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THE MINING-AGRICULTURE NEXUS AND FOOD SECURITY IN KENYASI, AHAFO REGION.

BY

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DECLARATION

I, Frank Boachie-Mensah, declare that except for references to works which have been duly cited and acknowledged, this thesis is the result of my own original research carried out under the guidance of my supervisors, Professor Joseph Awetori Yaro and Dr. Lydia Osei of the Department of Geography and Resource Development, University of Ghana, Legon. I also certify that this thesis has not been submitted ln part or whole for the award of any degree elsewhere.

The names of individuals cited in this thesis are fictional. Any resemblance thereof to any existing name is unintentional.

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DEDICATION

I dedicate this work to my late father, Gareth Boachie-Mensah, mother, siblings, my wife Barbara Donkor and all my colleagues for their immense support.

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ABSTRACT

Food security has been of paramount importance since time immemorial considering the crucial role of food in the survival of human beings. Food security is one of the Sustainable Development Goals. Despite all the global efforts toward ensuring food security, food security in sub-Saharan Africa (especially the rural parts) still ought to be attended to. Livelihood diversification has become very crucial in the face of the rapid challenges engulfing the agricultural sector. Small-scale mining has become an option for rural dwellers in mineral-rich areas in Ghana. This study, therefore, seeks to investigate the relative contribution of farming and mining livelihoods to food security. This study adopted a case study descriptive design and made use of the mixed-method approach. The findings of the study were about the objectives of study which are to assess the nature and level of usage of the two major livelihood strategies, to examine the determinants/motivations of household choice of the two livelihood systems, to discuss the relative contribution of small-scale mining and farming to the food security status of households and finally, to analyse the challenges of employing small-scale mining and farming activities in terms of contradictions and synergies. Following the first objective, the study shows that a majority of the inhabitants were into farming and mining, with farming being the dominant occupation amongst the residents of Kenyasi. The study also observed that a majority of the inhabitants earned relatively lower incomes (usually less than 1,000 cedis per month). This could be attributed to the fact that most of the farmers were only engaged in subsistence farming and only sold their produce when they had a surplus. Despite being a farming community, it was surprisingly identified that food shortage was prevalent in Kenyasi as most households indicated that there was not enough food for them throughout the year. For the second objective, the study found that farmers ventured into farming to be able to provide food for their consumption and sell the surplus to local markets. Those engaged in mining, it was mainly motivated by the higher income levels. The results from the fourth objective show that the synergies and trade-offs between mining and farming in contributing to livelihoods and food security were complementary. However, the operation of mining activities led to the destruction of farmlands within the community. The third objective centred mainly around contributions found that mining had also reduced the labour for farming by attracting farmers and casual potential labourers given the high wages in mining. The study recommended that it is therefore important to streamline the operations of both livelihood activities to harness their relative direct and indirect contributions to achieving food security.

CHAPTER ONE

INTRODUCTION

1.1 Background

Food security is a key developmental concern in many parts of the world, with the phenomenon being a key challenge in sub-Saharan Africa. Food security is a situation in which people have the economic means and physical access to food in adequate quantity and nutritious value, to meet their dietary and food needs required for a healthy life (FAO, 2015). As food is basic to human survival and well-being, food security is seen as a basic human right. Currently, food security is one of the central benchmarks of the Sustainable Development Goals (SDG 2; Zero hunger), which requires nations to ensure its accomplishment (Fanzo, 2019; UNESCAP, 2020). Hence, activities that promote food security are of the essence across the globe. Nevertheless, sub-Sahara Africa (SSA) is yet to catch up with the rest of the world in terms of ensuring food security. In recent times, there have been debates on the impact of the relationship between mining and agriculture activities on food security in SSA, especially in the rural parts where both activities are key livelihood forms. This study adds to the discussion, exploring the relative effects of both agriculture and mining on food security, as well as the relationship between these livelihood options and how that impacts food security in Ghana.

In a recent survey in Ghana, it was revealed that food security has worsened in the country, with a five percent increase in the total number of people deemed as food insecure (Asare, 2022). As of the end of 2020, therefore, over 3.6 million Ghanaians were deemed experiencing food insecurity, as they had very limited access to sufficient and nutritious food for active and healthy life (Asare, 2022). Food

insecurity was seen to be higher in Ghana's more rural north than the more urban south, with 2.8 million (78%) and 800,000 (22%) respectively (Asare, 2022). Moreno (2022) reports that food insecurity is worse in northern parts of Ghana, compared to the southern regions. It is noted that while these regions depend primarily on agriculture for livelihood, the dependence on climate (specifically rains) makes the livelihood challenging. It is explained that towards the southern parts of Ghana, two rainy seasons occur, compared to one season in the northern parts (Moreno, 2022). Consequently food insecurity characterises about 90% of northern Ghana.

Food security depends massively on the economic means of an individual. Hence, the economic activities of rural Ghanaians are important in the food security discussion. In Ghana, farming and mining are major economic activities and serve as the livelihood of many. In recent times, however, there have been concerns about the roles both agriculture and mining play in ensuring the continuous provision of food, especially in rural parts where poverty and food insecurity are key issues for rural households (Amponsah-Tawiah & Dartey-Baah, 2011).

Agriculture remains the main form of livelihood in sub-Sahara Africa (SSA), employing more people than any other sector (Osabohien, et al., 2020). The agricultural sector in SSA is characterised mostly by small-holder farming, which serves as the main source of income for the people (Kamara et al., 2019). It is observed that smallholder farms account for 80% of food produced in sub-Saharan Africa (Paloma et al., 2020). In Ghana, for instance, smallholder farmers produce a quarter of the world's cocoa (Maguire-Rajpaul et al., 2020). Again, much of the food urban dwellers consume is grown by small-holder farmers in rural areas who transport their produce from the hinterlands weekly to the cities. Rural farmers are therefore vital to food security in SSA. However, the agricultural sector in SSA has

some challenges which threaten food security. Population sizes keep increasing while farm size in the inverse is rather decreasing (Djurfeldt & Jirström, 2013). Dzanku et al. (2015) explained that smallholder farmers in SSA fail to increase their yield or expand their farms, leading to a cycle of poverty and food insecurity. With the lack of capacity to expand, smallholder farmers tend to overuse the land, leading to overexploitation of land. Consequently, the land loses much of its nutrients (Headey & Jayne, 2014; Tittonell & Giller, 2013).

Ghana shares in the agricultural challenges faced by other SSA countries. Decreasing farm sizes (Djurfeldt & Jirström, 2013), over-exploitation of already nutrient deficient lands (Headey & Jayne, 2014), and lack of access to necessary inputs (Konja et al., 2019) form part of the challenges. Consequently, smallholder farming in much of Ghana is characterised by low yield (Konja et al., 2019) leading to a cycle of poverty and food insecurity (Dzanku et al., 2015). Smallholder farming as a livelihood strategy is therefore incapable of reducing the rates of poverty in SSA, particularly in Ghana (Aniah et al., 2019). For instance, a study by Agariga et al. (2021) which was carried out in the Asutifi North district showed that an overwhelming (95.5%) of farmers reported they were relocated as a result of mining activity in their farming areas. Whereas only 4.5% of the people were not displaced. All respondents reported that agricultural areas were being sold off and transformed into mining concessions at an increasing rate. The majority of the 44 farmers who provided credible information had lost between 3 and 4 bags of cocoa production due to the loss of land to mining operations.

The overuse of land for agricultural activities, as noted earlier, gives rise to two main issues. Firstly, the loss of soil fertility throws rural farmers out of agricultural economic activities, at least temporarily, which leads to poor yields and wasted

efforts. The implication is that food production is reduced. The second implication is that rural dwellers would need to re-strategize how to survive, in terms of income generation and securing food. Consequently, rural dwellers realise farming is not enough to sustain their welfare and improve their lifestyles. Agriculture, particularly small-holder farming as a livelihood, therefore becomes insufficient.

Livelihood diversification, therefore, becomes necessary (Adepoju & Oyewole, 2014; Mahama & Maharjan, 2017). Rural dwellers have had to look to other forms of livelihoods off the farm or aside from agriculture to survive. Specifically, non-farm jobs have been suggested as an atypical form of livelihood diversification for rural dwellers (Kuwornu et al., 2014; Assan, 2014). In diversifying into non-farm areas, mining has become one of the dominant economic activities in some parts of rural SSA. Therefore, in the search for other livelihood strategies, small-scale mining has become an option for rural dwellers in mineral-rich areas in Ghana. Hilson (2016) observes that the era of structural adjustment was a point of crossover for rural livelihoods and the re-emergence of artisanal mining. This period, between the 1980s and 1990s, which was unbearable for rural farmers, was characterised by poor yield, shortage of farm inputs, low prices for crops and devaluation of domestic currencies. As a result, small-scale mining re-emerged as the most viable non-farm venture, attracting farmers to it today (Hilson, 2016).

Small-scale mining is a proven livelihood form. However, there is still debate on how mining activities facilitate or impede food security. Whiles critics argue that agriculture promotes food security better, there are some grey areas between the two livelihood activities, i.e. mining and agriculture. This study seeks to add to this debate, investigating the relative effects of these livelihood forms on food security, the synergies, and trade-offs.

1.2 Problem Statement

Rural dwellers have predominantly been immersed in small-holder farming as the main source of livelihood for centuries. In Ghana, for instance, agriculture employs the majority of rural households and is the primary livelihood choice. Agriculture employs 52% of Ghana's labour force (Food and Agriculture Organization, 2019). Small-holder farming is capable of ensuring food security since it is basically about food production. However, poor yield and the need for additional income have necessitated livelihood diversification, with small-scale mining becoming a preferred alternative. Small-scale miners contribute immensely to gold production, providing about 30-40% of Ghana's total, employing over 5 million people. Additionally, small-scale miners are heavily involved in the production of other minerals, including diamonds (Hilson, 2016). Both livelihood forms have become the main income earners for rural dwellers in Ghana.

Recent developments in small-scale mining have raised concerns about its importance to food security. Laari (2018) argued that the rise of small-scale mining activities in rural Ghana leads to a reduction in labour for agricultural purposes. Laari adds that abandoned mining sites become breeding grounds for harmful insects, including pests that destroy crops. Nukpezah et al. (2017) also contend that small-scale mining activities make the environment harmful to farming activities. The writers explain that in certain parts of Ghana, high levels of heavy metals have been found in irrigation water. Food produced under such circumstances will, therefore, have traces of heavy metals in them since these will be transferred from the water into the crops produced. This impedes the drive to attain food security. A similar observation is made by Baah-Ennumh and Forson (2017), who noted that small-scale

mining activities in Nsuaem in western Ghana render the land unproductive, making it difficult to cultivate food crops on it. Small-scale mining was therefore deemed an unsustainable activity due to its operations and the harm it causes to the environment and its impact on food production. To these writers, therefore, small-scale mining may not be a viable promoter of food security.

However, it has been acknowledged that small-scale mining gives individuals the economic capacity to venture into farming or revamp agricultural activities (Hilson & Garforth, 2012; Goumandakoye, 2017). Since small-scale mining can positively influence agriculture, both activities may be deemed as playing a complementary role in ensuring food security. Whiles Nukpezah et al., (2017), Laari (2018) and Mabey et al., (2020) for instance highlight the harm small-scale mining pose to agriculture, other writers have expressed contrary views. Hilson (2016), for instance, observes how small-scale mining employs many rural dwellers in Ghana and other mineral-rich countries in West Africa. Bansah et al., (2018) support this view, stressing that small-scale mining perpetuates in Ghana due to several benefits and factors, including economic reasons. Nonetheless, it is worthy of note that mining activities can permanently alter natural landscapes, disrupt animals and habitats, contaminate air and drinking water, and damage wildlife which intends will affect food security in the long run as fishes continue to while lands become desolate. It is noted that rural communities are largely poor, hence, small-scale mining is deemed an economically viable venture for rural dwellers. For the fact that poverty is a key factor to address in the quest to enhance food security, it is quite logical to assume that the benefits of small-scale mining are enough reason for these activities to be encouraged. This is buttressed by the evidence that small-scale mining helps farmers earn cash during the off-season, which is then re-invested in agriculture in several ways as seen in several

areas in Ghana (Hilson, 2016; Danquah et al. 2017; Asare, 2018; Ntiamoah, 2019). Consequently, it has been found that failure to ensure food security can have diverse socioeconomic effects on individuals in Ghana. For instance, studies found that food-insecure children are at least twice as likely to experience poor health and at least 1.4 times more likely to have asthma than food-secure children; and food-insecure seniors have constraints in activities of daily livelihood comparable to that of food-secure persons 14 years older (Gundersen & Ziliak, 2015). Furthermore, failure to address the issue of food security can lead to a shortage which intends can lead to an excessive rise in prices for food as well as discrimination (Seivwright et al., 2020). Also, food insecurity often leads to stress, cycles of fasting and binge eating, and the substitution of comparatively higher cost, higher nutrition food with lower cost, higher energy food, resulting in nutrient deficiencies, metabolic changes, weight loss or, seemingly paradoxically, overweight and obesity. Adults who are food insecure are more likely to have poorer health status according to their assessments, more chronic diseases like diabetes, cardiovascular disease, and depression, as well as lower rates of social and economic participation (Seivwright et al., 2020).

The discussion so far places rural dwellers and policymakers in a conundrum, as it is difficult to settle on the livelihood system which would benefit individuals and the society at large in terms of achieving food security. This problem gives rise to the consideration of combining both livelihood forms in the best ways; giving credence to exploring the synergies between the two for food security. Moomen et al., (2019) argue that it is important to focus on the synergies between both livelihood forms, as there is evidence to show the benefits of such symbiosis between them in Northern Ghana. It is argued that encouraging the existence of both livelihoods is necessary, as the synergy is vital in poverty alleviation, income generation and overall

sustainable development (Moomen et al., 2019). This view is shared by Mkodzongi and Spiegel (2019), who argue that based on evidence in Zimbabwe, efforts must be focused on drawing from the linkages between both livelihood systems. Further, the African Centre for Economic Transformation (2017) also highlighted the fruitful impact of the synergies between small-scale mining and farming in ensuring food security in other areas in sub-Saharan Africa. These arguments suggest that both livelihood systems play complementary roles in ensuring food security.

The problem, however, is how much of this complementary situation takes place, and how does this promote or hamper food security? This requires deeper enquiry and efforts to replicate evidence of synergies in different settings. The potency of the synergy rides on the extent of replicability of such findings in different contexts. Scarce evidence exists to prove the replicability of the synergy. This study sees the limited evidence as worthy of being addressed. This study seeks to answer the question: How do mining and farming together facilitate food security in Ghana? Does indulging in both livelihood strategies lead to more disposable income? How do farmers and miners use their income to ensure food security?

1.3 Research Objectives

The main objective of the study is to assess the relative contribution of small-scale mining and agriculture as livelihood strategies to food security in rural Ghana.

1.3.1 Specific Research Objectives

1 Assess the nature and level of usage of the two major livelihood strategies (agriculture and small-scale mining) in the community.

2 Examine the determinants/motivations of household choice of the two livelihood systems.

3 Discuss the relative contribution of small-scale mining and farming to the food security status of households.

4 Analyse the challenges of employing small-scale mining and farming activities in terms of contradictions and synergies.

1.4 Research questions

1. What is the extent of rural dwellers' involvement in agriculture and small-scale mining activities?
2. What is the motivation for the adoption of small-scale mining livelihood activities?
3. In what ways does small-scale mining facilitate food security directly or indirectly?
4. What is the changing contribution of farming to food security?
5. What are the downsides of choosing one livelihood system over the other?
6. How does the performance of both livelihood forms negatively affect food security?

1.5 Significance

On a theoretical level, this study contributes to the debates on small-scale mining, livelihood diversification and multi-livelihood strategies and food security outcomes. Essentially, it would contribute to the debate on the mining-agriculture nexus. It is anticipated that the findings from this research would contribute to governments' policy frameworks on the development of the agricultural and mining sectors. This study will throw more light on the essence of non-farm ventures in the development

of the Ghanaian economy. The study provides a detailed discussion that would assist policymakers to design policies that see complementarities between small-scale mining and farming. The study will seek to showcase the benefits of the joint livelihood strategy and promote livelihood diversification as a means for poverty alleviation and women empowerment.

1.6 The organization of the study

The current study was divided into six chapters. The first chapter presented the context of the study, the statement of the research problem, the significance of the study, the research objectives and questions and how the chapters are organized in this research. Chapter two provided the literature review, key concepts and the conceptual framework utilized. The chapter also discussed the relevance to the topic under study. Chapter three described the research area and methodology used in conducting this study. It provided a profile of the research area, the data collection procedures the demographics of the research participants and the type of research design used in this study. It also highlighted the data analysis procedures, the limitations of the research as well as the ethical framework utilized.

Subsequently, the findings of the research were presented in chapters four and five, highlighting the results of the statistical analysis of data gathered from the participants as well as a discussion of the results concerning relevant literature. Specifically, chapter four presents a characterisation of agricultural and mining livelihoods in Kenyasi, whiles chapter five presents 'Determinants of choice of livelihood mix and synergies'. Finally, chapter six presented a discussion of the findings and a summary of the whole study. Also, this chapter provided the conclusions of the research and recommendations for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the literature as well as the conceptual framework for the study. The chapter discusses the relevant concepts such as livelihood and rural livelihood, agriculture, small-scale mining, and food security. The chapter looks at the conceptual framework of the study, which hinges on the Sustainable Livelihood framework.

2.2 Concept of livelihood

Livelihood has been defined as the various activities individuals or households engage in, in the food search, for water, shelter, clothing as well as any other necessities required for human survival (Mphande, 2016). Livelihood also involves all the benefits individuals derive from the economic activities they are involved in. Mariwah et al. (2013) and Abdul-Kabiru (2017) note that the nature of livelihood individuals and households engage in is dependent on their location as well as the assets available to them.

2.3 Changing livelihoods in rural Africa

Rural households are known for engaging mainly in agricultural activities. Agriculture can be said to be the default economic and livelihood strategy in rural settings, possibly due to the immediate need for survival and subsistence. This implies that agriculture remains the dominant activity of most of the world's poor. In sub-Saharan Africa, agriculture is the principal employer of the rural folk, thereby being the highest contributor to the income or earnings of the people (Danso-Abbeam

et al., 2018). In South Africa for instance, it is observed that farming is a rural affair in most households in the rural areas, and is the main income-producing activity (Rantso, 2016). Nkoana (2014) supports this observation, commenting that rural households in South Africa and much of SSA are mostly engaged in livestock rearing and crop production as the main economic livelihood strategy.

In Ghana, for instance, agriculture is dominated by smallholder farmers or subsistence farming (Dzanku, 2015; Abdul-Kabiru & Maharjan, 2017). Much of the farming is meant to primarily provide food for domestic consumption, with surplus sold for income. Even with those who intend to produce on relatively larger scales for sale, the lack of adequate agricultural inputs and mechanization threatens farm yield (Diao et al., 2017). Again, rural farmers face issues of increasing population, unpredictable and unfavourable weather conditions, soil erosion and poor or diminishing soil fertility. As a result, household income is strained and production increasingly becomes insufficient (Asare, 2018). Therefore, rural agriculture is characterised by low productivity. Coupled with the limited accessibility to non-farm income sources, poverty among rural folk seems to be constant despite their activities, depriving households of the appropriate standard of living (Loison, 2015; Bryceson, 2018). Consequently, Dzanku (2015) observes that livelihood diversification is expected and has become a custom in rural areas in Ghana. This buttresses the point that the trend of agricultural productivity in rural Africa culminates in the diversification of rural livelihood systems. The need to access other forms of livelihood to improve their income levels and standard of living means rural folk would have to engage in other economic activities. What remains to be seen is the extent to which other livelihood forms can help rural folks attain food security (Lang & Barling, 2012; Manlosa et al. 2019). What then are the dynamics in rural

diversification? Which other forms of livelihood have emerged, and how do they affect food security in rural Ghana?

2.4 The agricultural sector in Ghana

Agriculture is a vital economic sector in Ghana, contributing immensely to the GDP of the country. For a long time, agriculture remained the largest sector of Ghana's economy, with a 36% share contribution to the GDP as of 2016 (Darfour & Rosentrater, 2016). Currently, statistics indicate that the contribution of agriculture to the GDP of Ghana declined from 21.1% in 2017 to 19.7% in 2018 (Ghana Statistical Service, 2019). Nevertheless, the sector remains the most vibrant economic sector, employing about one-third of the labour force in Ghana (Oxford Business Group, 2020).

The Ghana Statistical Service (GSS) indicates that crop production is the second-largest economic activity in the Ghanaian economy and number one in the agricultural sector. Crop production activities made up 14.5% of GDP in 2018. The nature or types of crops produced largely depend on agro ecological zones, though certain crops are cultivated in almost every part of the country. Whiles tree crops like oil palm, cocoa and coffee are dominant, there are some food crops as well, including cassava, plantain and cocoyam (Food and Agriculture Organization, 2019). However, in the middle belt of the nation, agricultural activities are characterised mainly by the cultivation of food crops like maize, yam, and legumes, as well as cash crops like cocoa, coffee, cotton and tobacco. Rice, a national staple is cultivated in all ecological zones in Ghana, whiles millet, cowpeas, groundnut, yam and maize are the predominant crops in the northern agricultural zones.

Apart from crop cultivation, another sector in Ghana's agriculture is livestock production (Baidoo, et al., 2016; Asamoah, 2019; FAO, 2019). The livestock sector contributes 6.7% of GDP in 2015 (GSS, 2016). It is estimated that about 40.5% of rural households in Ghana are into livestock production, with the majority of them in the northern part of Ghana (Seglah et al., 2019). Farmers in this subsector deal with livestock including cattle, sheep, goats and pigs, while poultry production is the commonest form of livestock production in Ghana.

Livestock production and crop cultivation have a converging point. Farm animals depend on food crops for feed. Poultry, for instance, survives mainly on cereals and grains as feed. Again, cattle also rely on farmland as grazing areas. Hence, the progress of the crop cultivation subsector is essential for the growth of livestock production due to these complementary functions. The agricultural sector is the key to ensuring food security and alleviating hunger, especially in rural, impoverished areas of Ghana and the whole SSA.

