

Effects of Illegal Gold Mining on Food Availability for Smallholder Farmers. A Case Study of Saa Community in Wassa Amanfi West District, Western Region of Ghana.



A Research Project submitted to Van Hall Larenstein University of Applied Sciences in partial fulfilment of the requirements for the award of Master Degree in Management of Development with specialization: Rural Development and Food Security

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DEDICATION

This work is dedicated to my darling husband David Domfeh and my unborn child, my parents Mr and Mrs Amoah-Frimpong. Your prayers, love and support have been the driving force that pushed me through this course

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LIST OF ABBREVIATIONS AND ACRONYMS

AEA	Agriculture Extension Agent
DADU	District Agriculture Development Unit
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
IFPRI	International Food Policy Research Institute
MDG	Millennium Development Goal
MOFA	Ministry of Food and Agriculture
OECD	Organisation for Economic Co-operation and Development
PNDC	Provisional National Defence Council
SSM	Small-scale mining
UNESCO	United Nations Agency for International Development
USAID	United States Agency for International Development.
WAW	Wassa Amenfi West
WFP	World Food Programme

ABSTRACT

The presence of gold deposits discovered in the Saa community of Wassa Amenfi West District has attracted a lot of Small-scale miners and illegal miners to the area for mining and their activities have both negative and positive effects on the lives of small holder farmers. Notwithstanding the positive effects of creation of employment, it has negative effects like causing of serious environmental destruction, land degradation and contamination of water bodies and uncovered pits breeding mosquitoes.

It is against this backdrop that the research sought to gain insight into the activities of the illegal gold mining on household food availability in Saa community in the Wassa Amenfi West District as the case. Specifically the study sought to identify the mode of operation of the illegal gold miners: investigate food habit the household, investigate the trend of domestic food production in the area before the mining activities and currently: find out the trend of food crops in the local market: sources of food donations and gifts to households in the study area.

The study employed qualitative approach and a case study was used. 35 respondents were selected for the data collection. Semi structured interviews with the use of checklist was used to interviewed fifteen (15) households heads who leased out their lands for mining, ten(10) illegal miners, 5 food crops local market women and five (5)key informants (District Director of Food and Agriculture Wassa Amenfi West, District Director of Minerals commission and the Assembly man, chief and two elders of Saa community).PRA tool (transect walk) was used with a check list to identify and explain the cause and effect relations among topography, soil and the natural vegetation in the area. Personal observation was an additional to for data collection. Using thematic analysis as a tool key themes in line with the objective and research questions of this study were extracted from the empirical data for analysis.

Generally, findings of the study showed that illegal gold mining activities in Saa community have affected household food availability. Farming is the main occupation of the people in the area and the households leased out farmlands for the miners.

Illegal gold miners contact land owners and pay amount of money to them for the land to be released for their mining activities. The study revealed three methods used are been used by the miners for gold extraction. The miners use equipment like pick axe, shovel, “Chanfa” man power machine and excavators to dig the soli for gold. And use mercury in the extraction

It was revealed in the study that households leased their lands out for the mining activities and this has reduced their land size for domestic food crop production. The average yields of the households before the mining and currently has reduced. Rice, one of the staple food is no longer cultivated by many households. The mining activities have had some effects on their food production which are: Farm land has been degraded, the land size for food production has reduced, Water bodies polluted, competition between farmlands and labour for mining and uncovered pits breed mosquitoes.

It was also revealed that prices of food crop in the local market has gone high e.g. 3 “fingers” of plantain which was selling at GH¢1.00 is now GH¢ 2.00, as compared to when the miners were not around, this is due to less production of such crops since farmers are no more producing it in large quantities because their farm land size have due to the mining activities. Food crops traders have to travel long distances (other districts) to transport food at high price to the community.

Based on the study the mining has affected food availability in the community and they no longer receives food as donations and gift from friends, neighbour, relative and children because of the mining activities.

It is recommended that MoFA in collaboration with the Ministry of Mines and Energy to refilled the uncovered pits in the areas as they have started in the Tarkwa municipalities for farmers to reuse it again for food production to promote food security.

