape Coast
5th May, 2021

The Chairperson
Directorate of Research, Innovation and Consultancy
University of Cape Coast
5th May, 2021
Dear Sir/Madam,

APPLICATION FOR ETHICAL CLEARANCE

I write in the above caption to seek your approval for the commencement of my data collection process concerning my Masters of Philosophy studies.

My thesis is titled “Effects of small-scale gold mining on livelihoods of selected mining communities in Obuasi municipality, Ghana”.

I count on your cooperation

Yours faithfully

Emmanuel Appiah-Kubi
MPhil Student
Department of Geography and Regional Planning
appiahkubiemmanuel100@gmail.com
[0547678213](tel:0547678213)

APPENDIX F

INTRODUCTORY LETTER

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF GEOGRAPHY & REGIONAL PLANNING



Our Ref: GRP/S.4./20/Vol.1/222
Your Ref:

UNIVERSITY POST OFFICE
CAPE COAST, GHANA
WEST AFRICA

26th March, 2022.

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Dear Sir/Madam,

**LETTER OF INTRODUCTION
TO WHOM IT MAY CONCERN**

The bearer of this letter, **Mr. Emmanuel Appiah-Kubi (SS/GEP/19/0001)**, is a second year post graduate student at the Department of Geography and Regional Planning, University of Cape Coast. He is conducting a study on the topic: *"Effects of Small-scale Gold mining on livelihoods of selected mining communities in Obuasi Municipality AAssembly, Ghana "*.

We shall therefore be very grateful if your organisation could assist him with any relevant information to support the study.

Thank you.

Yours faithfully,

Dr. (Mrs) Regina Amoako-Sakyi.
(HEAD)

Telephone: (Head) 03321-30681, (General Office) 03321-30680
Fax: 03321-34072 E-mail: geography@ucc.edu.gh