2.5 Challenges in the agricultural sector and implications on livelihood strategies

It has been observed that there is a decline in agricultural activities and therefore the contribution to GDP as a result of the increasing migration of labour from agriculture to other sectors of the economy (Diao et al., 2017; Rodrik, 2018). Experts have noted that due to urbanization and the development of cities in Africa, other forms of higher income-earning avenues have sprung up, attracting rural dwellers who are mainly farmers to pursue other ventures (Gollin et al., 2016; Hilson, 2016). Ordinarily, population growth and rapid urbanization should mean new market opportunities for rural farmers, as it implies a higher demand for food. However, the growing demand is beyond the existing food production capacity of existing farmers. Population

growth and urbanization turn out to be a bane, instead of a blessing, for local farmers and food production.

With emerging markets and the commercialization of agricultural products, farming systems experience alarming levels of usage and stress. Consequently, rural farmers have no time for fallow periods, and farm sizes keep reducing amidst the loss of soil fertility. Furthermore, with the commercialization of agricultural products, farmers focus their attention on specializing in the production of a few high-selling crops, in a bid to take advantage of the emerging market (Ecker, 2018). Though this boosts income levels, it affects the availability of food for rural households, and even the amount of food that is transported to urban centres for the growing population. Ecker (2018) cautions that this situation poses a threat to the state of food security.

Again, rural farmers fail to fully exploit these burgeoning markets in the urban centres, due to impediments such as poor transportation and unavailability of storage centres (Darfour & Rosentrater, 2016). Though the market may be available, a poor road network makes it difficult to convey farm produce to central markets and town centres. Again, with the inadequacy of storage facilities, much of this farm produce perishes; farmers lose their capital as well as the possible earnings they could have made if the product can be stored.

Additionally, one key challenge of rural smallholder farmers is finance. Credit facilities are hardly available to rural farmers (Awunyo-Vitor & Al-Hassan, 2014; Denkyirah et al., 2016). In a study by Aidoo-Acquah (2015), after examining the accessibility of credit facilities among small-scale farmers in the Western Region of Ghana, it was found that the high-interest rates on loans charged by banks and financial institutions made it unfavourable for farmers to access the facilities. The

banks also saw agriculture as a high-risk business. In a similar study, Alhassan et al. (2020) examined how credit facilities impact productivity and how productivity, in turn, affects market participation. The study revealed that credit positively impacts productivity, which in turn positively impacts market participation. The study also stressed that factors such as transport network information access also played an essential role in farmers' capacity to produce food to meet the required capacity. Indeed, access to financing, through credit was deemed as key in transforming subsistence farming.

With the difficulty in accessing credit, therefore, the capacity of smallholder farming to boost food security cannot be reliable. Per the discussion, agriculture cannot be sufficient for food security. Finance, for instance, is vital for farmers to have the needed capacity to improve yield and take advantage of new markets whiles enhancing food security. Hence, there is a need for farmers to seek alternative sources of finance, as credit facilities are almost non-existent.

Consequently, rural households migrate into other livelihood forms to augment their income. One question which arises, at this point is, which livelihood form can provide the needed alternative income for rural farmers? How does the alternative livelihood strategy adopt a link with farming to ensure food security? Though mining, specifically small-scale mining has been identified as an alternative livelihood, these questions need to be answered.

2.6 2.5 Rural livelihood diversification into non-farm ventures

The issues raised so far form the basis of rural livelihood diversification in much of Africa, especially Ghana. Ellis (2000) defined diversification of livelihood as a process by which rural households generate a varied collection of activities and social

support capabilities in their strife for survival and improvement in their standards of living. According to Gebru et al. (2018), livelihood diversification is explained as the upkeep and constant adjustment of a highly varied array of activities and works to curtail household income variability, lessen the hostile impacts of seasonality, and offer occupation or additional income. Rural livelihood diversification, therefore, concerns the different forms of activities rural dwellers engage in at various times, with the intent of enhancing their standard of living.

Kuwornu et al., (2014) observe that the key objective for rural diversification is to create other or multiple sources of income. Ellis and Allison (2004) had earlier established the need for diversification, noting that overdependence on (subsistence) agriculture as a livelihood form (in rural SSA and specifically Ghana) is a recipe for heightened vulnerability and poverty, which are cases of food insecurity. Livelihood diversification enables rural household farmers to devise other means to promote their level of income and minimize susceptibility to different livelihood shocks (USAID, 2017). Indeed, rural livelihood diversification is encouraged by governments in SSA, as it is seen as promoting food security and economic growth (Manlosa et al., 2019). Governments in SSA, including Ghana, see rural diversification as a plausible way of dealing with the hardships rural dwellers face.

As explained earlier, rural livelihood diversification occurs in two broad forms, which are farm (agricultural activities) and non-farm (non-agricultural economic activities) or off-farm activities where other activities which have no relation to farming are pursued (Ellis, 2000 Khatun & Roy, 2012). According to Khatun and Roy (2012), livelihood diversification attempts include the engagement of rural folk in agriculture-related ventures but not farming. Such activities include the production of oil and food processing (i.e gari). Households also move into other ventures which

are not related to agriculture in any way; this may involve migration into other activities such as carpentry. Mahama and Maharjan (2017) comment that households' choice of non-farm activities depends on household or individual preferences. As indicated earlier, rural dwellers in Ghana engage in small-scale mining as the main non-farm livelihood strategy (Asare, 2018).

In Ghana, livelihood diversification has been a feature of the rural economy for many years, notably since the 1980's when the nation experienced an economic meltdown (Abdul-Kabiru & Maharjan, 2017). This implies that livelihood changes have been a regular pattern of rural life in Ghana for the past three decades. Smallholder farmers have been observed to be migrating into non-farm activities (Kuwornu et al., 2014). This phenomenon has received the support of the state as a means of poverty alleviation in rural Ghana (Abdul-Kabiru & Maharjan, 2017). Governments and support agencies in SSA have over the years designed poverty alleviation programmes and interventions around livelihood diversification (Asare, 2018). However, according to Yaro (2006) diversification to new or secondary livelihood activities and changing the form, nature and content of the farm sector, characterised rural livelihoods in the rural areas. The adaptation process involves not just a move from the farm to the non-farm sector, but also an intensification of efforts in the farm sector with seasonal diversification into other livelihood activities. The idea is to promote and assist households in rural areas to be more innovative in finding more non-farm ways to engage in. Farming households are being encouraged to set up small-scale businesses in their home areas. Governments are also facilitating agricultural transformation among rural dwellers, as well as promoting an expansion of the agricultural value chain (Dzanku, 2015; ACET, 2017; AbdulKabiru & Maharjan, 2017). An expanded value chain implies more players will be needed in

the production and distribution of agricultural produce (Mahama & Maharjan, 2017; Alhassan et al., 2020). This comes with the creation of new roles for individuals to venture into. Again, this would require the shift from the traditional, archaic forms of farming to a more modern approach, with the introduction of new technologies, agricultural inputs and expanded market

2.7 Rural diversification into non-farm ventures

Much of the literature depicts that non-farm ventures have been identified as providing an avenue for rural dwellers to expand their income, culminating in a situation of income equality (Loison, 2015; Bryceson, 2018; USAID, 2017). Again, it is seen as curbing rural-urban migration, thereby reducing the stress in urban areas. Employment opportunities are provided for rural dwellers, who may be disadvantaged due to low earnings in farming (Asare, 2018). Further, non-farm activities enhance female empowerment, thereby contributing to gender parity (Galiè et al., 2019) Advocates of non-farm livelihood change argue, therefore, that it should be encouraged due to the positive impact it poses on the growth of rural economies in SSA (Bezu & Barrett, 2013). Overall, the national economies of nations in SSA are boosted when these livelihood changes take place (USAID, 2017).

It has been observed that though the thought behind livelihood changes in rural areas is great, one key challenge is the lack of capacity of rural households to enable them to take up more non-farm engagements (Ecker, 2018). Hence, though it is commendable that development strategies are being designed around non-farm ventures, it has been observed that this might serve as a disadvantage to a relatively larger population of rural dwellers. Critics argue that rural dwellers lack the requisite education, skills, financial capital, and technical expertise to exploit the opportunities

being offered by the promotion of non-farm diversification (Kyeremeh, 2014). Though governments in SSA are looking at ways of making these livelihood changes beneficial, there is no consensus on the impact of non-farm livelihood on the economy (USAID, 2017).

Nevertheless, many studies point out that livelihood diversification produces immense benefits for rural dwellers (Assan, 2014; Dzanku, 2015; Gautam & Andersen, 2016; Diao, et al., 2017; Asare, 2018; Yaro, 2006). Yet, though non-farm activities have been seen to support economic growth, agricultural activities still lead the way in enhancing rural economies. Therefore, to Dorosh and Thurlow (2016), though there is a concentration on the expansion of non-farm activities, with developmental programmes being framed around it, caution must be exercised. The observation is that it is safe to say that both livelihood options may be more effective in different circumstances. For instance, in a rural setting where households' low levels of education and skillset exist, it may not be prudent introducing more non-farm activities which may require people with higher levels of education. Development programmes structured around such non-farm ventures may not be impactful for rural dwellers in such cases. To make developmental programmes more effective, therefore, certain factors such as level of education, financial capacity, familiarity with technology and age of the labour force in rural areas ought to be considered.

Senadza (2012) observed that non-farm activities were more favourable to rural dwellers in Ghana, only when households had electricity (relevant technology) and access to credit. One form of non-farm livelihood which may require minimal technology and credit yet produces immense gains for rural folks in Ghana is small-scale mining. The most basic requirement needed to begin small-scale mining is the

availability of minerals. As a result, rural dwellers in areas identified as having minerals are attracted to small-scale mining as a livelihood choice. Nevertheless, some studies in Ghana have raised concerns about small-scale mining as a livelihood choice (Mumuni, et al., 2012; ACET, 2017; Kutah & Matsui, 2018). Critics believe every form of livelihood choice must produce more positive results than negative ones on the environment. However, it is argued that small-scale mining as a livelihood choice by rural households poses a threat to the environment (Danyo & Osei-Bonsu, 2016; Attiogbe & Nkansah, 2017; Kutah & Matsui, 2018). Yet, to rural dwellers in mineral-rich areas in Ghana, small-scale mining is a key income generator and economic tool for their progress.

In conclusion, livelihood changes in rural Africa are mainly a switch from agricultural or farm activities to non-farm activities. In the case of rural Ghana, rural farmers enter small-scale mining. There is however no agreement on which of these livelihood forms is beneficial to rural dwellers in terms of food security, though evidence exists to support either side in different contexts. However, Yaro (2006) asserts that the supposedly 'booming non-farm
sector' is not entirely real, for reasons of marginalisation and exclusion of the poor peasantry, resulting from spatial, capital, infrastructural and market limitations.

2.8 Small-scale mining

Another phenomenon that has emerged as an alternative livelihood strategy is small-scale mining (Hilson 2016; Iddriss, 2017). Small-scale mining (SSM) is a popular livelihood activity in mineral-rich countries in SSA, and its popularity is evidenced in the different names by which it is called in the sub-region. In Burkina Faso, the phenomenon is known as 'orpaillage' and diggers in Sierra Leone (ACET, 2017). In

Ghana, small-scale mining is popularly known as galamsey (Barenblitt et al., 2021; Eduful et al., 2020). However, the term galamsey is now used in reference to illegal mining (Barenblitt et al., 2021; Eduful et al., 2020).

Bansah (2017) observes that in Ghana, SSM is often a term used interchangeably with artisanal mining or artisanal small-scale mining. Laari (2018) adds that the definition of SSM or galamsey has evolved, expanding the scope of the activities of small-scale miners. Hence, SSM may refer to both legal and illegal or informal mining activities. Though it has been noted that SSM in SSA is largely an illegal activity, in recent years, governments in SSA have made efforts to legalise activities (Hilson, 2016). Efforts to regularise the activities of SSM activities have led to the identification of various categories of miners based on their level of formality or legality, which is determined by the issuance of mining licences (Adjei et al., 2012). These categorizations are as follows:

- Miners operating illegally; without licenses
- Miners with licenses/permits, but using unapproved mining methods
- Licensed miners whose activities do not reclaim land
- Licensed miners who sub-let their mining license to foreign miners (mining companies)

Hilson (2016) mentions that SSM has been a livelihood strategy of rural dwellers in SSA long before the arrival of multinational mining companies. SSM is the main non-agricultural livelihood strategy by rural households in recent times (Hilson, 2016). Though agriculture maintains its place as the key employer and income earner for many rural households in rural SSA, the contribution of the sector to the national economy took a nosedive due to structural transformation and rising urbanization (Ecker, 2018). The need for livelihood diversification has seen farmers get into other

forms of livelihood to improve their earnings. SSM emerged as a response to unfavourable conditions, which made agricultural activities less profitable.

Some of the unfavourable conditions include farm labour shortages (Asare, 2018), rising prices of minerals against the falling prices of agricultural produce (ACET, 2017), climate variability (Vorsah, 2015), failure of rural farmers to capitalise on emerging markets in urban areas (Diao et al., 2017) and destruction of farmland by heavy mining activities (Assan & Muhammed, 2018).

A study conducted by Osei et al. (2021) concluded that ASM is a key sector that allows young people to build their livelihoods (earn income and accumulate assets) (Osei et al., 2021). However, there are fears that whiles providing a source of livelihood for millions of people, SSM threatens farmlands and water bodies (Owusu-Nimo et al., 2018). Again, other studies (Babut et al., 2003; Bagah et al., 2016) have noted that the chemicals used in SSM such as cyanide, arsenic and mercury are harmful to the environment. Households in these mining areas are therefore at the risk of diseases like lung cancer, while other living organisms like plants, animals and aquatic life are also at risk of extinction if SSM activities are not checked, or ultimately halted (Attiogbe & Nkansah, 2017).

Though there have been calls on the government to halt operations of small-scale miners in Ghana, the nation has made efforts to ensure activities are controlled. The state acknowledges the impact of the sector on the economy as well as the potential it wields. To streamline SSM activities and provide checks, Small-Scale Gold Mining Act (PNDC Law 218) was passed in 1989 to provide for the licensing of such operations in Ghana (Yankson & Gough, 2019). This law failed to help deal with the issues in the SSM sector, leading to the promulgation of Mineral and Mining Law, ACT 709 of 2006. With this, the government intends to make SSM a more formal

venture, therefore calling SSM businesses to register their ventures. This will enable the state to generate more revenue from the sector through taxes. Despite the progress the nation has made in the fight against illegal SSM and the efforts to formalize these businesses, the relationship between SSM as a livelihood form and food security remains an issue of concern to rural dwellers and the nation as a whole.

2.9 Food security

According to the United Nations (UN), food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2008). The Food Security Network expands on this definition by explaining food security as a situation when all people at all times have physical and economic access to adequate amounts of nutritious, safe, and culturally appropriate foods, which are produced in an environmentally sustainable and socially just manner, and that people can make informed decisions about their food choices(Laari, 2018). This definition reveals the key dimensions of food security as a construct which include the physical accessibility and availability of food, economic accessibility to food and adequate food utilization. Adequate food utilisation encompasses the ability of the body to process and use nutrients as well as the dietary quality and the safety of the foods consumed.

2.9.1 SSM and Food Security

Small-scale mining (SSM), as has already been discussed, has been beneficial to the economy of Ghana, as well as other nations in SSA. In Ghana and other places in SSA, studies have found that SSM is a source of employment and income for many households, thereby alleviating poverty (Ulrike et al. 2012; Assan & Muhammed,

2018). However, in terms of food security, several studies have mentioned that SSM is detrimental (Mzembe, 2012; Iddriss, 2017). SSM has enormous negative implications on the environment and by extension, the livelihoods of people. . To Zolnikov (2012), SSM is the most environmentally destructive livelihood strategy. What makes SSM detrimental to the environment and food production is the introduction and use of heavy machinery like excavators by small-scale miners. Crawford and Botchwey (2016) argue that though this helps miners more to be productive, it makes the environment less productive for food production.

According to Ocansey (2013), Adu Yeboah et al (2008) discovered that one of the major negative effects of mining is the high cost of living in communities near mining sites. Most necessities, such as food, shelter, water, and other necessities, are prohibitively expensive for ordinary people to purchase. He stated once more that there are two major reasons for this situation. For starters, mining companies employ the majority of the strong and able-bodied young men in the mining industry, diverting them from the farms. Second, mining companies have taken over the majority of the farmlands in those communities. As a result, there is always a decrease in food production in those areas, as well as a need for food to be brought in from distant areas at exorbitant prices. According to Ocansey (2013), the release of chemical substances into the soil by mining processes discourages and destroys crops.

He also stated that environmental pollution in the mining area has had an impact on farming in general. According to the data analysis, mining for natural resources in the area has contributed to the loss of farming businesses, resulting in food insecurity in the area. This is due to mining activities consuming some of the fertile lands used for farming. As a result, there are not many crops grown in the area, and food is scarce as a result of the mining activities. Food production levels fall as more people choose

mining jobs over farming, resulting in low food production levels in farming communities. Ocansey (2013) documented in his analysis that the majority of participants in his study area owned only a few small hectares of farmland, implying that they were mostly engaged in subsistence farming and that the introduction of mining operations rendered their farming activities ineffective. The majority of these poor farmers made a living from their farming practices. As a result of the mining activities, they are unable to produce as much food as they once did, resulting in food shortages and price increases. He went on to say that high labour and input costs contributed to community food shortages. According to Tsuma (2010), land acquisition remains a major threat to food security and livelihood security in most mining areas. According to Tsuma (2010), mining investments are by definition located in rural areas where residents rely on healthy land systems for a living. Surface gold mining is encroaching on these areas, which are characterized by hilly-forested and fertile land suitable for food production. As a result of this situation, communities abandon farm-based activities in favour of more lucrative mining. This situation also has dire consequences, such as low food production, rising food prices, and an increase in illegal small-scale mining by rural residents.

2.10 Agriculture and food security

According to MoFA (2007), agriculture was primarily practised on a smallholder level using simple technology, accounting for approximately 80% of total agricultural output in Ghana.

According to the report, approximately 2.74 million households own a farm or raise livestock. According to the 2000 census, agriculture employed 50.6 % (4.2 million people) of the labour force. According to the census, approximately 90% of farmlands are not larger than 2 ha, and the majority of oil palm, rubber, coconut, maize, rice,

and pineapple farms are very large. In general, agriculture in Ghana is rain-dependent, though an estimated 6,000 farm enterprises in Ghana used some form of irrigation in 1999. In general, agriculture in Ghana is rain-dependent, though an estimated 6,000 farm enterprises in Ghana used some form of irrigation in 1999. According to reports, the average farmland irrigated in 2002 was around 11,000 ha, with a potential area for irrigation of 500,000 ha.

Rural households are the main food producers in Ghana, as much farming is done in rural areas. Smallholder farmers in rural areas across the country have been involved in the cultivation of food crops and livestock production as the main livelihood strategy for many centuries. Indeed, the rural households feed the nation, providing the bulk of the food the urban population need. The sector produces 51% of Ghana's cereal needs, 60% of fish and half of the meat products consumed in the country. Also, the sector provides the raw materials for the food processing sector in Ghana, notably cocoa, coffee, fruits and vegetables. With the huge labour force sector employs and the availability of land for farming, it is no surprise that Ghana is among the few African nations that achieved the Millennium Development Goal target 1C, which is the reduction of the number of hungry people (Darfour & Rosentrater, 2016). The agricultural sector remains the largest and fastest-growing sector in Ghana, growing at a rate of 5.5% annually (Darfour & Rosentrater, 2016).

The agricultural sector produces food to ensure food security in Ghana. However, it is common to have food shortages and malnutrition in most of the rural parts of Ghana (Ecker, 2018). Darfour and Rosentrater (2016) mentioned an estimated 1.5 million people are food insecure, representing 5% of the nation's population. Though food insecurity affects both urban and rural populations, rural populations are the worst affected.

Experts have identified some reasons why food insecurity seems to be lurking despite the contribution of farmers in Ghana. Lam et al. (2017) observe that one factor hindering Ghana's quest to attain optimum food security is poverty. It is explained that due to poverty, rural households barely feed appropriately which negatively affects their energy levels. This makes it difficult for them to produce on the farm, as rural agriculture is mostly non-mechanized. Again, farmers are seen to lack the necessary inputs to facilitate large-scale production. However, the population keeps increasing, hence, the nutritional needs of some people are not met due to the deficit (FAO, 2015). Schoneveld (2015) also noted that rural farmers are moving towards the cultivation of industrial crops (notably rubber, cotton, and jatropha) other than food crops. Hence, land for food cultivation has reduced in recent times. Furthermore, livelihood diversification, in this case, the migration of farmers into non-agricultural livelihoods, especially mining, has contributed to the low production of food crops. This situation also affects the quest to attain food security.

2.10.1 The synergy between agriculture and SSM and its impact on food security

Several writers note that SSM and agriculture are more similar than different (Urama, 2013; Hilson, 2016; Assan & Muhammed, 2018). This means both livelihoods act together in various capacities to enhance food security in rural areas (Hilson, 2016). Both livelihoods function together to have an impact on food security through income and capital generation and employment/labour.

Popular in food security literature is the essence of income in the quest to secure food. One way rural households earn an income is through the economic activities they are involved in. Hence, the economic activities they pursue are very important. Ordinarily, farmers earn income from their activities of food crop production.

However, food crops are highly perishable and tend to lose value as a result. Therefore, farming incomes may not be enough to ensure food security. This is a threat to households' food security. How does SSM come in to achieve food security? Small-scale mining offers farmers alternative employment which helps them earn an income, hence making food security possible despite perishability and season. Both SSM and farming, therefore, create a seamless flow of income by creating employment, thereby helping income generation constant secure food.