DADU MoFA through the District Minerals Commission should come together to intensify the education about the social and environmental consequences of illegal small-scale mining, that might affect food production leading to food unavailability

The Wassa Amenfi West District taskforce should intensify the operation of arresting the illegal miners in the district so that illegal gold mining will be minimal.

CHAPTER ONE: INTRODUCTION

This chapter presents the brief background of the study and it highlights on the research problem statement, the objectives and the research questions, it also focuses on the structure of the report.

1.1 Background.

Mining is a major lucrative activity in many developing countries. Ghana is endowed with abundant mineral resources such as gold, diamond, bauxite and manganese and Africa's second most important producer of gold (Wikipedia). Mining activities in gold-rich regions can be traced back to the days of colonialism when Ghana was called the Gold Coast. Mining industry was made lucrative because of the competitive price of gold on the international market in developing countries and this triggered a boom.

Small- scale mining is a largely poverty driven activity (Edwin and Gabriel, 2012). National statistics indicate that the gold mining industry is a major employer in Ghana it is estimated that it employs over 520000 Ghanaians with about 4 percent working in the large scale subsector and 96percent in the small scale mining subsector (Ghana National Commission for UNESCO, 2013).

According to Kessp (2013) small-scale gold mining has created employment for the unskilled labour force in rural areas of Ghana and also contributed to the production of gold. Notwithstanding these positive effects, small-scale gold mining activities of Ghana are answerable for a significant volume of mercury pollution and land degradation (Hilson, 2001).

In Ghana Small-scale mining was once a cherished traditional vocation. When the government legalized the practice in the late 1980s, the Provisional National Defence Council (PNDC) Law 218 was passed to legalize the small scale mining in a bid to control illegal mining. However it appears to be yielding no results as illegal mining activities were at a record high in according to the Ghana Chambers of Mines report (2008). It took to the fore some challenges including the procedures by which the government approved mining concessions to those who want to mine in small scale. The process for attaining license was demanding and slow and therefore forced many people to mine illegally. Despite the contribution of small-scale mining sector to the economy there are negative effects.

Illegal gold mining, popularly known as '*galamsey*' which means gather and sell, has become a major source of occupation for persons living around mining communities due to high standard of living and unemployment. The presence of gold deposits discovered in the Wassa Amanfi West District has attracted a lot of small-scale gold miners and illegal miners both locals and foreigners into the area for mining. PNDCL 218 (1989) reserved small-scale mining activities for nationals of Ghana who have attained licence from Minerals Commission but that has been ignored by the miners. Lately some of the illegal small scale miners arrested in Ghana were from China, Nigeria, Burkina Faso Niger (Kessp, 2012). Most of the foreigners including the Chinese come into the country as tourist and end up to mine gold without approval from the government (<http://graphic.com.gh/General-News/mad-rush-for-our-gold.html>). According to Benjamin *et al.* (2003) the illegal miners operate without obtaining license or follow the formal procedures, they have no concessions of their own and operate uncontrollably within concessions of large scale mining companies or in areas prohibited for mining such as forest reserves and farmlands. According to the Ghana Minerals and Mining Act 2006, foreigners are prohibited from small-scale gold mining on plots under 25 acres (Investor's guide, 2013).

Most of the illegal miners are disorganized and operate in a hit and run manner. They mine by digging pits and tunnels by hand using small equipment. Illegal miners (foreign and local

people) have a rather sneaky way of entering the industry. It takes only seeing the village chief and some of the land owners of the mining area and paying money for the lease of land to get mining concessions which otherwise are prohibited by law.

According to Hilson (2001) the recent increase in gold mining in Ghana had positive impacts on employment and improve living standards of people living in the mining communities. Notwithstanding the positive effects, it has negative effects too. Some of the negative effects of mining are it has caused serious environmental destruction, quantities of vegetation cover are removed, invented and burned transforming the natural environment into raw, bare, lifeless spoil bark. Contaminants of surface and ground water bodies have particularly been experienced in gold mining communities in Ghana (Tom-Dery *et al.*, 2012).

Traditionally, the Saa community in the Wassa Amenfi District of the Western Region of Ghana is a farming community where the people are mainly engaged in farming and rearing of livestock. Farming is a major source of occupation and centred on cash crop (cocoa and rubber) and food crop (cassava, plantain, yam, maize and rice). They are mostly subsistence farmers and produced food to feed their households. The community abounds in gold belts having two gold belts which are the Wassa Akropong and Asankrangwa-Manso gold belts. The influx of the activities of illegal small-scale miners have led to restructuring of livings in the community as a results of the mining which has become important for obtaining money of which farmers lease their farmlands to the miners to mine gold and is also attracting many people into the area.