Closely related to the previous point, SSM as a livelihood strategy is helpful for farming activities as it helps provide capital for investment into food production. Hilson (2016) asserts that in Ghana and other countries in the SSA, farmers undertake SSM to obtain capital to reinvest into their farming. Through their off-season mining activities, farmers acquire fertilizer, farming equipment geared towards mechanization, irrigation systems and extension services which boost farming as a livelihood. In a study by Ombeni (2015), it was found that SSM has facilitated the construction of feeder roads, and the provision of water for agriculture irrigation to boost food production.

Again, both agriculture and SSM use a common labour force. Both livelihood forms are affected by seasonality (Karaki, 2018). Hence, whiles the wet season may be a great time for farming, it puts miners on holiday. Such miners lend their time to crop production. In the dry season, when farming is also less intensive, farmers also get into mining fields. This complementary activity ensures food security in both ways. Miners helping on the farm boost food production make food available and help take advantage of larger markets, whiles farmers adopting SSM also help them acquire income and capital, whiles increasing mineral production. This complementary

labour relationship between SSM and agriculture is a regular trend in much of SSA and has been seen to be extremely helpful for food security (Urama, 2013). Hilson (2016) for instance found this synergy in various parts of Northern and Eastern Ghana, whiles Bakia (2014) and Hilson and van Bockstael (2012) saw this in Cameroun and Liberia respectively. Dondeyne and Ndunguru (2014) note that in Mozambique, off-season mining helps farmers make money to buy cattle. Hilson and Garforth (2013) realised farmers in southern Ghana get involved in SSM to generate funds that assist them in the management of their farms.

Furthermore, farming as a livelihood also provides miners with food. Mining requires so much physical activity, and the miners must have the right nutrition. Farmers provide miners with their food needs. Hilson and van Bockstael (2012) observed this in Liberia where rice farmers attract and feed miners.

With these observations, can it be said that agriculture and SSM always converge to ensure food security? Are there instances of divergence? And how does tension from this divergence impact food security?

2.11 Trade-offs and their impact on food security

Agriculture and SSM as livelihood strategies in rural areas are characterised by trade-offs. Urama, (2013) observes that though farming and SSM have a synergistic relationship that positively affects food security, they also have a competitive relationship, which often causes tension. Again, it is explained that though in more developed places like Australia the synergistic relationship seems to be growing, the opposite pertains in SSA, with tension resulting in trade-offs (Urama, 2013).

In recent times, it has been observed that labour is not necessarily a point of convergence for SSM and agriculture. SSM in rural Ghana, for instance, attract other nationalities, notably, people from other nations in SSA and the Chinese. As a result, the extra opportunities off-season farmers would have had in mining are diminishing. Whiles SSM activities are on the rise due to the availability of labour (throughout the year), agriculture is affected negatively as farmers do not get the chance to work for extra income from the mining sector. Food production therefore suffers. Though miners may make economic gains, these gains are hardly reflected in farming, hence food security is threatened.

Further, mining is not affected by issues of perishability or low yield like in the case of food crops. Hence, as farm produce loses value, the income levels of farmers fall. SSM offers alternative income due to the high prices of minerals. Eventually, farming labour is lost to SSM, where the economic gains look promising. Youthful rural dwellers who could have been helpful on the farm switched from farming to focus on mining due to the higher economic gains.

In the long run, this affects food production as farming activities decline, putting food availability in jeopardy. Though the economic means to secure food is made possible through mining, the availability of food becomes a problem.

Again, it has been observed that in rural mineral-rich areas of SSA, as land for mining is increasing, that agriculture is on the decline (Urama, 2013; African Centre for Economic Transformation, 2017). This phenomenon occurs as a result of landowners giving their land to SSM companies for some amount of money. Indeed, a report indicated the majority of farmers involved in studies in Ghana and Burkina Faso were ready to sell their farmlands to miners (ACET, 2017). Again, some farmers have been forced

off their farmland and compensated by SSM companies. This situation produces a positive effect on the growth of SSM, whiles stifling the growth of agriculture. This threatens the already delicate food security situation in rural Ghana (Darfour & Rosentrater, 2016).

2.12 Conceptual framework

A conceptual framework is a blueprint or guide for a research study (Grant & Osanloo, 2014). The Sustainable Livelihoods Framework serves as the conceptual framework for this study.

2.12.1 Sustainable Livelihood Framework

The SLF is a way of identifying the needs and concerns of the populace and aligning them with the development interests of the nation. It simply harmonizes the environment and the people's skills, access to resources and social networks, to facilitate the productive outcome of their livelihood strategies. Serrat (2017) suggests that the SLF guides the formulation of development policies and activities that are: people-centred, responsive and participatory, multilevel, conducted in partnership with the public and private sectors, dynamic and sustainable. SLF postulates that the outcome of rural livelihood strategies is determined by three elements (DFID, 2000). These elements are households' capital stock, which includes natural, physical, human, financial and social capital, the household choice of livelihood activity, based on their capital stock capacity and external factors or environmental factors, which is the culmination of institutional and policy arrangements, exposure to shocks, economic trends. The framework, depicted in Figure 1, suggests that the success or failure of livelihood forms depends on these three factors.

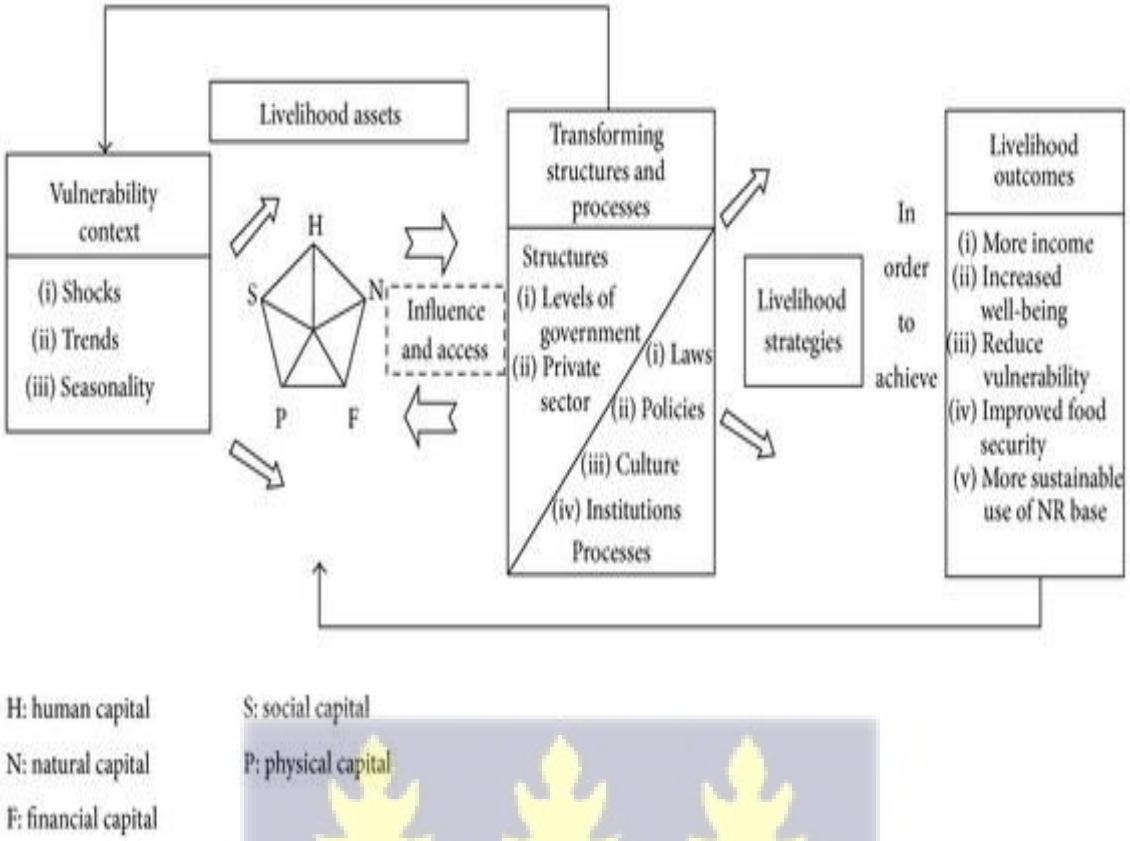

Figure 1: Sustainable Livelihoods Framework, Department for International Development (DFID, 2000)

In the context of this study, the SLF is applied and captured in the figure as follows:

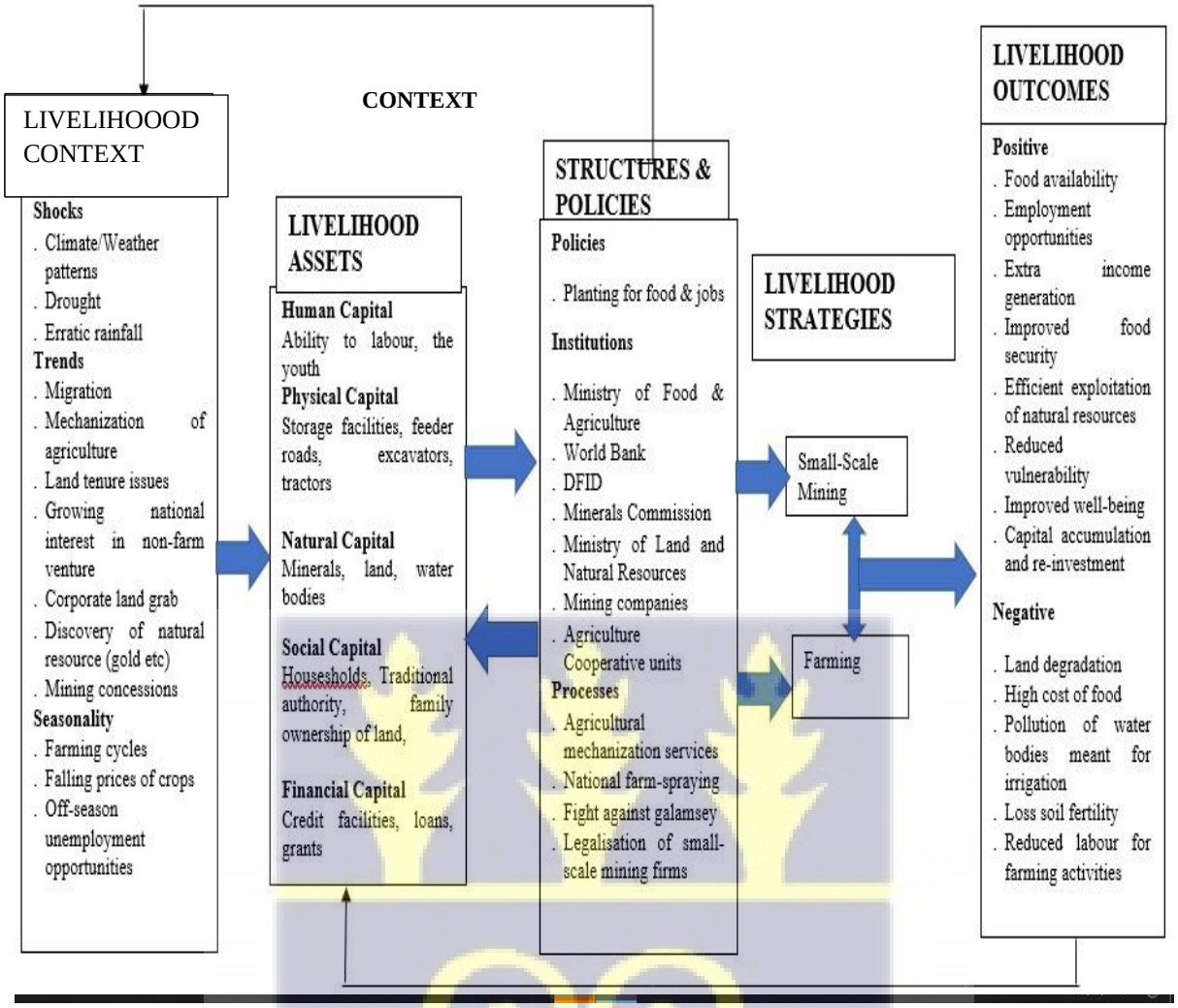

Figure 2: Conceptual Framework: Adaptation of the SLF, Researcher's Construct, 2020

2.12.2 Conceptualization of Food Security

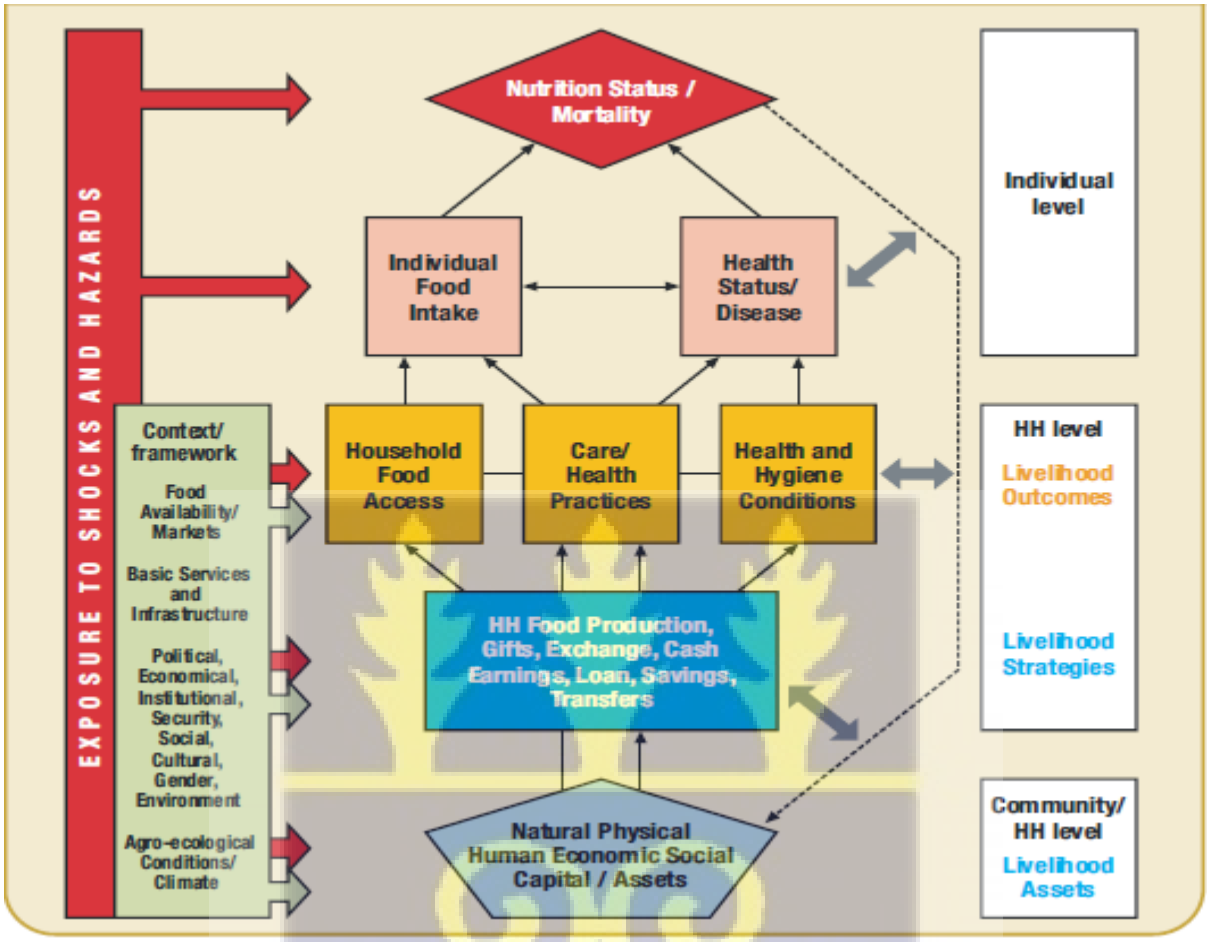

Figure 3: Food and Nutrition Security Conceptual Framework, World Food Programme (2022)

A specific understanding of food security and risk served as the foundation for Ghana's Comprehensive Food Security & Vulnerability Analysis (CFSVA). The development of field assessment instruments and the structuring of standardised reporting formats are all influenced by the Food and Nutrition Security Conceptual Framework. It also guides the choice of indicators for analysis and uses in geographic targeting. The Food and Nutrition Security Conceptual Framework, which CFSVAs have adopted, links households' asset endowments, livelihood strategies, and

social, political, institutional, and economic environments to the availability, access, and utilisation of food as the three fundamental components of food security. The key feature of the household livelihoods method is its capacity to produce a comprehensive and multifaceted profile of a micro-level context, including food, nutrition, livelihood, and rights-realization, with strong regional and national underpinnings.

This framework serves two functions during a CFSVA by offering:

- a basis for formulating initial hypotheses on the degree of vulnerability and food insecurity, as well as the causes and effects of both; and
- a brief method of visually representing the relationships among variables that affect food and nutrition security, which is useful during data collection and analysis.

The UNICEF Nutrition Framework and the (DFID) Sustainable Livelihoods Framework served as the foundation for the Food and Nutrition Security Conceptual Framework contextualization, which permits expanding interventions (CARE, 2002).

The evaluation of livelihood resources, the local agro ecological, political, and institutional context, and the ensuing livelihood options implemented by the population that may result in food security are the first steps in the analysis of food security. Numerous risks and more subtle changes have an impact on the macro environment, family-level resources, and household food security. Any household's or person's level of food security is often influenced by the interactions of a wide variety of agro-environmental, socioeconomic, and biological factors. There isn't a single, objective way to quantify food security, just like there isn't one for social

welfare or health. However, by concentrating on three different but connected dimensions (aggregate food availability, household food access, and individual food utilization) the complexity of the food security challenge can be reduced.

To achieve food security, it is necessary to address each of these individual aspects, making sure that:

- the aggregate availability of physical food supplies from domestic production, commercial imports, food aid, and national stocks is sufficient;
- household livelihoods provide adequate access for all household members to those food supplies through home production, market purchases, or transfers from other sources; and
- the utilisation of those food supplies.

A notion called vulnerability evaluates how exposed and sensitive a community or a home is to potential shocks in the future. The capacity of a household or community to manage the risk posed by shocks like droughts, floods, crop blight or infestation, economic volatility, and violence ultimately determines how vulnerable they are. This capacity is mostly determined by features of the home and the community, particularly the asset base and livelihood and food security policies of the household or community.

The concept demonstrates that risk exposure is influenced by the frequency, seriousness, and geographic and socioeconomic reach of natural and man-made disasters. The amount of natural, physical, economic, human, social, and political assets a household has, its level of production, its level of income and consumption, and its capacity to diversify its sources of income and consumption to lessen the effects of any risks it faces are all factors that affect coping capacity.

Rural households in Ghana face various forms of challenges which make them vulnerable in terms of food security. Food security, as noted earlier, comprises four pillars, which are accessibility, availability, utilization and stability. However, the vulnerability of rural dwellers means these pillars are affected in various ways, threatening food security (Ellis, 2000; Danquah et al., 2017). The vulnerability context has three components, as seen in the figure; namely shocks (erratic rainfall patterns, drought), seasonality (farming cycles, falling prices of crops, off-season unemployment) and trends (migration, land tenure, growing national interest in non-farm ventures). These elements affect the livelihood assets rural households possess, and how these assets are used to produce sustainable livelihoods (Ellis, 2000). In rural Ghana, shocks like erratic rainfall and flood have the propensity of destroying the assets of rural folks. Agriculture, which is the primary economic activity in such areas is hugely affected by poor rainfall, drought and floods. Food production is therefore affected negatively in such situations. Another form of shock that is prevalent in some rural areas in Ghana is tribal and ethnic conflicts. A notable one is the Guinea Fowl conflict between the Konkomba and Nanumba people of Northern Ghana, a place noted for massive food production in Ghana (Debrah et al., 2016). Such a situation leads to the destruction of property, including farms. In some cases, these shocks displace rural dwellers, having them change locations and lose their investments and assets. Again, other trends, such as the discovery of mineral resources in rural areas threaten the primary livelihood of rural dwellers. These minerals attract multinational companies, who troop to such areas to obtain land to set up mining firms and other institutions. In Ghana, places like Obuasi and Kenyasi depict such discoveries and the corporate land grabbing it comes with. Another issue of vulnerability is the

seasonality of agriculture as a primary livelihood. One significant challenge is seasonal unemployment among rural farmers.

With these challenges, people in rural areas would have to find ways to withstand and progress despite the vulnerabilities. Consequently, rural folk needs to increase their capacity by engaging in activities that would help them deal with the risks and vulnerabilities to ensure food security. The capacity of rural dwellers refers to capital or assets available to them. These include the capital stock or livelihood assets made up of natural, physical, human, financial and social capital. In Ghana, rural areas have youth who can work. Again, the people possess the knowledge and skill needed for economic activities such as farming. Other aspects of their human capital include their levels of education and capacity to adapt. Also, they make use of natural assets, which include farmland and water bodies, which have a direct impact on farming activities.

Certain parts of Ghana are blessed with mineral resources and this offers another avenue other than farming as a means of livelihood. Small-scale mining is therefore rife in areas that have mineral deposits in the land. The physical capital, which includes roads, technology or mechanization of agriculture, to a large extent, is inadequate in rural Ghana due to low levels of development. There is also the social capital available to rural dwellers, notably the social setting, chiefdoms and formal and informal relationships between the inhabitants as well as kinship ties. In rural Ghana, kinship ties are relevant in the allocation of land for farming activities, as land is usually owned by the family, tribe or community. Chiefs and leadership in such areas are therefore important in this mix, as they are the key adjudicating bodies in such areas. Issues of land tenure and their resolution are handled by chiefs and community elders. Again, due to the communal ties and norms, farmers can operate

sharecropping and mutual farming assistance (Noboa) (Afriyie et al., 2015). These communal ties also factor in virtually all economic activities rural dwellers engage in. Another category of capital, known as financial capital, refers to the wages earned, capital accumulated and credit facilities available to rural dwellers. Financial capital refers to the availability of credit facilities or loans, aids and grants to rural dwellers to pursue or enhance any livelihood strategy or activities they are involved in. Rural folk in Ghana are particularly handicapped when it comes to financial capital.

The framework assumes that at every point in time, these assets would be available to the poor in different measures. Hence, all of these would not be available in equal measure. For some assets, therefore, their effectiveness in producing value will depend on how it is combined with other assets. For rural dwellers to achieve sustainable livelihood outcomes, a range of capital would have to be combined. A successful livelihood outcome, in this case, food security, depends on a combination of factors and livelihood assets. For instance, though an individual may have mineral-rich land, the appropriate technology, knowledge and skills would be required to mine. Similarly, a farmer may have to rely on relatives to help sell farm produce to make a meaningful income.

It must be emphasized that the use of capital and its outcome, in efforts to address the vulnerability of food insecurity, is regulated by the structures and policies, institutions and processes. They are vital in the quest to transform a certain range of assets into viable outcomes. In Ghana, a policy like the Planting for Food and Jobs which was introduced by the state is one of the policies which influences the vulnerability context and the use and availability of assets.

It communicates the state's support for agricultural activities. The policy's execution is overseen by the Ministry of Food and Agriculture, through sub-agencies. Again,

intervention by donor agencies and institutions like DFID, and the World Bank as well as the role of the Ministry of Food and Agriculture also influences the vulnerability context of the rural poor. Also, mention can be made of the processes, such legislation of SSM and the fight against galamsey, which also influence the asset pentagon, whiles influencing the kind of livelihood strategy rural households undertake. These processes, institutions and policies are vital to every aspect of livelihoods. On one hand, they grant or deny access to assets (Serrat, 2017), and incentivise people to make the right livelihood choices. For rural dwellers to be able to transform their assets into productive ventures, the appropriate legislation and licence are fundamental (small-scale mining).

The policies, institutions and regulations pave the way for Ghana's rural folk to adapt to vulnerability by transforming their asset range into livelihood strategies. The framework depicts that the combination of assets and the relevant processes, policies and institutional support culminates in the choice of livelihood strategies. For instance, the availability of mineral resources cannot be to the benefit of multinational companies alone, as licences are given to small-scale miners too, enabling them to mine and make a living from it. Consequently, farmers venture into small-scale mining during the off-season. Again, with the agricultural extension services and other forms of support from the state, with policies like the Planting for Food and Jobs, farmers have the impetus to produce food. Other non-farmers are also attracted to farming due to the enabling environment created. Small-scale mining and farming, therefore, become the main livelihood strategies. These are responsible for a boost in food production, extra income, capital accumulation and reinvestment as well as improved well-being.

It must, however, be mentioned that both activities could cause excessive use of land. Whiles excessive farming the fertility of the soil, small-scale mining also leads to the destruction of the soil. Again, water bodies will be threatened by increased mining activities, and this may affect the quality of food as these water bodies are used for irrigation for farms. Mining activities may make the cost of living escalate, as demand will soar due to the migration of people from other places to work.

2.13 Critiques

The framework is also directly criticised for the following reasons: that people are invisible; that it is unclear how to analyse and measure capital assets; that it needs to give more consideration to socio-economic, historical, and cultural factors; that it is not sufficiently flexible; that the overall concept is ethnocentric and difficult to translate; that it is not sufficiently focused on eradicating poverty; and that it does not guide how to link micro-macro level with each other.

Marzetti (2001), who attempted to implement the SL framework in Brazil, echoed some of these critiques. She claims that the box labelled "policies, institutions, and processes" is overstuffed and serves as a place where potential action is "lost." She discovered that the Portuguese term for "social capital"—the "capacity to influence policy-making"—could not be accurately translated. The argument made by Neefjes (2000) that the framework is merely a tool and should, thus, be modified as necessary by individuals who use it should be kept in mind when defending the framework as a thinking tool.

The framework shows that though the livelihood forms may have a positive impact on food security (as well as poverty alleviation), they may have some downsides. This study, therefore, deems it important to study the synergies and consider the

trade-offs, as this would help accentuate the positive outcomes whiles dousing the negative livelihood outcomes.

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 Introduction

The chapter presents the profile of the study area, and the research design detailing the specific methods for data collection and analysis.

3.2 The profile of the study district

This study was set in the Asutifi North District (AND), located in the Ahafo Region (formerly Brong Ahafo) of Ghana. The AND came into being in 2012, via the legislative instrument 2093. The district has Kenyasi as the capital, with another 138 towns or settlements, with notable ones being Ntotoroso, Kenyasi No. 1 and 2, Gyedu and Gambia No. 2. The district covers a total land surface area of 936 sq/km (Ministry of Local Government & Rural Development, 2018; Ministry of Finance, 2018).

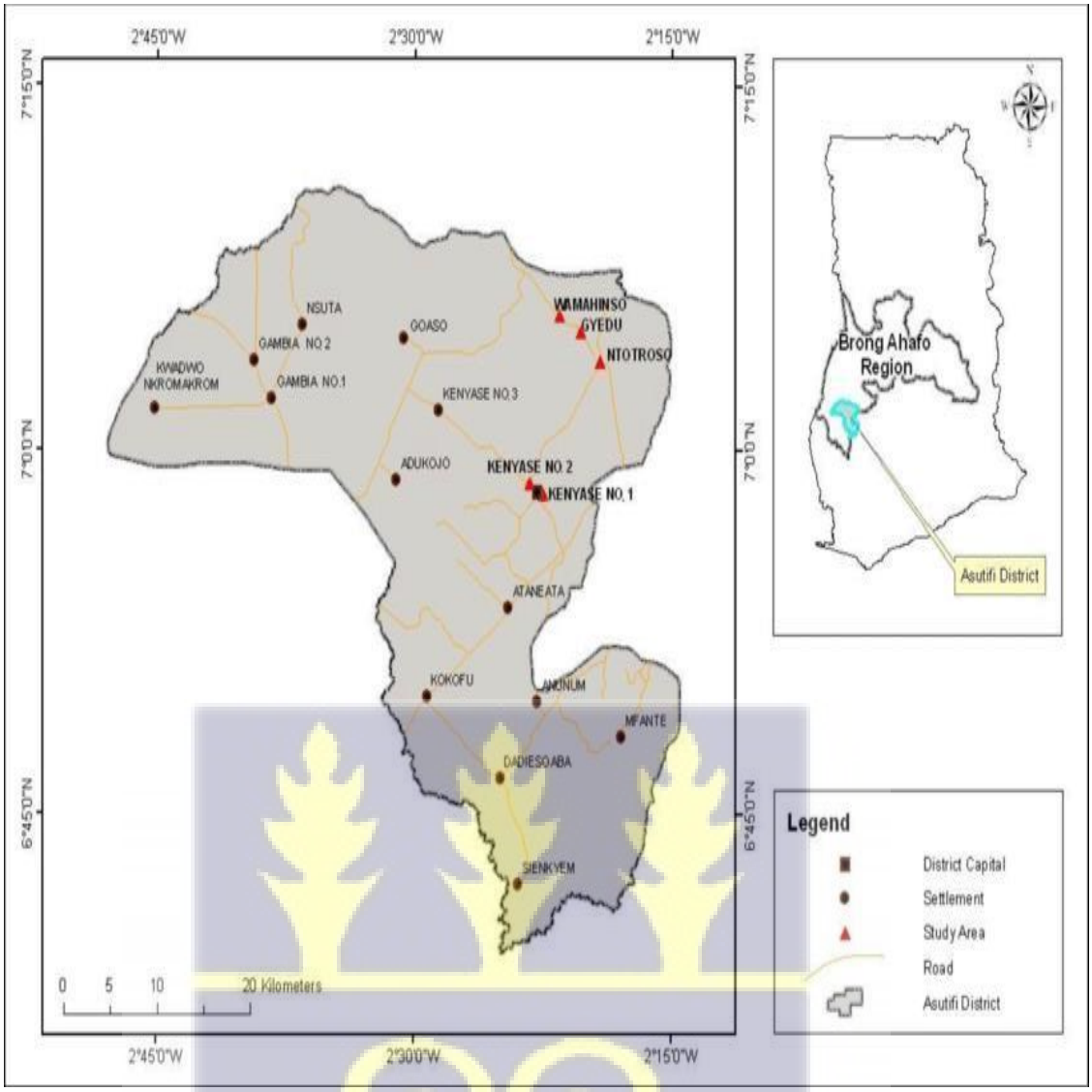

Figure 4 Asutifi North District Map

3.2.1 The population and economic activities

It is estimated that the AND has a population of 52,259, which is 2.7% of the Ahafo Region's total number. Males make up 51.2%, with females being 49.8%. It is indicated that the population density of AND is 55.81 per square kilometre per land. AND is mainly a rural area, though some parts of it can be said to be urban (Ministry of Finance, 2018). Nevertheless, the majority of the population, 35468, live in rural

areas, whiles 16,791 inhabit urban parts. Of the total population, about half of them are less than 20 years, with the rest being more than 20 years.

The AND is largely agrarian, with agriculture being the main livelihood option for about 60% of the population (Ministry of Finance, 2018). Farmers in AND grow crops largely for subsistence, though some cash crops such as cocoa, oil palm and citrus feature marginally. The main crops include maize, cassava, plantain and cocoyam, as well as vegetables like okra, pepper, tomato and garden eggs. Other activities are tree-planting, livestock rearing, and fish farming. Agriculture employs 8,024 households, with the majority, 7887 of them being involved in crop farming and 2318 involved in livestock rearing.

Aside from agriculture, mining is also a prominent economic activity in the district. The mining industry in the district is dominated by Newmont Ghana Gold Limited which operates a gold mine in the Kenyasi area. The establishment of the mines has generated direct employment for the youth of the communities in the district, who find mining as an alternative form of livelihood.

Due to the farming activities, there is a market for the trading of farm produce. Additionally, the researcher's observation in the town revealed that there are other forms of livelihoods in the district, namely building and construction, carpentry, and agro-based processing activities like gari processing and palm oil extraction.

3.3 Research Design and Data Sources

Research design is defined as a framework of methods and techniques a researcher uses to combine various components of research to address a research problem in a reasonably logical manner (Bhat, 2019). This study uses a case study research design.

Yin (2018) defines a case study as an empirical research method used to investigate a contemporary phenomenon, focusing on the dynamics of the case, within its real-life context. Harrison et al. (2017) write that the case study design is effective in exploring complex phenomena deeply to develop a clearer understanding. Case study design involves the in-depth study of a case in its naturally occurring habitat. A case study remains one of the widely-used research designs in social science research, with its attraction being its capacity to generate deeper knowledge or understanding of a situation (Ridder, 2017). Though it has been criticised for its lack of generalizability, the case study design is still very popular among researchers.

Onghena et al. (2019) and Yin (2018) contend that case study designs may involve both qualitative and quantitative approaches. This study, therefore, adopts a mixed-methods approach. This implies that this study deploys elements of both qualitative and quantitative methods. According to Creswell and Plano Clark (2011), using a mixed approach provides more clarity and understanding than using a single approach. Again, the triangulation technique used under this method, such that data gathered via either quantitative or qualitative means complement each other in interpreting the outcome of the study (Almalki, 2016).

Quantitative research encompasses the gathering of data, quantifying and analysing the data statistically to confirm or reject a preposition (Williams, 2011). Many experts recommend the use of a quantitative method in social science research because of its capacity to be used in studying a wide range of phenomena and flexibility (Al-Flaiti, 2013). On the other hand, qualitative research is a form of social study which focuses on how people interpret and make sense of their experiences to understand social phenomena (Mohajan, 2018). A qualitative study allows the researcher to explore the behaviour, perspectives, feelings and experiences of people,

in the bid to understand their perspectives. The qualitative techniques this study uses are face-to-face interviews.

The study made use of two main forms of data sources, namely primary data and secondary data. Primary data is data that is collected from a source mainly for a study (Mohajan, 2017). For the research approach being used, the study used questionnaires and interview guides to collect primary data from participants.

Secondary data refers to data secured from other materials and sources other than from the primary participants of the study (Olabode et al., 2019). Secondary data can be sourced from books, research articles from journals, news articles and websites. These sources, as well as census data from government databases, were used for this study

3.4 The survey and its sampling

Walliman (2017) defines the research population as all the members and individuals targeted for the research. The AND has a population size of 52,259. Kenyasi, the capital and the focus of this study has a population size of 10000 (GSS, 2015). These communities were Kenyasi No. 1 and Kenyasi No. 2, which together have a population size of 10000 (GSS, 2015). These are farming communities that have been in the limelight due to the mining activities of both multinational companies and small-scale miners. Emmanuel et al. (2018) have found the district as one where mining has affected farming activities and food security in the long term. Again, since the advent of the Newmont mining firm, the AND, mining and other mining-related activities and their effects on the inhabitants' main livelihood have been of prime concern (Opoku-Ware, 2014). On this background, these communities are ideal locations for the study.

A sample is a group selected from the larger population, who have the likeness and characteristics of the larger population and are deemed to be logically representative of the population. Sharma (2017) defines sampling as a technique deployed by the researcher to systematically select a relatively smaller number of participants from a larger pre-defined population, based on the aims of the research. For this study, several forms of sampling were done. These were done to ensure a comprehensive sample adequate for this study was attained.

First, purposive sampling was used to decide the communities for the study. Purposive sampling involves the selection of participants of a study based on the researcher's perception that a certain group of people are highly relevant for a particular study due to their special experience of the phenomena and in-depth knowledge of the situation. For this study, two communities were used.

The sample size refers to the number of elements to be included in the study (Elfil & Negida,

2017). The sample size is the number of representatives of a population selected for a purpose.

In determining the sample size for this study, the mathematical formulae provided by Yamane

(1967) was used to arrive at the final sample size. This formula is expressed as $n = \frac{N}{(1 + N(e)^2}$

, where n is the sample size, N is the population size, and e is the level of precision.

For this study, the community of interest has a population (N) of 10000. Therefore,

the sample size for this study is determined by n= 10000/[1+10000(0.05)2];

n=10000/26 = 384.62=385

Though the expected sample size was 385, the researcher was able to gather data from 126, given the resources available along with the constraints faced by the researcher. The principal constraint was that the study was conducted amid the COVID-19 pandemic. Contacted participants who initially agreed to partake were subsequently reluctant, fearing contact with the field agents who were from Accra, where COVID-19 infection rates were on the rise. Despite efforts to get total participation, including explaining that the agents had tested negative, the individuals reneged on their initial approval. Again, some individuals believed they had to receive some rewards or compensation for participation, though they were earlier informed participation will not come with compensation. Consequently, the desired sample size was reduced. Again, at the time of the study, it was found that a lot of the micro miners had gone to their sites to work because the rains had made the ground easier to drill and dig, for this reason, Most of them did not return home and therefore getting access to them was difficult. Also, some farmers had just started harvesting and could not return home early. Again, the researcher had to respect the decision of some farmers and miners who declined to participate, though there was an initial agreement. This situation reflects the argument of Nayak (2010). According to Nayak (2010), the final sample size calculated gives an approximate guide for the sample size appropriate for the target population. In some instances, the sample size calculated may be adjusted for feasibilities such as funds, duration of the study and available subjects. Larger sample sizes may be a waste of limited available resources (time and money) when an answer can be accurately found from a smaller sample (Nayak, 2010) complemented by qualitative data. The inclusion criteria for this study were adult residents within the Kenyasi community who are 18 years or older and into farming or mining as a means of livelihood. For this study, the sample size included was less

than half the intended sample size mainly due to the unavailability of miners and some farmers.

3.5 Data collection

Data collection involves the process of gathering information from various sources using proven procedures.

3.5.1 Data collection procedures

Participants were contacted through key persons in the community of interest. These key persons included popular individuals in the community and individuals from the traditional authority. Upon discussions with these key persons and other members of the community, the researcher met the various informal groups of farmers and miners, communicated the mission with them, and invited them formally to be part of the study.

For data collection, the main instrument used for quantitative analysis for the study was questionnaire administration. Also, a structured interview guide was used to collect primary data for the qualitative analysis.

In the quantitative research approach for this study, the researcher engaged respondents and assisted them to fill out the questionnaires. The questionnaires had four sections. The first section required the sociodemographic data of participants. The subsequent three sections focused on gathering data based on the objectives of the study. These sections had questions concerning each of the objectives. The respondents were made aware of the purpose and objectives of the study and made to sign a consent form to confirm their participation. The questions were read out and responses were filled inappropriately.

The qualitative approach involved data collection through a semi-structured interview guide. The semi-structured interviews were conducted because it is fluid and flexible which ensured that there was flexibility with regards to how questions were asked and the sequence with which questions were asked, as well as particular areas or emerging questions to ask subsequent study participants (Mason, 2011). The use of the semi-structured interviews, therefore, allowed the interview process to be shaped by the interest of the researcher, the understanding of study participants, and unanticipated ideas which emerged from the interviews. While providing the researcher with an opportunity to probe by asking follow-up questions to elicit explained answers or emerging ideas that were not clearly understood by the researcher. Thus, leading to a complete and in-depth understanding of the phenomena under investigation (Cramer, 2018; Roulston and Choi, 2018). The researcher was also able to adapt questions that suited participants and their situations and, allowed the researcher to ask new questions in subsequent interviews (O'Reilly and Dogra, 2018). Participants were approached and informed of the study and its purpose.

Semi-structured interviews were conducted with a total of 24 participants comprising ten farmers, ten miners, two district officials and two Ministry of Food and Agriculture officials as well as two officials of the Minerals Commission of Ghana. At the commencement of each interview, the consent of interview participants was sought and they agreed. Participants were also made aware of their rights to refuse any question they were uncomfortable with.

In agreement to participate, the interview section was conducted. Though the survey instrument was prepared in English, the interview was conducted in the local dialect for non-English speaking participants. Participants were interviewed in the comfort of their homes where privacy could be guaranteed. The purpose and objectives of the

study were explained to participants before they are made to provide consent before the commencement of the interview. During interviews conducted with participants, the researcher asked questions and probed responses from participants using a combination of the non-directive probes (such as 'can you tell me more?') and echo probes (such as repeating the responses provided by participants to be sure before further questioning). This ensured that the researcher did not influence participants' responses while encouraging them to clarify the information they provided. Interviews were recorded, translated where necessary and then transcribed for onward analysis. Each interview section lasted between 15 and 20 minutes.

3.6 Data analysis

The data analysis for this study, which employed a mixed technique, included both qualitative and quantitative data analysis (Onwuegbuzie & Combs, 2015). The researcher employed a technique known as parallel mixed analysis, in which pertinent quantitative variables were subjected to descriptive and inferential statistics, while qualitative data were subjected to thematic analysis.

3.6.1 Quantitative Analysis

Quantitative data were gathered in the field with the help of pre-made questionnaires, which were then examined, processed, and analysed with the software known as the Statistical Package for the Social Sciences (SPSS). The SPSS version 27 was used to analyse quantitative data, which involved descriptive and inferential statistics. Responses to questionnaire items were examined and sorted and each participant's questionnaire was numbered to prevent double-counting. Questionnaire items were given distinct codes, such that each response was represented by a number. Briefly, the cross-sectional survey was used to measure the relations between the key

concepts. The descriptive statistics feature of SPSS (Statistical Product for Service Solution) can also give summary statistics such as the mean, median, interquartile range, and standard deviation. Thus, frequency tables, percentages and cross tabulations were generated and their interpretations thoroughly explained. Microsoft Excel was then used to organize the tables.

3.6.2 Qualitative Analysis

Thematic analysis was used for qualitative data to provide an understanding of the interview narrations, and how they align with the aims of the study. To accomplish the study's research goals, interview transcripts were prepared by the researcher, by listening to the audio, translating and writing them into English via Microsoft Word. The transcripts were carefully examined and analysed to identify any new problems that may arise. Initial codes were crafted from the essential ideas that emerged from the data, and these major ideas are defined and reinforced more as the process continues.

Since the study uses mixed analysis, descriptive and inferential statistics and thematic analysis methods were therefore combined, linked, and integrated to produce an overall explanation or conclusion (Onwuegbuzie & Combs, 2015).

3.7 Challenges during the research

The study was conducted at the height of the COVID-19 pandemic. To curb the spread, there were so many restrictions, notably physical distancing. This slowed down the pace of the research and increased the cost of travel times and cost of living for the researcher. Again, this prevented the use of FGD in the study which was initially intended.

3.8 Ethical considerations

Ethics refer to the norms or standards of behaviour that are used to guide moral choices about behaviour and relationships with others (Sobočan et al., 2018). It simply refers to the conduct, analysis and presentation of a research report in a morally acceptable manner to all parties involved. Therefore, every researcher owes it to society, the academic community and participants to make certain ethical considerations. This study took some steps in this regard.

To deal with the issue of informed consent, all participants who partook in the survey and the interviews were well informed about the purpose and objectives of the research. For documentation, all participants/participants were asked to sign an informed consent form. As part of the informed consent, participants were provided with a clear explanation of the importance of their role in achieving the objectives of the research. Participants were given pseudonyms during the analysis to protect their identities.

The principle of voluntary participation was also adhered to. Consequently, participants were made to understand that taking part in the study is voluntary and that they can freely withdraw and or discontinue participation at any time, without any explanation. The purpose of adhering to this principle was to make sure participants were not forced to be part of the research.

Also, all the participants were assured of confidentiality and protection of identity. For this reason, participants were not required to provide their names in any recording or on any sheet. Again, participants were informed that the outcome of this study is meant for academic purposes only.

CHAPTER FOUR

FARMING AND MINING LIVELIHOODS IN THE KENYASI

4.1 Introduction

This chapter presents findings on the two major livelihood strategies of farming and mining in Kenyasi. It begins by presenting the socio-demographics of the informants and proceeds to systematically analyse the nature of the two major livelihood strategies.