The mining activities cause frequent destruction of farm lands without sufficient sum of money being paid to the affected farmers, (Akabza *et al.*, 2005). The illegal mining operations in Ghana are located in areas where agriculture production is the main economic activity and source of income for the greater percentage of the population. Ensuring food security for the rural households is a challenge especially where food production is limited based on the activities of these illegal gold miners. The World Food summit (1996), define food security as existing “when all people at all times have access to sufficient, safe and nutritious food to maintain a healthy and active life” food security is seen in the world as an important principle. However Anane (2003) indicated to the fact that surface mining involves the clearing of large tracts of forest and agriculture land resulting in land degradation. Farm lands are loss due to the mining activities (Schueler *et al.*, 2011). Miththapala (2008) also mentioned that land degradation leads to loss of subsistence and reduced food security.

Agriculture is the mainstay of the regional economy employing about 70% of the economical active population and account for about 60% of GDP (Gross Domestic Product). About 77% of the rural population depends on directly and indirectly on agriculture for their household food. Research done by Fernando and Juan (2012:3) revealed that agriculture productivity has reduced in Ghana between 1988 and 2005 by 40% as a result of mining activities due to environmental pollution and competition for key inputs like land and labour. One of the primary factors to low food productivity is soil degradation caused by mining activities (Ocansey, 2013).

Abandoned pits become breeding grounds for mosquitoes increasing the incidence of malarial which affects the health status of the farmers and their ability to produce food crops and reducing production of farmers. In recent times there have been reported cases of waterlogged pits, soil erosion (Hilson, 2001), pollution of fresh vegetables and food items (Essumang *et al.*, 2007) for communities in mining areas. Numerous research have been carried out on effects of illegal gold mining, some focus on its impact on the youth, land degradation and environment but little has been done on the aspect of its effects on food availability.

It is against this backdrop that the research seeks to gain insight into the activities of the illegal gold mining and how it has affected food availability in households for small holder farmers in the district. The result of the research will be contributing to effective government policy within Ministry of Food and Agriculture (MOFA) in the Wassa Amanfi West District to ensure food security since that is one of their major objectives of the Ministry. It will also help MOFA to plan appropriate strategies as well as those adversely affected by these illegal mining activities. Thirdly, it will also contribute to enforcing laws concerning illegal mining and possibly raises awareness to the concerned people on the possible hazards they will face in the long run.

1.2 Research problem

Illegal gold mining activities have become rampant in Ghana these days of which Wassa Amanfi West district is not an exception. The miners mine independently of mining companies by digging pits and tunnels by hand using manual equipment. They use cyanide which is toxic and have adverse effect on the environment and their activities are also degrading the farmlands, Benjamin *et al.* (2003). Farmers are leasing out their farmlands for mining for short term benefits, men and women who would usually engage in agriculture labour are now joining the miners which might be gradually taking the interest of these small-scale farmers away from food production. This has reduced the quantity of food produced in an area per year and the food available in the market causing food shortage. (MOFA DADU Annual Report 2012).

As one of the main objectives of MOFA **annex 5** at the district level to promote food security, the effects of mining activities on food production within the district and its nearby towns are gradually becoming evident as perceived by the inhabitants, for example high prices of food due to its shortage and there is lack of knowledge about how it is affecting food availability in the area.

It is in light of these that the Ministry of Food and Agriculture (MOFA) in the Wassa Amanfi West District seeks to gain additional knowledge to the illegal mining activities and its effects on household food availability of the people of Saa community.

1.3 Objective

The main objective of the study is to gain insight into the effects of illegal gold mining on household food availability of smallholder famers in Wassa Amanfi-West District and to contribute to the government policy on promoting food security.

Specific objectives.