4.2 Socio-economic and demographic profiles

Table 1 Demographics

Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	79	63
	Female	47	37
	Total	126	100.0
Age	18-20 years	24	19
	20-29 years	42	35
	30-39 years	37	29
	40-49 years	18	12
	50-59 years	8	7
	Total	126	100.0
Marital status	Single	48	38
	Married	57	45
	Separated	9	7
	Divorced	4	3
	Widowed	8	7
	Total	126	100.0
Educational level		26	21

	No formal	59	47
	education	19	15
	Basic	6	5
	High school		
	Tertiary		
	Others	16	12
	Total	126	100.0
Household size	1-3	37	29
	4-6	71	56
	Above 6	18	15
	Total	126	100.0
Number of children	1-3	49	39
	4-6	54	43
	Above 6	23	18
	Total	126	100
Duration of stay in the community	1-5 years	8	6
	6-10 years	11	9
	11-15 years	24	19
	16-20 years	53	42
	Above 20 years	30	24
	Total	126	100
Migrant status	Native	100	79
	Migrant	26	21
	Total	126	100
Religion	Christian	62	49
	Muslim	15	12
	Traditional	39	31
	Others	10	8
	Total	126	100

The findings reveal that the majority of the participants were aged between 20-29 years (33%). The majority were between the youthful ages of 20 to 40 years suggesting that many constituted the workforce.

In Ghana, female-headed households constitute just 27% in rural areas and they are mostly engaged in non-agricultural self-employment activities (FAO, 2012). Small-scale mining is also known male-dominated profession. It was, therefore, essential to identify the proportion of males and females in this study. It is indicated that the majority of the participants were males, who were 63%.

From the survey, it was discovered that most, 45% of the participants of the study were married. The high proportion of married could have an impact on their livelihoods as the breadwinner of the family may have a higher number of dependents and this may have an impact on food security.

In an attempt to establish the level of qualifications of the participants, the study sought to examine the educational background of the participants. The study revealed that the majority of the participants, 47% had attained basic education. The analyses suggest that most of the participants have a lower level of education. The poor academic progression implies that the people are forced to look for alternative means of livelihood to the formal employment sector.

From the table, as follows, it was observed that a majority, 56% of the participants had a household size between 4 and 6. The Household's size was analyzed as it may have an impact on food security. Ihabi et al., (2013) in a study found that household size was statistically associated with food security with an increase in household size resulting in the household being food-insecure.

Concerning the number of children, 43% of them had between 4-6 children which served as the majority. The number of children indicates the proportion of dependents that impacts food security. More children indicate a higher number of mouths to feed.

The study also sought to investigate how long the participants had stayed in the community. The table below summarizes the number of years that the participants have stayed in their respective communities. From table 1, 42% of the participants indicated that they had stayed in their respective communities for 16-20 years. The majority of the participants are indigenous to Kenyasi. This characteristic suggests that the participants may be owners of lands or mining fields and would be involved in farming or mining activities.

79% of the participants were natives. This result fits the narrative that the high proportion of natives implies they may have landed for farming and mining purposes. Migrants too are known to travel for work or other economic opportunities. This is evidenced by the participation of the Chinese in small-scale mining in Ghana.

The study found that Christianity was the dominant religious group in Kenyasi as 49% of the participants were Christians. The majority of the participants indicating Christianity agree with the fact that Christianity is the biggest religion in Ghana with around 71.2% of Ghana's populace (Ghana Population and Housing Census [GPHS], 2010).

4.3 Livelihoods in the communities

Various forms of livelihood exist in Kenyasi. These main forms are farming, mining, and other forms of livelihood. Crop farming in Kenyasi is mostly rain-fed. During the off-season, it warrants that farmers engage in alternate livelihoods to make ends meet. In this study, it emerged that majority of the participants 59.5% had other

livelihood forms. This suggests that the people of Kenyasi acknowledge the inadequacy of farming or mining as a sole means of livelihood.

Table 2 Diversification of livelihoods

Diversified livelihoods	Percentage
Forest/wood-based and related industry (Carpentry)	3.2
Automobile (Mechanics)	4.0
Service-related industry (Dressmaking, Leatherwork, Shoemaking)	7.1
Metal base industry (Metalwork, Aluminium)	3.2
Agro-based industry (Food selling, Food processing, Bakery)	29.4
Public/Civil Servant	12.7
None	40.5
Total	100

Source: Field data, 2020

4.3.1 Income levels

The income level of rural inhabitants is very crucial and may have consequences on food security (Osei-Asare, 2013). Rural areas supply urban areas with food and if rural dwellers do not earn a favourable income, they would have no option other than to depend on the cultivated crops to survive which would have adverse ramifications on food security in the urban areas. Points out that most rural inhabitants in Ghana earn incomes that are only enough to cover living expenses for the family. This argument is buttressed by the sixth report of the Ghana Living Standards Survey which found that the average monthly income of rural households in Ghana was 275

cedis which are below the international poverty line (449 Cedis per month) as set by the World Bank.

4.3.2 Duration of work in chosen livelihood

Working experience in any form of livelihood is very critical as it shapes the perception of workers on how their chosen livelihood affects the overall economy. Within the context of farming and mining in rural areas, the experience levels of farmers and miners in their chosen professions will go a long way to influence their understanding of how their professions might affect food security in the long run (Hilson & Banchinrigah, 2009). Concerning the working duration of the inhabitants of Kenyasi in their respective livelihoods, the study observed that 39% of the participants had been involved in mining, farming and trading as their livelihood activity for more than 5 years. It was also found that 29% of the participants had worked between 3 – 5 years in agro-based activities, 23% of them had worked between 1 – 3 years in service-related livelihood and only 9% had worked below one year other chosen sources of livelihood.

Table 3 Duration of work in chosen livelihood

Chosen Livelihood	Length of time	Percentage
Others	Less than 1	9
Service-related livelihood	1-3	23
Agro-based activities	3-5	29
Mining, Farming, Trading	Over 5	39
Total	Total	100

Source: Field data, 2020

4.4 Farming livelihoods in Kenyasi

4.4.1 Participation in farming

Agricultural activities in communities include crop farming and livestock rearing. In this study, it emerged that a total of 50.8% of the participants were engaged in farming as a means of livelihood. Of these, 33 were engaged in crop cultivation and 11 were in livestock rearing. 20 participants also indicated that they were combining both livestock rearing and crop production.

Figure 5 A female farmer in Kenyasi One participant recounted:

'I mainly grow maize. Sometimes, I add other crops. I saw that the maize is sometimes rotten and we throw them away. We lose all our money. So a friend suggested that we also have some fowls so that at least, we can use the rotten maize to feed them.

When you even have the maize, rearing fowls is not a problem. And over here, many people do that'…. [Yaw Baa]

This account reflects the way mainstream farmers are adapting to their peculiar difficulties by adding other farming activities to what they initially began. The participant recounted that it is quite common to find other farmers rearing animals in addition to crop production. This reflects the agricultural trends in the AND district where the majority of households are engaged in crop farming (ANDA, 2013).

To buttress these views espoused by the participant, personnel from the District Assembly argued that farming has been the most important activity in the area as found in the quote below: Asked about the state of farming in the community, one personnel informed the researcher:

I have been living in this community for 33 years. The few years I've not been here, I was either schooling or going to make a living. And I do not think an activity is performed here better than farming. Farming is everything in this community and even those around us….The land is good. So you can understand why. And everything grows well here….you can mention maize, plantain, cassava, cocoa, tomatoes. Everything that needs to be put into the soil to grow, grows here….[Braa Ben]

The account by the District Assembly personnel indicates that the fertility of the soil is the basis for the inhabitants' love for farming. Again, his account indicates that farming is an age-long economic tradition.

4.4.2 Crops grown and farm sizes

In the communities, the major food crops grown include maize, rice, cassava, plantain and cocoyam alongside vegetables such as tomato, garden egg, or, and pepper. Also,

tree commercial crops grown include cocoa, oil palm, coffee and cashew. In this study, participants were quizzed on the main major food crop grown.

Figure 6 A maize farm (Asutifi North District, 2020)

The results revealed that the majority of the participants 32.8% grew maize as the main crop, 18.8% grew cassava and 6.3% grew rice (Figure 7).

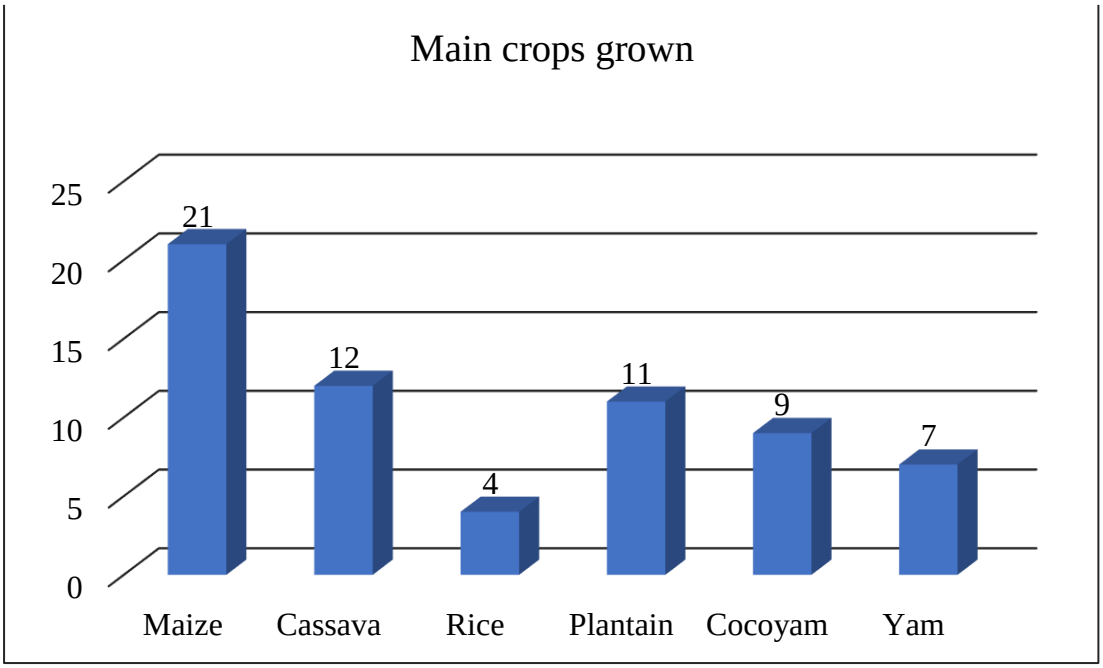

Figure 7: Main crops grown

Figure 7 presents the main crops grown by the participants. Conspicuously missing is cocoa, which is a major cash crop in Ghana. Whiles cocoa is known to thrive in the area, participants offered myriad reasons for the low production of cocoa. One participant claimed that:

When people come here, they only think about food and then work. Everyone thinks our community produces food…..so they are only interested in buying. So when you produce cocoa….you're wasting your time Massa. But even gari sells so fast so, we want to grow cassava for now… [Kofi Baah]

This account reflects the intent behind the livelihood choices of the community. The local people realised people troop into the villages and towns to work. Naturally, food will be in high demand with the number of people coming into the town. The indigenes there act accordingly, producing food crops, which are more likely to sell faster and make them enough money. On the other hand, further probing revealed

another reason why food crops dominate the list of crops participants were producing. The following narration paints a picture:

A few years ago, I was involved in cocoa production. At that time mining was not like it is today. But when people started the galamsey, there was nobody to work with on the farms…..and my cocoa too was big, more than one acre, like three times the Roman park here… when harvest came I paid people to help with….but when the buying officers came, I could not even get much. Even my brother's cassava ….he got good money. So for me, I decided to grow cassava and maize….. [Alaska]

The narrations of the inhabitants cement the observation in the graph (Figure 7). Inhabitants are attracted to food crop farming because of the demand and marketability. It is seen that food crops produce more cash-back returns than cash crops like cocoa. Nevertheless, the accounts of the participants showed there are still some people growing cocoa in the community, though on a much lower scale.

On the actual farm size cultivated, 53.1% of crop farmers cultivated 3 to 5 acres of land, 18.8% on 5 to 10 acres and 9.4% on 11 or more acres (Table 4).

Table 4 Farm sizes cultivated by participants

	Farm sizes	Frequency	Percentage
Female	1 to 2 acres	12	19
Male	3 to 5 acres	6	9
	5 to 10 acres	12	19
	11 + acres	34	53
	Total	64	100

Source: Field data, 2020

The table shows that most men farmed on larger land sizes than most women did. Whiles male farmers were dealing with between 5 to 11 acres, female farmers were farming on 1 to 5 acres. Interactions with the farmers revealed:

When someone is handing over their property, like land, they need strong people to handle issues on the farm. My father for instance passed on my piece of land to me, though I was not the eldest child. I am the third, but the first male. So he passed on the farms to me. I have about
7 acres. I manage everything but, my sisters have smaller portions…and I have the biggest portion. You know women, they can't even do much. [Michael Gyamfi].

One female farmer/participant added:

I bought this land from a neighbour. At the time, the mining people had come to this place. So I wanted to also grow something small to sell to the workers and the visitors. I managed to get only one acre… [Kwame Asuo]

The narrations provide an understanding of why women have smaller farms than men in the community

4.4.3 Access to Land for farming

The farmers work on land either owned or rented. In the AND district, land for agriculture may be obtained through hire, outright purchase or sharecropping which is the most common practice (ANDA, 2013). The results show that the majority of the participants 64.1% owned the lands they cultivated. Of these, 14 inherited the land from deceased families, 9 purchased the plots, 12 took over unoccupied lands and 6 were gifted with the plots.

Providing more emphasis, one participant (a farmer) explained that:

The land is for my family... my great grandfather was part of the initial settlers in this town, so they started farming here. When I was a child, I remember we used to have palm trees here. My father used part of the land for a fish pond and this side for cattle. He also planted maize.

Later I started a cassava farm here…. [Yaw Agyei]

4.4.4 Sources of labour

Farm labour is usually necessary for the various stages of crop cultivation including weeding, ploughing, planting, fertiliser application and harvesting. Hence, farmers need to have extra hands, especially during planting and harvesting. It was seen that farmers usually relied on friends and family, other farmers, miners and other artisans to assist.

Table 5 Nature Farm Labour

Labour	Frequency	Percentage
Family & Friends	18	28%
Other farmers	15	23%

Miners	8	13%
Artisans/Migrants	13	20%
Miners and Farmers	10	16%
Total	64	100

Source: Field data, 2020

Farmers hardly have a fixed number of workers on their farms. For male farmers, they can mobilize friends, who may be other farmers, or involved in other professions to assist them as and when necessary. Those who have children involve their children in farming, especially female farmers. Turns out that during the lean farming season, when farmers have to wait to harvest, or plant, many of the people who work on the farm move to other livelihoods, and return to assist farmers when they are needed. For much of the time, farmers move through the farms themselves, with few available farmhands to assist with activities like fertilizer application and control of pests and weeds. Joe Boy, a 38-year-old farmer recounted:

Most of the time, my wife and cousins are here to assist on the farm. When it gets to time to harvest, we arrange with other farmers and people who have other jobs….for them, they come because they need money. For my friends, they only need some of the harvests, or we cook and eat….you know some of them also have their farms…so when it's time to work on theirs, we all go and assist. [Joe Boy]

Another participant also mentioned that he gets some artisanal miners and/or migrants to assist with farm work when the need arises.

As for labourers, I always call the galamsey boys… some boys from other towns and even from Kumasi and Sunyani come and work in the pits here. You know the gold too, it has its time. So when it's time, they come to this town from various places to mine….But sometimes, they have to wait their turn to use the pits. So they will be around the neighbourhood, and they are always willing to work…so I just call them, and we talk about how much they will take then they work on the farms for us…When the work is not plenty, I just call my brother's children to help me

[Kennedy Appiah]

4.4.5 Motivations for involvement in farming

The relevance of agriculture to the economy of Ghana cannot be underestimated as it continues to be the largest employer in the country's rural areas (Darfour & Rosentrater, 2016). The country's economic fortunes have been tied to agriculture, whose average contributions to GDP were 60% in the 1970s, 54% in the 1980s and 36% in the last half of the 1990s. Currently, statistics indicate that the contribution of agriculture to the GDP of Ghana declined from 21.1% in 2017 to 19.7% in 2018 (Ghana Statistical Service, 2019). Most rural households in Ghana are therefore engaged in farming and usually inherit the occupation from their parents. Farm labour is therefore normally drawn from family sources but complemented mostly with hired labour. One interviewee explains this arrangement

Farming is a noble and very safe job. I have loved farming since infancy because most of my family members are farmers. As a kid, I used to go to the farm with my dad who always taught me how to farm. I, therefore, inherited the habit of farming. Also, farming, means I can easily feed my family and also sell some of my produce

to make money. The food security of my family is therefore guaranteed. [Kwadwo Fosu]

The study investigated the different reasons for the inhabitants' involvement in farming. The results of the response are provided below

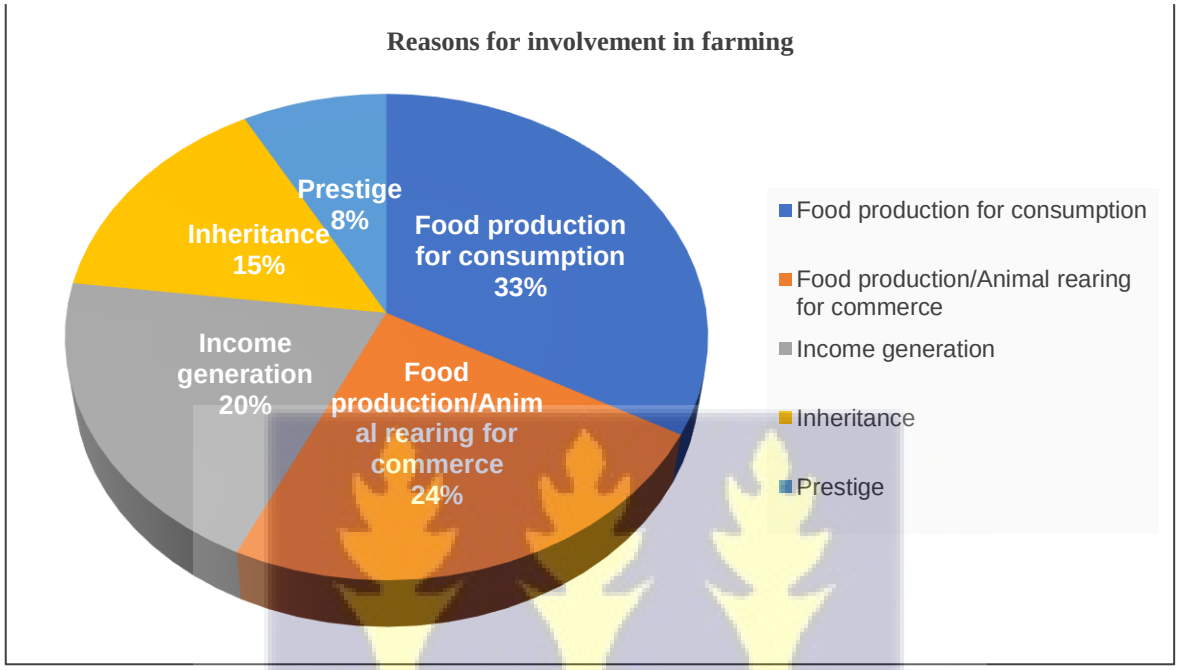

Figure 7: Reasons for involvement in farming

4.4.5.1 Food for the family

According to the ANDA (2013), most of the farmers in the district practice subsistence farming. Farmlands are often limited to a few acres and this makes food production limited. In this study, it was noted that the majority of the farmers had relatively average crop output due to the subsistence nature of farming.

4.4.5.2 Income generation

In the district, crop farming constitutes the major source of income and accounts for about 51.1% of all household incomes (ANDA, 2013). The results of this study

revealed that the majority of them were making less than 1000 cedis annually from crop production. Most of these farmers farm to feed their families and sell excess produce. Some farmers noted that

It's through farming I have been able to send my children to school. I often farm and sell the product to make money [Alaska]

I farm every year because I see it as a sure way to make money. Last year, for instance, the money I made from selling my produce was what was used to secure extra farmland from my friend…he got injured in a road accident so he hardly farms these days. So for me, farming has helped me. Much of the income my parents made in their lifetime was through farming [Yaw Agyei]

4.4.5.3 Inheritance

In this study, it emerged that the majority of the participants 64.1% owned the lands they cultivated. Of these, 14 inherited the land from deceased families. Inheritance of farmlands is a common regularity in Africa. Farmers often engage children at a tender age on the farms. These children when they come of age often are given a plot to farm and subsequently take over plots left behind by their parents. A respondent noted that

I inherited 10 acres of land from my papa 7 years ago. Other siblings of mine had some plots too. We were introduced to farming at a very young age and have been farmers ever since… [Yaw Baah]

Another stated that;

Though I am a public servant, I also farm during the farming season. I inherited some acres of land some years back and couldn't leave it to fallow. I have some experience

in farming due to my regular visits with my father during childhood. I have been farming since" [Bra Ben]

4.4.5.4 Prestige

Farming represents a prestigious profession as it serves as a means to provide for one's family. However, some farmers have more prestige than others based on their affluence in farming. In Ghana, the national best farmer award is given to farmers with a large scale of operations, diversified farming operations, as well as the farmer's role in community development (FAO, 2019.). This implies prestige is associated with large farmlands with high productivity and employs the community. In this study, very few had a farm of sizes greater than 11 acres. When quizzed a respondent said

"I take pride in my farming. I can boast that very few people in this town can challenge when it comes to the number of farms and quantity of harvest, I employ a lot of people during the farming season"..... (Kennedy Appiah)

4.5 Determinants of success in farming

While there are general reasons why people are motivated to get into farming, there are fundamental factors that determine decisions to get into farming. These are basic factors that determine the kind of livelihood people engage in.

4.5.1 Farmland availability

Farming is inseparable from land as it is impossible to carry out farming without land. Securing access to land is therefore an important element of engaging in agriculture. The process of getting access to land is fraught with hurdles. Inheritance laws and customs often overlap, which makes the transfer of land to young farmers notoriously

complex and problematic. Besides, loans to assist youth in acquiring land are rare (FAO, 2014). Some of the participants indicated:

Farming was the only option for me after basic school because my grandfather had a large tract of land. At the time, my father had relocated to Sunyani, where he operates a chop bar with his sisters. Therefore, farming came naturally to me, because I had about 2 acres of land which was not even in use, so I decided to start farming- [Kofi Baah].

I once came here to visit a schoolmate who works at one of the mining firms here. Then I realized the large forest area. I enquired and was informed that certain areas are owned by some families. I contacted the families involved, and when I got a good deal I paid for it. Now, I have 4 acres of farmland. I plan to acquire more in a couple of years. [Michael Gyamfi]

Both accounts attest to the availability of land as being the core reason for the involvement in farming. Though one may not be interested in farming at first, the fact that the land is available makes farming a preferred economic activity.

4.5.2 Soil Fertility

Soil fertility is important for crop production. Okorogbona and Adebola (2015) in a review note that the characteristics of soil fertility including soil texture, soil structure and soil constituents are essential for crop productivity. The ANDA opines that the district lands are generally fertile and suitable for crop productivity. One farmer affirmed

This townland used to be very fertile. I remember a year we harvest so much with little input.

These days, though the land is still good, we have to add fertilisers to help the crops to grow [Alaska]

Another reported that:

For, I was attracted to farming because I realized the land in the area is fertile. On a good day, anything you put in the soil germinates and blossoms. This made me attracted to farming as a livelihood [Kwame Asuo]

4.6 Challenges in farming

For many developing economies, agriculture is the lifeline of both rural inhabitants and the urbanites at large. Despite this, farming activities in many developing economies are beset with several challenges which reduce the economic contributions of the agricultural sector (Rodrik, 2018). The numerous challenges that have engulfed farming activities in the developing world have gained massive attention worldwide due to their sensitive nature considering their overwhelming effects on food security. Farmers in Kenyasi identified several challenges being faced by them in their quest to help in the achievement of food security. Most of the participants cited similar challenges which were later grouped and presented in the pie chart below.

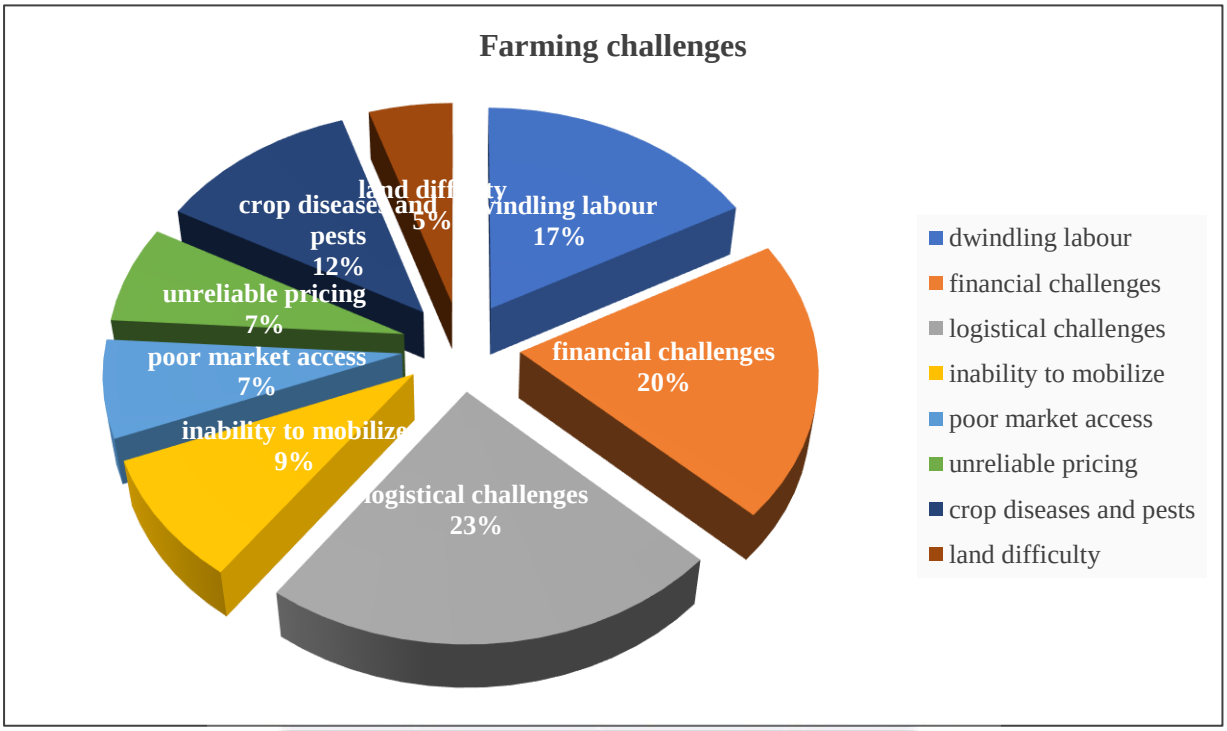

Figure 8 Farming Challenges

The figure indicates that a majority, 23% cited logistical challenges as the main challenge to farming in Kenyasi. This was followed by financial challenges which were cited by 20% of the participants. 17% of the participants also indicated that dwindling labour was an issue. 9% indicated their inability to mobilize as a challenge and 7% cited poor market access.

Alaska, a farmer, gave some detail on the challenges they face as farmers:

Ooh, challenges… a lot my brother. For me, I think not having equipment like a tractor and harvester makes life as a farmer very difficult. You see, harvest time is very important. If you have a machine to harvest, your job is made easier. So without those things, we farmers struggle- [Alaska]

Another farmer had a different challenge though:

Boss, money is all we need… but when you go to the banks, they won't mind you; sometimes I wonder if the bank people know the importance of our job. One bank manager told me they fear we may not pay up when we are given the loans… So we need money, and having nowhere to get even loans or little bits of credit is a problem…aside from that, I'll say sometimes, we don't get the chance to take our goods to the market early enough….and you know how the competition in the market is…very tight…-[Yaw Agyei]

4.6.1 Falling farm yields and profitability

Due to the impact of mining on the arable lands of the community. Most farmers are limited to small acreages and this limits their productivity. In this study, it was noted that the majority of the farmers in this study were small-scale farmers and this accounted for the relatively average crop output. One farmer indicated:

These days, it is hard to get back the money you put into farming. Because I think the soil is changing, so though we do our best to plan a lot, the yield is nothing to compared to the cost- [Alaska]

The high rate of poor farm yield ultimately has affected the profitability of farming in Kenyasi.

4.6.2 Financial challenges

With poor profitability comes financial challenges. The majority of participants in this study reported that, without other non-farm activities, annual farming would have been a problem for most farmers. Hilson (2016) asserts that in many developing nations including Ghana, farmers in mining communities engage in small-scale mining to obtain capital to reinvest into their farming. This study assessed the financial challenges faced by farmers in Kenyasi. Participants were asked to indicate

whether or not getting capital to engage in farming was always available. Some of the responses are captured below:

You know, as for farming, once you start putting money into it, you always need to ensure to continue it….otherwise, your initial investment will not be worth it. But money is always hard to come by these days so starting farming itself is problematic-[Kwame Asua]

For me, starting it was not so difficult because I was into mining. I still do it (mining) from time to time, and the money I made from it was what served as my initial capital when I wanted to farm. I also teamed up with a fellow miner who wanted to go into farming. So together, we had quite a good amount to start.-[Joe Boy]

From the responses, it was observed that 44% of the participants responded negatively to the availability of capital for farming in Kenyasi and 56% of the participants however responded positively to the notion. Some participants confirmed that they mostly depended on non-farm activities to raise finance for input into their farms. This accounted for most of the farmers engaging in mining and other non-farm activities.

4.6.3 Dwindling labour

Mining activities in farming communities have effects on the availability of labour for farming since farmers in rural communities also engage in mining activities as an alternative livelihood.

There is therefore intense competition for labour between farming and mining in such communities (Adi, 2013).

4.6.4 Labour Availability

	Nature of labour	Availability on farms
Male	Migrant	Seldom
	Indigene	Often
Female	Migrant	Often
	Indigene	Often

Such is the case in Kenyasi as both farming and mining compete for labour. Migrants who typically provide labour on a farm now gravitate towards the more lucrative mining. One farmer lamented:

These days it is hard getting people to work with us on the farm. Previously, we used to have the boys from the neighbouring towns coming to assist. But these days, they move with the mining boys so it is difficult to get them-[Kofi Baah]

In an assessment of the case of dwindling labour for farming, it emerged that 61% of the participants stated the unavailability of farming labour in the face of mining in Kenyasi and 39% of the participants however affirmed the availability of farm labour. The participants noted that they often depended on children, relatives and friends as labour during the farming season.

4.7 Mining livelihoods in Kenyasi

The AND has immense potential with many mineral deposits including gold, bauxite, manganese, sand and other minerals. The district has numerous gold mines including the Ahafo mines. Gold mining in the district became prominent with the advent of

Newmont Ghana Gold Ltd in 2004. Apart from the Ahafo mines, there are other sites mined by small-scale miners in the district. According to a respondent, small-scaling mining has been present even before the coming of Newmont Gold mining.

'*Mining has been with us since time immemorial; I cannot say when exactly, but it has been very long. My grandmother had inherited gold from her husband, whom I was told was a miner.*

He also got the mines from his father…..this is about 3 generations ago….long before Newmont and any formal attempt from the state to mine here-[Official from District Assembly]

Figure 9 Small-scale mining activities

4.7.1 Participation in mining

Mahé and Naudé (2016) reveal that in most parts of rural Ghana, the occupational choice and structure of natives is different from that of migrants as migrants are more likely to be engaged in higher-earning jobs than natives. This notion is reinforced by the findings of the study as most 64.5% of those involved in mining (which relatively

pays high than farming and other occupations in Kenyasi) were migrants. The AND district is noted for its high migrant population due to the presence of a mining firm in the district (ANDA, 2013).

Table 6 Origin of small-scale miners

Origin small-scale miners	Frequency	Percentage
Natives	22	35.5
Migrants (foreign nationals)	10	16.1
Migrants	30	48.4
Total	**62**	

Field data, 2020

The mining sector employs a wide range of people of different ages. Though the profession is male-dominated, there are some females involved in mining.

Figure 10 A female miner

Women's participation in mining activities is very low in Ghana (GGS, 2010; Rufai et al., 2014).

This assertion was confirmed in this study as just 9.7% of the total participants were miners.

Small-scale mining is mostly male-dominated and women's place in the mining sector and its impact on their livelihood are under-researched (Andrews & Siakwah, 2021). This suggests the need for more research into the impact of mining on the livelihoods of women and the need for policy directives to drive women's participation. Age distribution characteristics revealed that the mining sector is dominated by the youth. In this study, most of the miners 90.3% were below the age of 40 years. Mining is a strenuous activity that demands enormous strength and energy. The consequence of such is the overwhelming presence of the youth in mining.

Table 7 Demographic Profile of Small Scale Miners

Demographics		Frequency	Percentage
Gender	Males	56	90.
	Females	6	10
Total		**62**	**100.0**
Ages	18-20	12	19
	20-29	21	34
	30-39	23	37
	40-49	6	10
	50-59	0	0.0
Total		**62**	**100.0**

Source: Field data, 2020

4.7.2 Access to mining lands or concessions

The rights to all the minerals belong to the Government of Ghana. The Minister of Lands and Natural Resources has the right to all minerals raised, won or obtained in Ghana. Mining companies and small-scale miners are required to acquire a license from the minerals commission to be given the rights to mine.

Figure 11. A mining site

Table 8 Mining License Status of Miners

License Status		Frequency	Percentage
Licensed operator	Female	7	11.3
	Male	31	50.0
Unlicensed	Female	6	9.7
	Male	18	29.0
		62	100

Source: Field data, 2020

On the difficulty in accessing mineral rights or being licensed to operate, it was a common assertion among participants that attaining a mining license from the mineral commission was a daunting task. A miner lamented;

I have had the money and equipment to operate my small-scale mine. The issue now has to do with the license. I have been following the people for years now. I just continue mining with an operator with a license- [Kwasi Obeng]

Another participant indicated that:

Haha... As for me, all I know is the area is available and I go search for my gold. What licence again. People farming do not need a licence, so why do I need to get a licence before I work. There is no job for us women, the little we can get from mining too, you people say licence…what licence? - [Christy]

The issue of licencing seemed to have infuriated the small-scale miners. One participant answered quite harshly:

My brother, I don't need a licence. Even those who have it went through a lot of trouble before getting it. The government does not assist us in any way but wants us to pay for licences. We have been mining for decades in this community, and all is well. I don't want to hear licence issues at all.-[Moses Kyei]

On the issue of licences, personnel of the Minerals Commission emphasized that:

"We have had issues with small-scale miners and their licencing. For many of them, they believe it is not important, whiles some feel it is a drain on their finances. Over the years, we've found ways of letting them understand this need, through opinion leaders and other forms of sensitization"-[Mr Antwi]

4.7.3 Indirect employment – food vendors, suppliers, traders

Due to the strenuous nature of mining and the male dominance in the sectors. Women tend to stay on the periphery and supply services to these miners as a means of livelihood. Andrews and Siakwah (2020) opined that women work on the margins of

the mining profession making them both financially and socially vulnerable. One of the women in the study said;

When you come to the mining site, other women come there to sell food, water, cigarettes and other items. Some also stay on the roadside away from the mining sites. They can sell a lot and make money- [Christy]

4.8 Motivations for involvement in mining

In recent times, there has been an increasing recognition that the rural economy is not confined to the agricultural sector alone (Csaki & Lerman, 2000). In an attempt to diversify into nonfarm areas, mining has become one of the dominant economic activities in many rural parts of Africa (Kuwornu et al., 2014).

4.8.1 Income generation and high prices

In the district, mining constitutes a source of income and accounts for about five percent of all household incomes (ANDA, 2013). Both natives and migrants engage in mining for income generation. From the study, most of the participants representing 31% indicated that they engaged in mining to generate income. This is in tandem with the findings of Barenblitt et al., (2021) and Danso-Abbeam et al. (2018) who pointed out that most Ghanaians venture into mining because of its high remuneration.

"I ventured into mining because of the money. The mining job pays although, it is very risky, especially with the galamsey. Every month I make at least 4,000 cedis and most of the time I even make more than that. Also, since the mining job pays good money, it comes along with respect and I love that. (Kwame Mintah, a miner)

Minerals such as gold have high prices on the market and probably account for the increasing number of miners in the district (ANDA, 2013). In this study, 22% cited the high prices of minerals as their reason for venturing into mining, this speaks to the high-income generation capacity of mining.

4.8.2 Prestige

With enormous wealth from mining, people become affluent and gain some sort of prestige in society. Mining is usually associated with bravery and may be considered a risky venture. In this study, 24% of the miners engaged in mining because of the prestige attached to it. The youth make huge amounts of money and live affluently. One distinguished miner indicated

That:

'*Thanks to God for the gold we have in this land; through mining, my family has become one of the most respected in the country. Mining was seen by my great grandparents as a do-or die affair…..and the fact that the men in their lineage excelled at it, it made us quite affluent*-Kwasi Obeng'

To wit, the recognition of one's prowess as a prolific miner is a benchmark of prestige for small-scale miners.

4.9 Determinants of entry and success in mining

Mining, like any livelihood option, depends on certain key markers. Capital has always been a requirement for many livelihoods, and this study had a similar revelation. Other determinants include the possession of the skills and know-how and access to mining land.

4.9.1 Capital availability and access

Mining has increasingly become an important contributor to the economy of developing countries including Ghana. However, one of the key challenges has been to develop policy options for making investments in the mining sector attractive and which will be supportive to all actors for sustainable development (Poncian & George, 2015). The creation of an enabling environment for mining firms is therefore imperative in the sustainable development of mining (Lugoe, 2012). The key to creating such enabling environment includes the availability of capital. Mining is typically capital intensive. Capital is needed for digging tools, chemicals and machines. Without such income, small-scale miners tend to work in the mines of well-to-do owners of minefields. A miner reported that

'I had to work in people mines to gather money before is started my mining operations. Starting mining needs plenty of money. Some people just stay away due to its risky nature and high amounts of money needed" (Kwame Mintah, a miner)

4.9.2 Skills

Harsh working conditions and the introduction of technologically advanced machines are placing growing demands on the qualifications of mineworkers, forcing mine workers to undergo continuous training (Stocklin-Weinberg et al., 2019). The complex environmental conditions under which underground mining operates and both numerous natural and technical hazards result in many accidents, including fatalities in the mining industry (Brodny & Tutak, 2019). This suggests that the training of miners is very crucial. To identify whether the miners in Kenyasi possessed the necessary skills they were asked whether they had received training or not. From the study, it was realised that most of the participants representing 62%

had not received the necessary training in mining and as such did not possess the necessary skills required to engage in mining. However, 39% had received some form of training from supervisors. In the 'galamsey' pits, training is usually done by colleagues. This suggests that injuries would be rampant as most of the miners are not equipped with the necessary skills and knowledge to engage in mining. A miner with a Gold mining company noted that

"At our company, we are usually trained extensively on both mining and the use of protective

Material. Miners at the company are therefore highly skilled" (Solomon Obeng, miner)

A small-scale miner said

"I had to learn from my colleagues in the minefield. Some of those who have mined for long

are usually open to teaching new ones" (Kojo Mintah, miner)

4.9.3 Access to mining land

Over the past few decades, attempts by governments of developing nations especially in Sub-Saharan Africa to regulate or formalize small-scale mining as a result of the sector's increasing socio-economic and environmental importance have largely been unsuccessful (Nyame & Bloher, 2010). Even though mining laws have tended to vest all minerals in the state, increasing evidence suggests that mineral-rich lands for artisanal mining continue to be frequently traded between local landowners and miners or interested groups outside the official legal regime (Kidido et al., 2015). The issue of land ownership in the mining industry is therefore very relevant in the context of this study.

Miners usually are engaged with people who own mining lands. A migrant miner noted that;

> *"I came to this town specifically to mine. I followed a friend to a man who owns a mine. We* discussed *terms and I started mining with them"* (Yussif Dauda, miner)

It was observed that only 37% of the small-scale miners owned the lands they used for operation. The land ownership pattern of miners in Kenyasi confirms what was noted by Kidido et al. (2015) as some mining lands continue to be traded between local landowners and miners which is contrary to the law which vests all minerals in the state.

4.10 General challenges facing mining livelihoods

4.10.1 Regulations from environmental authorities

The rights to all the minerals belong to the Government of Ghana. The Minister of Lands and Natural Resources has the right to all minerals raised, won or obtained in Ghana. Mining companies and small-scale miners are required to acquire a license from the minerals commission to be given the rights to mine. In this study, miners were quizzed on access to mineral rights. The results revealed that out of the 49.2% of miners recorded in this study, only 21% of them confirmed they operated with licenses or work with operators with licences. Despite these regulations, miners evade the regulatory bodies and mine under unrestricted conditions. This constitutes illegal mining. On the difficulty in accessing mineral rights or being licensed to operate, it was a common assertion among participants that attaining a mining license from the mineral commission was a daunting task. These put the miners in situations where they are forced to engage in illegal mining.

4.10.2 Dangers to mining – pit collapses

The annual injury incidence rate among small-scale gold miners is high in Ghana (Nakua et al., 2019). Dangers related to mining include pit collapses in underground work, machinery fails and slips/falls. There have been several incidences of pit collapses leading to injuries in mining sites in Ghana. Nakau et al., (2019) reported annual incidence rate of mining-related injury was 289 per 1000 workers in a study. Then there was the devastating pit mine collapse at Dunkwa-on-Offin in the Central Region where numerous people were buried in an illegal mining pit; over 100 miners were killed in that disaster (Emmanuel et al., 2018). In the same region, in June 2021, a collapsed mine pit reportedly killed 3 people and trapped dozens (Xinhua, 2021). A participant in this study reported a harrowing experience that trapped his friends

"On that faithful day, I had delayed going to the mine pit due to some issues I can't even remember. Getting to noon, it rained heavily that afternoon and we heard sudden news that a mine pit has collapsed. We rushed there and the place was very bad. I lost 2 close friends that day" (Kwame Atta, miner).

Almost all of the participants in this study asserted they were aware of the dangers associated with the mine pit. Out of the total miners in this study, 39 reportedly have had accidents with various degrees of injuries. This suggests the need to ban all illegal mining activities in the country.

4.11 LINKAGES BETWEEN FARM AND MINING

The agricultural sector or crop farming plays a central role in Kenyasi as it constitutes more than half of most household incomes (ANDA, 2013). The farming season however is not all year round and most farmers engage in other non-farm activities.

There exist a relationship between these farm and non-farm activities. Hang, (2019) notes in a study that the non-farm sector affects agricultural production as it provides income for agricultural input (seeds, fertilisers, herbicides and pesticides) expenditures and hired machines or labour. This assertion was confirmed by a farmer in this study

"For me, we usually end up eating all the produce from the farm. I usually depend on my carpentry shop to gather money for the next farming season. I pay for ploughing, seeds and fertiliser with the money I save from the shop" (Kojo Kumi, farmer).

On the other hand, food crop farming provides the energy required in most non-farm activities. Mining in the Kenyasi region remains a lucrative venture for both small-scale and large-scale miners. Income generation as revealed in this study is far higher than income generated from crop farming. Income generated from mining therefore can be invested in nonfarm activities as a means of growing or sustaining another means of livelihood. Kojo Mintah notes

"I own a bakery where my wife works. You see, we started it before I started mining. When this started going on well in the mining, I invested the money in the bakery and now we employ about 5 people" (Kojo Mintah, miner)

A common theme in the literature on food security is that income is essential in the pursuit of food security (Hilson, 2016). One way rural families make money is by participating in the local economy. As a result, their economic activities are critical. Farmers are typically compensated for their labour in the production of food crops. Food crops, on the other hand, are highly perishable and lose their value as a result

of this. As a result, income from farming may not be sufficient to provide food security. Households' food security is in jeopardy.