- a. To identify the mode of operations of the illegal miners.
- b. To investigate the trend of domestic food crop production in the area over time.
- c. To find out which food crops are available in the market and price fluctuations on food crops in the area.
- d. To know the how illegal sources of food donations and gifts to households.
- e. To investigate the food habit in the households

1.4 Main research question.

1. What are the effects of illegal gold mining on food availability in the Wassa Amanfi-west District?

1.5 Research questions.

- What is the mode of operation of the illegal gold miners?
 - a. How do the illegal gold miners acquire land for their operations?
 - b. What process do the illegal gold miners go through to extract the gold?
- What are the trends of domestic food crop production in the area over time?
 - a. What is the trend of land under food crop production?
 - b. What is the average yield of food crops before and after the mining activities?
- Which food crops are available in the market and prices?
 - a. What is the quantity of food crops available at the market at certain period of the year?
 - b. What is the trend of food prices in the market over time and what people can buy?
- What are the sources of food donations and gifts to the households?
- What are the food habits in the household?

1.6 Report structure.

This report is organized into six (6) chapters. Chapter one (1) is the introduction of the study and this comprises the background information of the study in the selected study area, problem definition, research objectives and research questions. Chapter two indicates the literature review focusing on food security, illegal mining, and conceptual framework to the study and small scale gold mining industry in Ghana.

Chapter three (3) discusses the study area, methods used in data collection during the field research and the sources of data. These include sampling techniques, as well as methods of data collection and analysis. The results of the findings are presented in chapter four (4). The results of the findings are discussed in chapter five in relation to the literature review. The chapter 6 of the report constitutes the conclusion and recommendation for MOFA and other stakeholders.

CHAPTER TWO: LITERATURE REVIEW

2.0 INTRODUCTION.

This chapter reviews literature relevant to the study and in line with its objectives. The chapter is organised as follows, definition of concepts and conceptual framework of the study. It also includes description of mining industry in Ghana, the small scale gold mining in Ghana and food security and mining. This will give room to recognise previous knowledge and also guide the researcher into discovering new things in the study and add to the limited knowledge and compare findings in chapter 5.

2.1. Definition of concepts.

Illegal gold mining: is the process of extracting ore or minerals from the ground with the absence of land rights, mining license, exploration or mineral transportation permit or any document that legitimate allows the operation and are subject to regulation by either the Environmental Protection Agency or the Minerals Commission, or both and it can be operated in the surface or underground. Mining without registration and regulation is illegal because they are unregulated and operate outside the law.

The illegal gold miners operations often cause major environmental damage, use mercury for processing which pollute the environment (GHEITI, 2013). They operate on the surface or underground and it normally takes place at a hidden place such as forest, existing farms or river banks. It does not need any educational qualification or experience, it is done by all categories of persons who are physically strong; men, women and children. According to Reisenberger (2010) 30% of the people engaged in illegal mining are women. They use manual and traditional methods like pick-axes, shovels, barrel, head pans and nets and the miners work in a group of three to five (Edwin and Gabriel, 2012). Mercury is added to the concentration and used by the miners to separate the gold (Aryee, 2003).

Small holder farmers: they are those marginal and sub marginal farm households that own or/ and cultivate less than 2.0 hectare of land to produce small commodities for their home consumption (FAO, 2002).

Households: it constitutes a group of people who own the same productive resources, live together and feed from the same pot. Also it can be defined as collection of individual living together and headed by man or woman not necessary sharing the same housing unit. The individuals carryout productive, reproductive and sometimes are involve in communal roles for the benefit of their units. Average household size is 4.1 According to Ghana Statistical Report (2008).Households are being headed by who is identified as the head by members of the households. 72% of the household heads are male and 28% are females (Ghana Government, 2013).

Food security : the World food summit in1996 define food security as a situation “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (WHO, 2013).At the World Summit of food security in 2009, the concepts was extended and specified by adding the “four dimensions” of food security which are availability, access, utilization and stability”.(FAO 2009, 1fn.1).

Food availability: According to FAO (1996) is when there are sufficient quantities of food available on a consistent basis.

Food accessibility: when there is adequate resources for acquiring appropriate food for a nutritious diet.

Food utilization: According to FAO (2008), utilisation is describes how the body make use of the various nutrients through adequate diet and clean water. Sufficient nutrient and energy intake by individuals are the results of good care and feeding practices, food preparations, diversity of the diet and intra-households distribution of food.

Stability: household or individual must have access to adequate food all the times to be food secured.

From these four dimensions discussed above, the study will focus on food availability and the dimensions of domestic production, availability in the local market and donations and gifts of food crops in the households and how it has been affected by the activities of illegal mining. The staple of food crops are cassava, plantain, cocoyam and maize.

2.2 Food availability concept.

According to FAO (1996) food availability is when there are sufficient quantities of food available on a consistent basis. This is through domestic production or imports and it addresses the supply side of food security and is determined by the level of food production, stock levels and net trade and it reflects total annual production. World Food Programme (2012) went on further to explain food availability as the extent to which enough quantity of food is physically present in an area, and this includes food produce on local farms and found in the local markets, and provided as food aid and gifts. Even if people may have money and there is no food available in the market people are at risk of food insecurity. Imports capacity is at the national and regional level but in the district level food available in the local market is considered.

Domestic production is one of the means for achieving adequate availability. According to Yang and Hanson (2009) food security significantly depends on food availability. To increase food availability countries should pay attention on increasing productivity. Food availability is closely interrelated to availability and use of natural, human and economic resources especially scarcity of natural resources (FAO, 2012).

Food availability has the tendency to be reduced by productions failure related to labour constraints, and loss of assets (USAID and WFP, 2007). According to OECD (2013), food availability can be increase by improving agriculture productivity (more efficient use of imports such as labour, land and water).

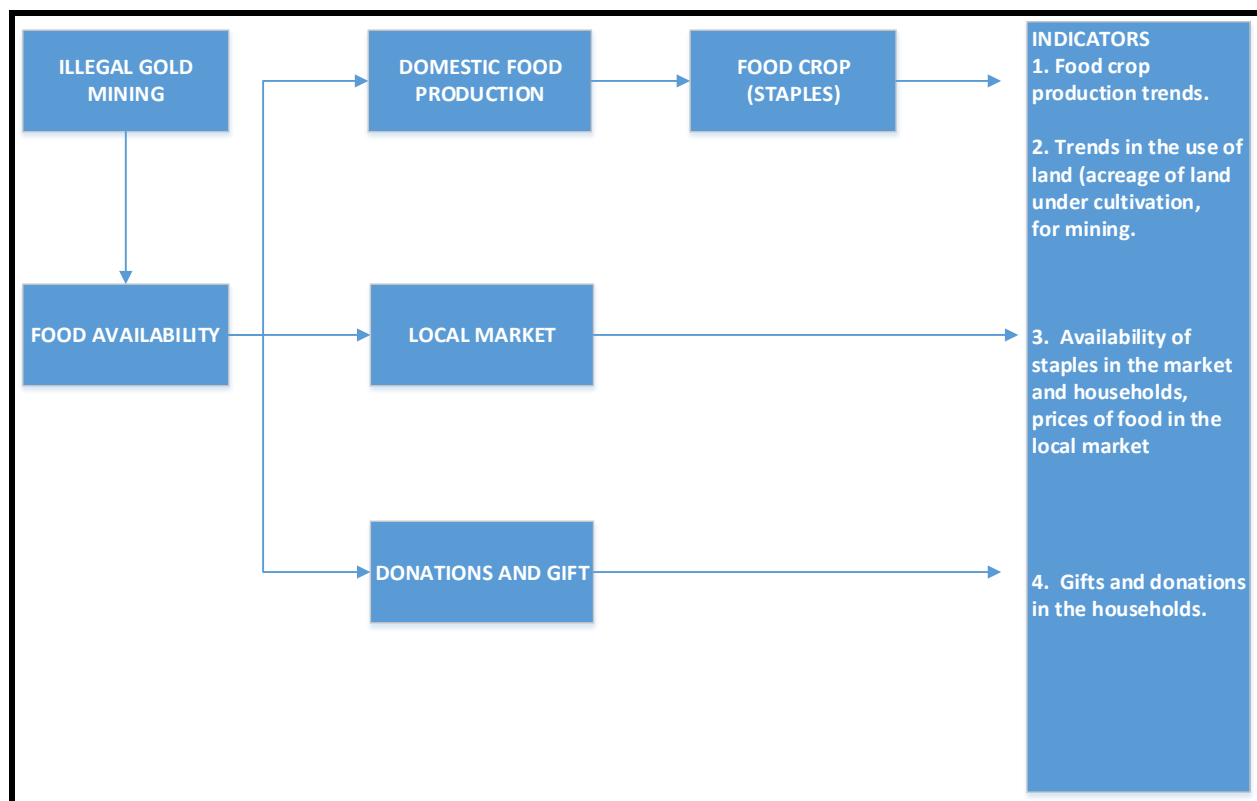
Agriculture productivity will increase if there is no pressure on natural resources, in perspective of rising struggle between agriculture and other use of limited land and water resources connected to mining activities.