"*The farming we do does not always yield income. This is because when there are no money people do not buy the crops and they go bad. If we do not send the crops to the towns or cities we do not get any income. When the crops go bad because of no money people go hungry. It is a sad case. We cannot give the foods out for free because we toiled for them and we cannot also watch for it to go bad. It is a huge dilemma" (Kojo Kumi, farmer)*

To attain food security, SSM comes to the rescue. Because small-scale mining provides farmers with an alternate source of income, food security can be achieved even in the face of perishability and seasonality (Assan & Mohammed, 2018). Because of this seamless flow of money that is created by establishing jobs, income generation is always secure and stable (Lam et al., 2017).

"*I am a farmer. That is my main job. But sometimes I do a bit of mining to get extra income. I am mostly paid for labour on the farms after I work but the income is often very little. So to be able to ensure food is available for me and my family, I have to take up mining as well. This has helped me in getting extra income." (Kojo Kumi*, farmer)

Agriculture and food production are closely linked to SSM as a livelihood strategy since it provides capital that may be invested in food production (Hilson, 2016). In nations like Ghana and the rest of sub-Saharan Africa (SSA), farmers are turning to SSM to raise funds to reinvest in their businesses. Farmers benefit from off-season mining activities by acquiring fertilizer, farming equipment aimed toward mechanization, irrigation systems, and extension services that improve farming as a

means of income. SSM has facilitated the development of feeder roads and the provision of water for farm irrigation to increase food output (Ombeni, 2015). A common labour force is employed by both agribusiness and SSM. There is a seasonality to both sorts of employment (Karaki, 2018). As a result, while the wet season may be ideal for farming, miners are forced to take a vacation. The time of these miners is used to cultivate crops. When farming is less productive in the dry season, farmers turn to mine.

"When it is the rainy season, I go into mining and stop the farming for a while. This helps me raise money so that I can invest it into my farm. It is very helpful. So while the crops I have planted grow in the rainy season, I earn extra income from mining"

(Kojo Tei, farmer)

Food security may be ensured in both ways by this complementary effort (Hilson, 2016). Having miners help on the field increases food production, allowing farmers to take advantage of broader markets, while farmers who embrace SSM also gain money and capital (Hilson & Garforth, 2013). Much of sub-Saharan Africa has witnessed the benefits of this type of cooperative labour arrangement between small-scale farmers and large-scale farmers (agricultures) (Dondenye & Ndunguru, 2014). So much physical exertion is required in mining, and the miners need the proper nourishment. Miners rely on farmers for their food supply (Hilson & Bockstael, 2012).

I am a miner and my brother is a farmer. Sometimes I and a few of my miner friends help on his farm. This helps my brother in increasing his production. Because, although he has workers when my friends and I join there is an increase in labour

and production. During the wet seasons, my brother also joins us at the mining field. He joins mainly to gain capital for his farm. (Kwame Attah, Miner)

From this chapter, it can be deduced that during the off-season, farmers and non-farmers alike are drawn to farming because of the enabling environment. As a result, the primary means of subsistence are small-scale mining and farming. These contribute to increased food production, additional income, capital accumulation, and reinvestment, as well as a better quality of life. Food and poverty alleviation are also benefited by these forms of employment.

4.12 Chapter conclusions/discussions

A detailed description of the Kenyasi people's primary livelihood techniques was provided in this chapter, which served the study's first objective of introducing readers to the Kenyasi people. Mphande (2016) asserted that livelihood refers to the various activities that individuals and households engage in to attain the basics of life, such as food, shelter, water, and clothing, based on the findings of the literature review. Planting crops is still an important source of revenue for most people, even though it has a lower income-generating capability when compared to other sources of income, such as mining. To produce on a greater scale to raise revenue, however, proper agricultural inputs and mechanization are required, and the lack of these poses a threat to farm production, according to Diao et al. (2017a). For a community's economic development to be successful, both natives and migrants must participate. This is because the indigenous provide land and the migrants provide labour, respectively.

In this chapter, the researcher explains that the residents became involved in farming for a variety of reasons, including food production for consumption, food production for trade, income creation, inheritance, and social prestige, among others. In line with

research conducted by Darfour and Rosentrater (2016), which states that agriculture's importance to Ghana's economy cannot be emphasized, as it continues to be the countries principal source of employment in rural areas, this statement is accurate. The fact that, despite the numerous reasons why the people ultimately end up becoming farmers, those causes have established a viable source of income for the residents.

CHAPTER FIVE

THE RELATIVE CONTRIBUTION OF SMALL-SCALE MINING AND FARMING TO FOOD SECURITY

5.1 Introduction

Ghana faces serious threats to food security as the average yield of crop production has been gradually declining over the past years (Darfour & Rosentrater, 2016) while global food prices have also been soaring. In almost two decades the importation of commercial food and food aid has reached only about 4.7% of food needs which indicates the huge gap in the nation's quest to achieve food security. This chapter assesses the relative contribution of small-scale mining and farming to the food security status of households.

5.2 The contribution of farming to food security

Farming is essential in attaining food security. Farming produces food for the sustenance of life and the food produced on farms is expected to provide for the nutrition requirements as well as be available all year round. From the perspective of the farmers in this study, farming activities in Kenyasi were very crucial in ensuring food security as the community is fed through farming. Concerning this, Kojo Ackah, a farmer said

"In my opinion farming is very crucial and more beneficial for the community because it provides the food which is used to feed the community. We all know that human beings cannot survive without food but we can survive without minerals. So, farming plays a much

more crucial role than the other livelihood strategies" (Kojo Ackah, farmer)

5.2.1 Farm incomes

The soil or land of the AND district is fertile and noted to be very suitable for the production of a variety of crops (ANDA, 2016). In this study, participants were quizzed on the number of bags (100 kg) of the main crop they planted produced. The results showed that averagely maize productivity by participants was 17 bags, cassava 9 bags, rice 12 bags, cocoyam 11 bags and yam 8 bags. The majority of the farmers in this study were noted to be small-scale farmers and this accounted for the relatively average crop output.

The income level of rural inhabitants is very crucial and may have consequences on food security (Osei-Asare, 2013). In the district, crop farming constitutes the major source of income and accounts for about 51.1% of all household incomes (ANDA, 2013). The results of this study revealed that the majority make less than 1000 cedis annually from crop production. This makes for a monthly average of fewer than 100 cedis. Compared to the average income per month (200 cedis) for a household, the income from crop farming seems inadequate.

Table 9 Income from crop farming

Farm sizes	Average monthly income	Frequency	Percentage
1 to 2 acres	Less than 500	12	19
3 to 5 acres	500-1000	6	9
5 to 10 acres	1000-2000	12	19

11 + acres	2000 and above	34	53
	Total	**64**	**100**

Source: Field data, 2020

The contribution of mining to food security

The potential impacts of the mining industry on local food security are difficult to predict. From one perspective, mining may generate more employment opportunities, provide farmers access to the market and increase fiscal transfers to resource-producing regions (Crawford & Botchwey, 2016. To find out how mining had contributed to food security, participants engaged in mining were asked to tell whether mining had helped in the achievement of food sufficiency. From the study, it was observed that 81% of the miners earned enough money to get food for their households, and only 19% indicated mining had not given them enough money to provide food for their households.

For mining, it was found that its impacts on food security in Kenyasi were double-sided. Some of the participants indicated that it did more harm than good whereas others thought otherwise. Papa Kyene who has engaged both small-scale miners and a farmer provided insight into how mining affected food security. He said

"Farming is my main job but during the off-season, I engage in mining. The income from mining is really good and I make use of the money I get from the mining activity to provide inputs to my farm to increase production which invariably contributes significantly to food security.

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On the other hand, Nana Boat, a farmer also buttressed the negative effects of mining on food security as he said

"Since mining gives quick money, it has led to a situation where farmers in the community are gradually changing their jobs to engage fully in mining. The labour force for farming is therefore reducing and as such is also affecting the production levels and this is having a huge effect on food security".

5.2.2 Incomes from mining

The income level of rural inhabitants is very crucial and may have consequences on food security (Osei-Asare, 2013). In the district, mining constitutes a vital source of income and accounts for a significant portion of most household incomes (ANDA, 2013). The results of this study revealed that the majority of them were making more than 4000 cedis annually from mining. Mining remains a lucrative venture in Kenyase. This suggests the need to streamline efforts to formalize or stop illegal mining. The nation loses huge amounts of unpaid tax on royalties due to the menace of illegal mining.

Table 10 Income from mining

Average income (annually)	Percentage
Less than 1000	2.3
1000-3000	5.6
3000-4000	36.5
4000 and above	55.6
Total	100

Source: Field data, 2020

5.3 The food security status of households

From the survey, 59% of the participants indicate that they are worried about their household not having enough food to eat. The food shortage problem in Kenyasi affected the food preferences of the inhabitants as 62% asserted that they could not eat the food they preferred. This suggests that the high price of foodstuff in Kenyasi had led to a situation where most households had no option other than to eat what was available as they did not have the luxury to eat their preferred food (Ecker, 2018). About 59% of the participants also pointed out that their household members had accustomed themselves to eating foods that they did not want, and this was a result of a lack of resources to obtain other types of food. It was also observed that meeting the daily required nutrition was a problem for most households in Kenyasi as 61.9% of the participants responded positively to the statement that their household members had to eat smaller meals than required because there was not enough food. It was also revealed that 18% had experienced situations where there was no food of any kind to eat in their households because of a lack of resources to get food.

Table 11 Livelihood activity and household food security status

	Food Secure	**Transitionary food security**	**Food insecure**
Farming	43%	22%	35%
Mining	40%	27%	33%
Farming & Mining	60%	31%	9%
Others	33%	21%	46%

Field Data 2020

Transitory food insecurity affects households that can meet their minimum food needs at normal times but are unable to do so after a shock (WFP 2004). Farming for instance is affected by seasonality and shocks such as drought, falling prices and trends in land tenure (Ellis, 2000; Danquah et al., 2017). Ellis (2000) provides that these are the forms of vulnerability that affect the food security capabilities of farming. In this study, farming was seen to contribute to food security, much more than it was contributing to food insecurity. Nevertheless, few of the farmers indicated outside the main seasons, they were largely affected by the shocks mentioned earlier. This is deduced from the point that it is seen that 22% of the participants are in transitionary food security.

As Table 11 depicts, mining was seen to facilitate food security (40%), while food insecurity (33%) and transitionary food security (27%). Combining both farming and mining livelihoods, the trend was the same; few households (31%) got into transitionary food security zone, with fewer indicating food insecurity (9%). Both livelihoods combined to contribute massively to food security (60%).

5.4 The synergies and trade-offs between small-scale mining and farming

5.4.1 Synergies between mining and farming in achieving food security

Most rural households earn income solely from the livelihoods they are engaged in. Ordinarily, most of these rural inhabitants tend to be farmers who earn income from their activities of food crop production. It must however be noted food crops are highly perishable and tend to lose value as a result. Therefore, farming incomes may not be enough to ensure food security. In the face of this income, diversification has become popular. Mining in rural areas serves as a lifeline to farmers as it provides

them with alternative employment which helps them earn an income, hence making food security possible despite perishability and season (Karaki, 2018). Both SSM and farming, therefore work hand in hand to help in the achievement of food security.

The study sought to examine the synergies and trade-offs between mining and farming in contributing to livelihoods and food security. This sub-section, therefore, delves into the downsides of the choice of one livelihood over the other as well as how the performance of both livelihood forms (farming and mining) affects food security. The two livelihood activities complement each other in the following ways discussed below:

5.4.1.1 Capital for investments

Small-scale mining in rural areas provides an alternative source of income to farmers engaged in mining as an alternative livelihood (Juma, 2015). Mining, therefore, serves as a lifeline to rural farmers by providing them with money for investment in their farms thereby promoting food security. Hilson (2016) buttresses this as he asserts that in Ghana and other countries in the SSA, farmers undertake SSM to obtain capital to reinvest into their farming. Within the context of Kenyasi, the study identified that 33% of the miners did not agree that their income from mining influenced farming. 67% of them however indicated that their income influenced their farming activities. As indicated by Papa Kyen, a farmer who is also a miner,

"I inject a larger share of the money I earn from the mining job into my farming job. The mining job pays but it's very risky. Aside from the risky nature of the mining job, it also requires a lot of physical strength. This means you can only do it for a shorter period, unlike farming you can do it for a long. I, therefore, invest the money from

mining into my farms so that shortly, I can fully concentrate on my farming business".-[Papa Kyen]

Concerning the specific use of mining income in farming, it was realised that 42% of the participants made use of their mining income to acquire farming input, 20% of them used their income for the settlement of land for farming, 19% of them also used their mining income to finance agricultural supports services and help in the construction of farming infrastructure such as storage units. From this, it is evident that mining income was having a significant impact on farming and food security in Kenyasi.

Table 12 Utilization of mining income in farming

Utilization of mining income in farming	Frequency	Percentage
Acquisition or payment of land for farming	25	20.0
Acquisition of farming input	53	42.0
Financing agricultural support services	24	19.0
Construction of farming infrastructure	24	19.0
Total	**126**	**100**

Source: Field data, 2020

However, some of the miners engaged in farming as an alternative livelihood, and some indicated that they did not invest their mining income into mining. For these people, it was realised that 23% of the miners indicated that the income was not enough. 50% of them also cited the fact that it was only meant for re-investment into mining. 27% also indicated it was only meant for ensuring their food security.

5.4.1.2 Employment

Ghana has a long history of farming, but many stakeholders are of the view that the highly seasonal nature of farming coupled with the perishable nature of crops has caused a lot of local farmers to diversify into non-farm activities. (Kapstein & Kim, 2011). Most farmers in mining communities, therefore, look no further than mining as an alternative livelihood (Mzembe, 2012). The study identified that 59% of the farmers also engaged in mining as an alternative livelihood. Some of these were however engaged in other non-farming ventures. Kwame Atta who is both a farmer and a miner said

"I am engaged in both mining and farming. Concerning farming, I own a large cocoa farm (about 6 acres). I also have other small farms in which I grow a variety of crops including maize, yam, cassava and tomatoes. Farming is my main job but when the off-season approaches, I concentrate on mining to avoid being unemployed during the off-season-

[Kwame Atta]

Just like farming, small-scale mining as a livelihood in rural areas is also affected by seasonality which compels some of the small-scale miners to diversify into another livelihood (Assan & Mohammed, 2018). In diversifying, into other forms of livelihood, farming becomes the most favourable option (Manning & Theodoro, 2018). A similar case can be cited in Kenyasi as some of the inhabitants engaged in mining also engage in farming as an alternative livelihood. The study identified that 42% of the miners also engaged in farming as an alternative livelihood and 58% were either engaged in other non-farm activities or did not have other livelihoods.

5.4.1.3 The family division of labour

The family division of labour is essential in ensuring food security. In families where there are several income earners, the burden of ensuring food security can be shared. Farming and mining also make use of family labour. In this study, results showed that the majority 31(48.4%) typically used family labour including children and other relatives on their farms.

5.4.2 Contradictions and challenges integrating farming and mining

5.4.2.1 Challenges posed by mining to farmers

The operations of mining activities by small-scale miners, illegal miners and large-scale poses a significant threat to farmers and crop farming. The challenges posed include land degradation, labour shortages and difficulty in access to land.

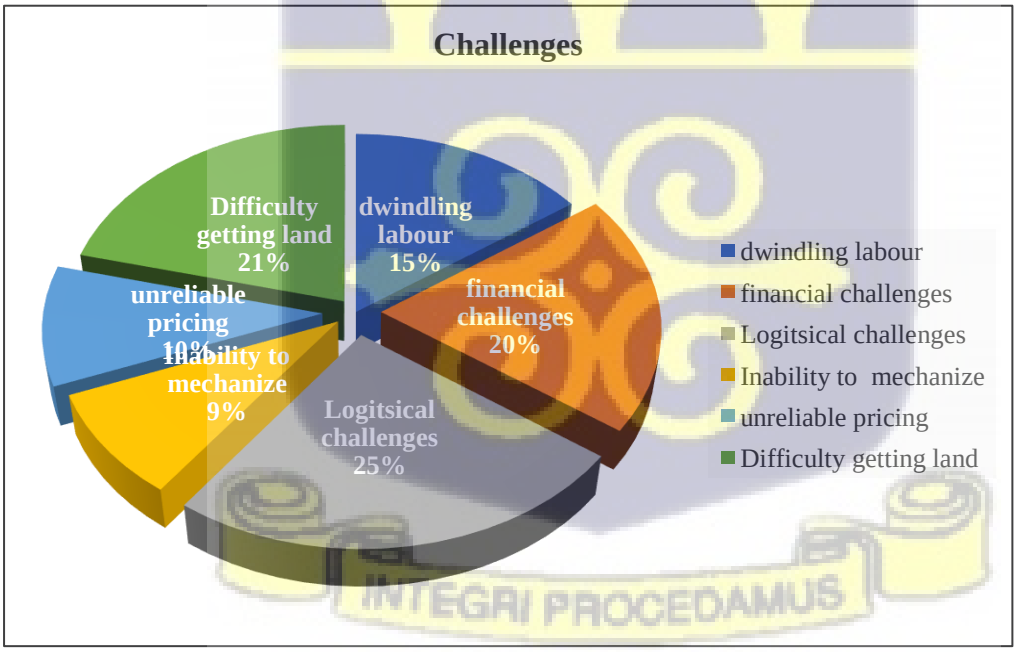

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Figure 12: Challenges posed by mining to farmers

5.4.2.2 Land degradation

Mining involves the digging of the soil to great depths to expose mineral rocks that are then processed and refined to extract the mineral. The consequence of digging to great depths implies mining causes a dent in the land. In Kenyase, mining activities have affected natural resources. Acres of land, plants, forests and water bodies have all been compromised. According to ANDA, (2013) rainwater in the town is no longer usable due to chemical gases released into the atmosphere by the mining companies. Kwabena Akandoh, a participant in this study, who was engaged in mining also provided insight into how mining negatively affected the lands. He said

"The mining activity in Kenyasi has led to the destruction of a lot of fertile lands. This is because the mining activity involves the use of chemicals which are very harmful and has the potential to destroy the soil. As a result of this most of the fertile lands in the community have been rendered infertile" (Kwabena Akandoh, farmer)

5.4.2.3 Labour shortages

Mining activities also have effects on the availability of labour for farming since miners in rural communities engage in farming activities as an alternative livelihood. There is therefore intense competition for labour between farming and mining in such communities (Adi, 2013). Such is the case in Kenyasi as both farming and mining compete for labour. To look into the availability of mining labour in the face of farming in Kenyasi participants were therefore asked to indicate whether or not mining labour was available in the face of farming. From the responses, it was observed that 39% of the participants responded negatively to the availability of mining labour in the face of farming in Kenyasi and 61 % of the participants however responded positively to the notion.

5.4.2.4 Increased prices of basic commodities

Opoku-Ware (2014) reported that there has been a tremendous increase in the prices of goods and services in Kenyasi due to mining over the past years. This was confirmed in this study as almost all of the participants complained about the increased prices of goods and services especially food kinds of stuff. One participant lamented

"It is now very expensive to live in Kenyasi, this started when Newmont started operations in the town. Rich people came into the town and the prices of things have been going up since" (Papa Kyen, farmer)

Opoku-Ware (2014) asserts that this situation compounds the poverty situation in the community due to the inflation of prices at a rate at which both locals and Newmont workers are expected to purchase.

5.4.2.5 Difficult access to land

Land degradation leads to the damaging of arable farmlands. Farming is inseparable from land as it is impossible to carry out farming without land. Securing access to land is therefore an important element of engaging in agriculture. From another perspective, mineral production may contribute to the marginalization of poor smallholders by encouraging land grabs (Iddriss, 2017). The arable lands used by farmers may be encroached on and depleted based on the activities of miners. Papa Kyen, a farmer lamented

"I used to have a farm that lay close to a river body, I left it fallow after it lost its fertility. I prepared to return to it in a certain year and realised miners had deposited chemicals and dug up portions of the land. I just stopped farming there"

5.5 Challenges posed by farmers to miners

In many developing economies, the contribution of the mining sector to the national economy and social development does not meet the expectations of the people due to several challenges facing the mining industry. Neingo and Tholana (2016) report that this is partly attributed to the fact the mining industry is still recalibrating to a set of strong headwinds after the commodity boom peaked in 2011. Kessey and Arko (2013) also note that the mining industry in Ghana suffers from several setbacks ranging from volatile market conditions to resource scarcity and environmental mandates. This section, therefore, looks at some of the major dilemmas that have grappled with mining activities in Kenyasi. From the survey, a majority, 25% cited logistical challenges as the main challenge to mining in Kenyasi. This was followed by difficulty in getting land which was cited by 21% of the participants. 20% of the participants also made mentioned financial challenges. 15% also indicated that dwindling labour was an issue and 9% indicated their inability to mechanize as a challenge.

5.5.1 Competition for land

Land degradation has become synonymous with mining and the majority of miners struggle to acquire new lands for mining minerals. Securing access to land to engage in mining has come the right of solely the rich with many land owners' reluctance to lease out land due to the damage caused by mining.

To look into the competition of land between mining and farming, participants were asked to indicate whether lands were available for both mining and farming. From the responses, it was observed that 69% of the participants responded negatively to the availability of land for mining Kenyasi. In terms of the specific reasons, 25%

indicated that mining destroys land and owner are reluctant to release lands for mining, 17% also indicated that farming had increased the cost of mining land and 68% noted that there were simply no more lands available in suitable sites for mining.

5.5.2 Competition for labour

Farming activities in mining communities also have effects on the availability of labour for mining since miners in rural communities also engage in farming activities as an alternative livelihood. There is therefore intense competition for labour between farming and mining in such communities (Adi, 2013). Such is the case in Kenyasi as both farming and mining compete for labour. To look into the competition for mining labour in the face of farming in Kenyasi, participants were asked to indicate whether or not mining labour was available in the face of farming. From the responses, it was observed that 39% of the participants responded negatively to the availability of mining labour in the face of farming in Kenyasi and 61 % of the participants however responded positively to the notion. In terms of the specific effects of farming on mining activities, 35% indicated that farming had led to the preservation of farmlands in the face of mining. 17% also indicated that farming had increased the cost of mining land. 31% also cited that farming had led to the unavailability of labour for mining and 17% also indicated that farming in Kenyasi had led to the demonization of mining.