The demand for food in sub-Saharan Africa where agriculture yields are lowest and the percentage of population growth remains high, is expected to be twice the current level in 2050(FAO, 2012)

Agricultural productivity, therefore, needs to accelerate substantially over current global rates of productivity growth, to meet that expected demand. Local food production decreases the economic and environmental effect of transporting food (Science Daily, 2013) to the local market. The world has kept up with the challenge of population growth. However global food availability cannot be settled in the long run in view of continuous population growth, increased land scarcity, and difficulties with attaining sustainable increase in yields of crops.

Global foods prices are probable to raise by 30 percent for rice and perhaps double for maize by 2015 according to (UN News, 2013). Trade is important to food availability particularly where there are local or regional shortages of natural resources (FAO/OECD, 2011).

Figure 1: Operationalization of Food Availability.



Concepts

Dimensions

Sub-dimension

indicators

(Source: Authors construct 2013)

2.3 Domestic Food production.

Agriculture in Ghana accounts for about 40% of national economy, three quarters of export incomes and employs 60% of the labour force. Moreover agriculture is the most important sector for poverty reduction and has assisted the country to achieve the first objective of Millennium Development goals (MDG1) by having the country's 1990 poverty rate before the 2015 target year (Nyenteng and Asumang-Brempong 2010).

Majority of rural households in Ghana are involved in agriculture. The six major food crops produced in the Western Region contribute to 7.4% of maize, 7.3% of rice, 8% of cassava, 13% of cocoyam, 4.4% of yam and 22.2% of plantain to the national food production. Food crops that are produced in the area contributes to the local market. (SRID, 2000).

Most of the households cultivates food crops for their home consumption and sell the surplus. In the local market. Plantain, cocoyam, maize and cassava are the most dominant crops produced by most rural households. Domestic food crop production of most of the staples in the district are decreasing as indicated in table 1, probably due to the relatively smaller cultivable area for food production. Food production can be increased by expanding agriculture area or increasing area of productivity. (Global Food Security 2013).

One of the several means that people have to acquire food they need is through food production (FAO, 2008).

Table 1 Food Crop Production in Wassa Amenfi West District. 2011-2012.

Commodity	Cultivated area (Ha)		Yield (MT/Ha)		Production (MT)	
	2011	2012	2011	2012	2011	2012
Maize	1500	1650	1.5	1.5	2250.0	2175.0
Rice	850	500	3.0	3.0	2550.0	1800.0
Cassava	1700	1650	15	15.0	25,500.0	26250.0
Yam	220	165	20	20.0	4.400.0	3700.0
Cocoyam	200	180	10	10.0	2000.0	1800.0
Plantain	1200	1100	11.5	11.5	13800.0	12650

Source: MOFA, Wassa Amenfi West District 2012.

2.4 Food availability in the local market.

Buying and selling forms an essential part of the district economy. The markets in the district are organised in the various communities. The market centres operate effectively on designated days, a wide assortment of goods and services ranging from food stuffs to clothing are sold in the market. Prices of food have increased globally and this high food prices reduced the household ability to purchase food forcing them to decrease the quantity of food (IFPRI, 2013).

Food prices increased in mining communities mainly because strong men who are to go into agriculture are been taking away by the mining industry, and most farmlands are also been taken over by the mining activities (Ocansey, 2013). Availability of food at the households level involves that food is available in the local or community market. According to Braun, et al.(1992) seasonal differences in production and seasonal high food prices usually contributes to food insecurity of poor households Unexpected changes in incomes and prices affect the capacity of households, not at all times in the same way to obtain food that is available. Below table presents the prices of food crop in the local market from 2009-2012. This is before the mining and currently of the mining activities.