5.5.3 Competition for capital

Hilson (2016) asserts that in many developing nations including Ghana, farmers in mining communities engage in small-scale mining to obtain capital to reinvest into their farming. To look into the competition for capital in Kenyasi, participants were therefore asked to indicate whether or not getting capital to engage in was available

in the face of farming. From the responses, it was observed that 44% of the participants responded negatively to the availability of capital for mining in the face of farming in Kenyasi and 56% of the participants however responded positively to the notion.

5.6 Chapter conclusions/discussion

According to the findings of the study, food scarcity was widespread in Kenyasi, and the food security status of the majority of households was inadequate, with instances in which food was either low in nutritional value or townspeople were forced to make do with what they had or risk starvation. The authors of a study conducted by Abdul-Kabiru and Maharjan (2017) discovered that because of the economic meltdown and food insecurity, livelihood diversification has become a normal characteristic in the rural economy to reverse these challenges. They concluded that this is the case. The town's food security was aided by mining, farming, and other non-farm businesses, among other things. The study also analyzed the importance of farming in Kenyasi, concluding that it is critical to achieving food security because it provides food for the entire community. On the topic of mining's role in the community, it was discovered that the impacts of mining on food security were split, with one position emphasizing the creation of employment opportunities, while the other suggested that mining supplied nothing to feed their families. Many challenges confront rural communities that are heavily reliant on agriculture, including a lack of rain, disposing of large quantities of food due to its high perishability and the lack of storage space. As a result, the study found that combining farming and mining creates an even more effective method of ensuring food security than either one alone. It is suggested in the study that various elements may work as complements to mining and farming in Kenyasi. Kenyasi mining and farming activities play an important role in providing

funds for daily activities because funds from farming or mining or both can serve as capital for investments. Furthermore, to reduce the rate of unemployment in Kenyasi, most farmers in mining communities have diversified into non-farming activities, thus creating a loophole for employment opportunities. The fact that it enhances the potential earnings of individuals and their families by offering a varied source of income reduces the rate or potential of food insecurity because either livelihood might be used as a substitute for the other is another point to consider. Food security becomes increasingly difficult to maintain as the number of families grows. A division of labour among family members and inside the family would therefore be a critical component of achieving food security.

During and between growing seasons, rainfall plays an important role in determining food production and availability throughout the year in Ghana, contributing to the country's food insecurity crisis (Lam et al., 2017). As a result, food insecurity is created at the home level, resulting in poverty and chronic distress in the surrounding community. According to the Ministry of Food and Agriculture (MOFA), although Ghana is largely food secure, there are pockets of food insecurity in all regions due to extremely limited resources and inadequate alternative livelihood opportunities for the majority of people to meet their nutritional requirements.

The findings of the study identified four significant issues that arise as a result of the actions of mining and farming as means of subsistence. Several of the challenges posed to farmers by miners include land degradation, which exposes the mineral rocks that have not been processed or refined, as a result, mining causes a hole in the ground and depletes natural resources, the study found that the situation of labour shortages is a challenge because there is intense competition for labour in both the farming sector and the mineral mining sector, and the study found that increased

prices of basic commodities are also a challenge. The mining industry and miners face several obstacles despite the numerous benefits it provides to individuals, families, and the economy. According to the findings of the study, mining activities in Kenya face several difficulties, including competition for land. This is because the right to access land to mine has now been restricted to the wealthy and influential, and other landowners are unwilling to give up their lands because of the damage mining causes to the environment, the increased cost of mining, and the general lack of suitable lands for mining sites. Another issue that miners must deal with is the scarcity of available labour. Because of the dangers involved with mining in Kenyasi, participants thought that mining proved to be more dangerous than farming, which was the alternative source of income. Participants believed that mining destroyed land, whereas farming preserved land while also experiencing a continuous increase in the number of people employed in that sector. Studies such as Hilson (2016), which illustrate the involvement of capital funding in mining activities, were also in agreement with this viewpoint. According to the findings of the study, it is difficult to obtain capital investment for mining in Kenyasi.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The main aim of this study is to find out how agriculture and mining contribute relatively to food security in Kenyasi. This chapter provides a summary, conclusions and recommendations for the study.

6.2 Summary of findings

6.2.1 Farming livelihoods in Kenyasi

According to the findings of the study, the majority of the residents were involved in farming and mining. Kenya's population were primarily engaged in farming as their primary source of income. This is not surprising given the fact that the existing literature on the livelihood system of most rural areas in Africa indicates that rural households are known for mostly engaged in agricultural pursuits (Osabohien, et al., 2020). The researchers also discovered that the vast majority of the population earned wages that were far lower than the national average (usually less than 1,000 cedis). This might be ascribed to the fact that the majority of the farmers were only involved in subsistence farming and only sold their produce when they had a surplus at their disposal. For this reason, much of the farming is focused on producing food for domestic consumption, with any surplus being sold to generate revenue. The few who had greater earnings were largely employed in the mining industry, which accounted for the majority of them. When it came to working duration, it was discovered that the majority of farmers had been involved in their occupation for significantly longer periods than the majority of miners. It was also discovered through the interviews

that the mining job was considered to be temporary, and that the majority of those who worked in it did so to be able to invest their earnings back into their farming businesses to be able to devote their full attention to their farms shortly. According to the interviews, it was also discovered that the majority of the farmers received their farming practices from their parents, which has always resulted in their involvement in the occupation for a longer period.

6.2.2 Mining livelihoods in Kenyasi

As part of their research, Kenyasi researchers looked into the relationship between food security and the two most prevalent livelihoods in the region (farming and small-scale mining). Interestingly, the findings of the study revealed that food scarcity was widespread in Kenyasi families, with the majority of households reporting that they did not have enough food to last them throughout the year. Farming in Kenyasi is characterized by reduced crop yields as a result of the fact that the majority of the farmers are subsistence farmers, putting their food security at risk. The study also indicated that the few farmers who were able to harvest great yields had enormously commercialised their farming company, resulting in frightening levels of usage and stress among the rest of the farmers. As a result, the vast majority of agricultural products were destined for markets outside of urban areas, with only a small portion being used to feed the local population.

When it came to the impact of mining on food security, there were both positive and bad outcomes. However, it was discovered that chemicals from mining had the potential to reduce food yields, which was a negative development. On the plus side, the study discovered that the high levels of cash generated by mining activities

boosted the economic accessibility of households to food, which was a significant finding.

6.2.3 Determinants/motivations of household choice of the two livelihood systems.

The study examined the major reason that lead people in the district into mining and farming activities. It was identified that for farming, the major reasons included; inheritance, food for domestic consumption, income generation, prestige and food production or rearing of animals for commercial purposes. Furthermore, the study finds that the majority of individuals go into mining for income generation and higher prices while a few go into mining because of prestige.

6.2.4 Contribution of small-scale mining and farming to the food security status of households.

The study finds that mainly, farming activities contributes to the food security status of household by producing a variety of food crops enhancing food security. Furthermore, the contribution of mining was difficult to predict. It was found that it provides access to funds for farmers to continually produce more to sustain the people. Another perspective also identifies that creates job opportunities which in turn gives access to more income for individuals to help afford adequate food for their household. Nonetheless, the study found that other residents found mining activities to be detrimental to food security as they perceived that mining had done more harm than good in terms of food production since it has disposed of and damaged much land which could be used for farming.

6.2.5 Synergies and contradictions between mining and farming

They also looked at the synergies and trade-offs that exist between mining and farming in terms of contributing to livelihoods and food security. Following an

investigation, it was discovered that mining operations in Kenyasi had resulted in the devastation of farms in the surrounding area. It has also been observed that, in addition to posing a threat to food security through the destruction of farmlands, mine was also limiting the amount of labour available for farming by recruiting farmers who were attracted to mining because of the high money that comes with it.

According to the findings of the study, the majority of farmers in mineral-rich communities throughout most of Africa have been pushed off their farms and compensated by mining companies. This condition has a beneficial impact on the expansion of the mining industry while hurting the growth of the agricultural sector. Because of the higher economic rewards from mining, young rural dwellers who could have lent a hand on the farm instead choose to concentrate their efforts on mining. As a result, it was shown that mining money helps farmers enhance their food production, as the majority of farmers who were also involved in mining stated that they invested their mining income into agriculture in an attempt to completely focus on mining shortly. Hilson and Van Bockstael (2012) argue that farming is extremely important for the operation of mining operations because it provides miners with food and is extremely important because mining requires so much physical activity. The study also found that farming was extremely important for the operation of mining activities.

6.3 Conclusions

Farming and mining are intertwined in such a way that they generate a synergy that has an impact on food security, income and capital accumulation, as well as labour, according to the findings of this study. Farmers who engage in mining activities during the off-season have the opportunity to provide for themselves and their family

members. In times when the sale of food crops does not yield the amount of revenue that would be wanted, this is a viable option to consider. Likewise, the miner can perform the opposite action. This is the essence of income generation: to provide for one's survival by engaging in economic activity. A common reason for farmers and miners to interlope between occupations is that, on the part of farmers, income from crop production is highly dependent on demand, and because crops are perishable, their value diminishes over time. As a result, farmers enter the mining industry by providing lands to support themselves and the mining industry in return. Mining also serves as a source of funding for investments in agricultural development. This is accomplished by the acquisition of funds, which are then reinvested back into farming.

Another method in which farming and mining intertwine is through the usage of the same human resource pool. The reason for this is that both occupations are affected by the seasons, and as a result, workers gravitate to the side where they can earn more money. This also contributes to the preservation of food security on both sides. Mining increases mineral production while also assisting the labour force in acquiring income and capital, and miners contribute to the increase in food production. The fact that farming contributes to the provision of food for miners is perhaps the most significant component of it, given the amount of physical activity necessary.

In light of the numerous findings in the study, it is possible to conclude that food security is a by-product of both sources of income. Individually, either of these modes of subsistence can contribute to food security. However, when both of these factors are present, optimal food security can be achieved. Each of these means of subsistence has flaws that make it insufficient for extinguishing the embers of food insecurity completely on its own. The limitations of both livelihoods are mitigated by

the fact that they work together. Both livelihoods share a large number of resources and act as a mutually beneficial investment in one another. As a result, it can be asserted that rural residents engage in both activities to maintain maximum food security.

6.4 Recommendations

The study makes the following recommendations, which are supposed to impact policy, practices and research.

Policies such as School Feeding Programme, Planting for food and Jobs as well as the Anti-Galamsey expected to be impacted by the outcome of this study. Since farming and mining remain the most vibrant and economically viable livelihood forms in the community, the state is entreated to initiate policies to mitigate the negative impact of mining and measures to curb illegal mining. Existing policies on agriculture promotion and food security like School Feeding Programme and Planting for food and Jobs should be reviewed to factor the vital role small scale mining plays ensuring agriculture remains a viable livelihood. The Government of Ghana's Anti-galamsey policy should be seen as a sensitive one, given the evidence of the role of small-scale mining as a viable livelihood. Future policies should incorporate various elements of these existing policies and acknowledge the synergies between farming and small-scale mining as functional for achieving food security. With the contribution these livelihoods make to the economic progress and food security status of the community, the state may have to implement strategies to ensure farmers are motivated to continue to produce more to support livelihood while minimizing the adverse impact of minors on farming activities. Again, the state is also expected to team up with private microfinance institutions to support farmers and miners to be able to produce at optimum level without causing hindrance to each other. Lastly, the

state's regulatory bodies in the mining and farming sector should enact and enforce regulations that would see the proper use of land by farmers and small-scale miners.

It is recommended that farmers and miners are trained on the best practices to help protect the environment. Farmers and miners are implored to strive for more adaptive methods of farming and mining. Again, farmers and miners should use their resources to better one another's livelihood, as this ultimately leads to food security.

For purposes of generalization, it is suggested future studies should include more mining and farming areas in the country. This will aid in getting different perspectives from various people. Results from those studies may also find that lived experiences may or may not be the same from inhabitants of this present study. Future studies can also explore are major forms of livelihood aside from farming and mining.

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APPENDICES

APPENDIX 1

RESEARCH QUESTIONNAIRE

Dear Respondent,

Your response and cooperation will be very much appreciated. The information you will provide shall be used **ONLY** for academic purposes and shall also be kept confidentially.

Thank you.

Respondent ID:	REGION	DISTRICT	EA	Date: dd/mm/yyyy
				_ _/_ _/_ _ _ _
Village name:				
Time interview starts:			Time interview ends:	

Enumerator Name:		
Respondent name		

SECTION A: PARTICIPANTS' CHARACTERISTICS

1. Please, provide your information as it is indicated in the tables, fill your age, and tick the corresponding answer for age, marital status, gender and level of education.

1. Age		**2. Marital Status**		**3. Gender**		**4. Level of Education**	
18-20yrs		Single		Male		No formal education	
20-29yrs		Married		Female		Basic	
30-39		Separated				High School	
40-49		Divorced				Tertiary	
50-59		Others				Others (state)	

5	**1.** Household size… **2.** Number of Children:……(Household members <18) **3.** Number of adults:……(Household members 18+)
6	How long have you been living in this community (In years and months? E.g. type 2 years 3 months). ……
7	Are you a native or migrant? …….
8	Which religion do you belong to? **1.** Christian ☐ **2.** Muslim ☐ **3.**Traditional ☐ ☐**4.**Other …….. **5.** No Religion ☐

SECTION B

The nature and level of usage of the two major livelihood strategies (agriculture and small-scale mining) in the community

In the tables below, answer by ticking the box corresponding to your preferred option

9. Nature of d livelihoo		**10. Average monthly income (in cedis)**		**11. How long have you been in this activity (in years)**	
Farming (crop cultivation)		Less than 1000		Less than 1	
Farming (livestock)		1000-1999		1-3	
Farming (fishing)		2000-2999		3-5	
All the above		3000-3999		Over 5	
Mining (employed by mining company)		4000-4999			
Mining (Small-Scale Miner)		5000 and above			

12. Which livelihood strategy are people involved in most?

a. Farming (any form)

b. Small-scale mining

c. Other

13. Which of these groups of people are involved in farming most?

a. Local migrants

b. Natives/indigenes

c. Foreigners

d. Don't know

14. Which of these groups of people are involved in small-scale mining most?

a. Local migrants

b. Natives/indigenes

c. Foreigners

d. Don't know

Analyse the determinants/motivations of household choice of the two livelihood systems

- Questions for farmers

15 Why did you choose farming as your key livelihood strategy?

a. To produce food for domestic consumption……

b. To cultivate crops/rear animals for commercial purposes……

c. To generate income

d. Inheritance

e. Prestige

f. Other (specify)

16 Do you think you have the requisite skills to be successful at farming? Yes…. No……

17 How did you receive these skills? a. Formal skills training b. Family c. Self-taught d. Through experience

18 Has the government and other institutions created the enabling environment for farming to thrive? a. Yes ……. b. No …….

19 **A**. If Yes, what are some of the interventions which influence your choice to stay in farming? **B**. If No, how can the government and other institutions act to influence your decision to continue farming?

20 What is the most troubling challenge you face as a farmer?

a. Dwindling labour

b. Financial challenges (eg. Capital, Lack of credit facilities/loans, aids)

c. Logistical challenges (e.g. Lack of storage facilities, farming equipment)

d. Inability to mechanize

e. Poor market access

f. Unreliable pricing regimes

g. Crop diseases and pests

h. Difficulty getting land to expand farms

i. Others

21 Do you own the land you operate on? a. Yes …… b. No……

22 A. If Yes, state how you came to own it ……

B. If No, explain the land tenure system ……

23 Do you think you produce enough food to feed households in the community? a. Yes

…… b. No……

• Questions for miners

24 Why did you choose mining as your key livelihood strategy?

a. To generate income to secure basic needs like food

b. Inheritance

c. Prestige

d. High prices of minerals

e. Available market

25 Do you think you have the requisite skills to be successful at mining? Yes…. No……

26 Has the government and other institutions created the enabling environment for mining to thrive? a. Yes ……. b. No …….

27 A. If Yes, what are some of the interventions which influence your choice to stay in mining?

B. If No, how can the government and other institutions act to influence your decision to continue mining?

28 What are some of the challenges you face as a miner?

a. Dwindling labour

b. Financial challenges (eg. Capital, Lack of credit facilities/loans, aids)

c. Logistical challenges

d. Inability to mechanize

e. Unreliable pricing regimes

f. Difficulty getting land to mine

g. Other (specify)

29 Do you own the land you operate on? a. Yes …… b. No……

30 A. If Yes, state how you came to own it …….

B. If No, explain the land tenure system

…….

31 Do you think mining earns you enough money to get food for your household?
a. Yes

…… b. No……

Examine the synergies and trade-offs between small-scale mining and farming in contributing to livelihoods and food security

Questions for Farmers (Kindly tick your preferred response in the space provided next to the option)

- Synergies

29 Do you also practise small-scale mining as an alternative livelihood? Yes …. No …….

(*If Yes, proceed to questions 30-36*)

30 During which period do you engage in mining?

a) Concurrently (all year round) ……

b) When farming is less conducive (dry season) …..

c) When farming becomes less rewarding ……

d) When mining is more rewarding …… Anytime I deem fit…….

31 Comparing farming as a livelihood strategy to mining, which one has been more rewarding? a) Farming ……. b) SSM……. C) Not sure ……

32 Does your income from farming influence your mining activities? Yes …. No…..

33 If Yes, how? Settlement of land for mining…… Acquiring mining equipment…… Acquiring mining licence …. Buying food when mining……

34 If No, why? Income not enough……. Only meant for re-investment into farming ……

Meant for securing food…… Other ……..

35 Would you like to stay in mining permanently? Yes….. No…….

36 How do you use your income from mining? Purchase of farm inputs……..

Securing more land for farming…… Securing more land for mining…….

Acquiring mining equipment……. Supplementing household food needs……

- Trade-offs

37 How is crop production affected by mining activities? Negatively…..

Positively…… No effect ……..Not sure…….

38 Do you believe labour is always available for farming compared to mining? Yes….

No…..

39 How has mining activities affected farming and food production?

a) Decreasing farmlands for increasing mining fields……

b) High cost of farmland……

c) Unavailability of labour for farming activities……..

d) Decline in food production ……..

e) Depletion of soil……..

40 If you have mineral-rich farmland, would you consider selling to a mining company/use it for mining instead?

41 Do you believe chemicals used in mining affects crop cultivation negatively? Yes ….

No ……..

Questions for small-scale miners (Kindly tick your preferred response in the space provided next to the option)

- Synergies

42 Do you also practise farming as alternative livelihood? Yes …. No ……. (*If Yes, proceed to questions 43-49*)

43 During which period do you get into farming?

a) Concurrently (all year round) ……

b) When mining is less conducive (wet season) …..

c) When mining becomes less rewarding ……

d) When farming is more rewarding ……

e) Anytime I deem fit…….

44 Comparing mining as a livelihood strategy to farming, which one has been more rewarding?

a) Farming ……

b) SSM…….

c) Not sure ……

45 Does your income from mining influence your farming activities? a) Yes …. b) No…..

46 If Yes, how?

a) Settlement of land for farming……

b) Acquiring farming input……

c) Financing agricultural support services ….

d) Constructing farming infrastructure …… 47 If No, why?

a) Income not enough…….

b) Only meant for re-investment into mining ……

c) Meant for securing food……

d) Other ……..

48 Would you like to switch to farming permanently?

a) Yes…..

b) No…….

49 How do you use your income from farming?

a) Purchase of farm inputs……..

b) Securing more land for farming……

c) Securing more land for mining…….

d) Acquiring mining equipment…….

e) Supplementing household food needs……

- Trade-offs

50 How is mining affected by farming activities?

a) Negatively…..

b) Positively……

c) Not sure…….

51 Do you believe labour is always available for mining in the face of farming?

a) Yes….

b) No…..

52 How has farming activities affected mining and minerals mined?

a) Preservation of farmlands and decreasing mining fields……

b) High cost of land for mining……

c) Unavailability of labour for mining activities……..

d) National interest in agriculture demonizes small-scale mining ……..

53 Would you relinquish your mining field to use as a farmland?

a) Yes ……

b) No…….

Food security

		Food Security Status	**YES**	**NO**
54		In the past four weeks, did you worry that your household would not have enough food?		
55		In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?		
56		In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?		
57		In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?		
58		In the past four weeks, did you or any household member have to eat a smaller meal that you felt you needed because there was not enough food?		

59		In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?		
60		In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?		
61		In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?		
62		In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?		

How much has been spent in the last four weeks to buy food to supplement what was available?

APPENDIX 2

INTERVIEW GUIDE FOR FARMERS AND MINERS

Section A: Socio-demographic details

1. Sex? _____

2. What is your age? _____

3. What is your marital status? _____

4. What is your highest level of education? _____

Section B: Describe the two major livelihood strategies (agriculture and small-scale mining) in the community

5. What is your occupation? Are you a farmer or miner or both

   a) Are you working with a mining company or you are into galamsey?

   b) Are you a licensed miner?

   c) Which crops do you grow? Which animals do you rear?

6. How much do you earn? Give a range

7. As a miner/farmer, are you affected by seasonality?

   a) How do you cope?

Section C: Analyse the determinants/motivations of household choice of the two livelihood systems

8. Why are you into farming or mining, or any activity you are involved in?

9. Is income enough for your family?

10. Are you attracted by the other forms of livelihood apart from your main?

a) Why do you think you are attracted or not?

11. Do you think (engaging in) mining is more beneficial to you?

12. Is farming more important to the community than any other activity?

Section D: Examine the synergies and trade-offs between mining and farming in contributing to livelihoods and food security

13. Do you engage in farming only, mining only or both?

a) If yes, when do you get into mining or agriculture?

14. How is the income made from agriculture or mining used?

b) Do you use mining income in agriculture?

c) Do you use agriculture income in mining?

15. Does engaging in mining affect your household food availability and access?