Table 2 Average Food prices in Wassa Amenfi West District.

Commodity	2009 (Ghc)	(€)	2010 (Ghc)	(€)	2011 (Ghc)	(€)	2012 (Ghc)	(€)
Maize (100kg)	60	24	80	32	120	48	120	48
Local rice (100kg)	120	48	150	60	180	72	190	76
Yam (250kg)	90	36	125	50	330	132	125	60.8
Cocoyam	85	34	102	40.8	75	30	90	36
Cassava(91kg)	55	22	60	24	110	44	140	56
Plantain (9-11kg)	4	1.6	6	2.4	7	2.8	8	3.2

Source DADU MOFA 2012**2.5 Food Donations and Gifts.**

In improving food security at the national level, buffer stocks and public food grain distribution systems is essential. A well-functioning public distribution system especially one that provides free or subsidized food is also important (IFAD, n.d.). Food can be available through trade, barter and individual and community support and networks. It can also be received as a gift (FAO, 2008).

2.6 Mining industry in Ghana.

The mining industry of Ghana accounts for 5% of the country's GDP and minerals make up 37% of total exports of which gold contributes over 90% of the total minerals exports. Ghana's mining and minerals development industry remains focused on gold. Ghana is the 2nd largest producer of gold producing 80.5tonnes in 2008 (Wikipedia). Gold contributes 90% of the total value of minerals, it has attracted large number of large and small-scale operators (Akabzaa and Darimani, 2001) the main owners of the large mining companies are foreigners. Government and private Ghanaian investors account for less than 15 % percent of the shares in these mines and small scale mining activities is restricted to Ghanaians. Both foreign and local companies are actively involved in exploitation of gold. By October 2000, 224 local and foreign companies held mineral rights for gold explorations (Akabzaa and Darimani, 2001).

There are 9 large mining companies in Ghana operating and these includes AngloGold Ashanti, Newmont Ghana, Goldfields Ghana, Abosso Goldfields etc. Before the structural adjustment era the government of Ghana had at least 55% shares in all large mining operations. The ownership structure of the industry has radically change with private investors now playing a leading role. Foreign companies control an average of about 70% of shares in these mines. The government has 10% free share in each mine, with the option to acquire an additional 20% at the prevailing market ((Akabzaa and Drimani, 2001).

2.7 Small Scale gold mining (SSGM).

There are about 300 registered small-scale mining groups in Ghana and they constitute a major source of employment for small-scale gold miners and generate foreign exchange to Ghana's economy. Moreover there are a lot of such groups that are not registered and mine illegally. Only 20% of small scale miners operate legally in Ghana and 80% of their population operate illegally (Ghana Business News, 2013). There are two types of small scale miners which are

legal and illegal miners (Amankwah and Anim-Sackey, 2003). Legal small scale miners include those who have acquired mining licences from Minerals Commission of Ghana to cover their concession, while the illegal small scale include those mining and/or processing ores without the requisite mining license. According to Akabzaa and Darimani (2001) small scale miners are faced by several challenges. Research shown by Hilson (2001) also discloses that, the gold is been extracted by “crude” technologies which also pose a risk to the miners themselves who are dying due to poor safety standards. A great danger to the environment is also posed. The activities of the miners pollute rivers and streams nearby that serve as a source of drinking water for communities downstream. Business are not registered aside the environmental and work-related risks and therefore do not benefit from any form of training to improve their business practises. The non– registration of their businesses also means government loses the requisite taxes for development. Small scale mining is located in the rural areas and often poverty driven. Miners are generally unskilful and produce little.

Small scale gold mining has both positive and negative effects of the people living around the mining communities. Some of the positive effects are creating of employment, making contribution to foreign exchange earnings (Hilson 2001).

Notwithstanding these positive effects, it has also cause large percentage of environmental degradation in Ghana. It is also responsible for the release of an estimated 5 tonnes toxic mercury emissions each year and cause damage to landscape through intense prospecting and excavation activities. There has been reported cases of waterlogged pits and soil erosion recently, water bodies that serve as a source of drinking water for mining communities are being polluted by the activities of the miners and pollution of fresh vegetable and fruits (Tom-Dery et al., 2012).

2.8 Small-scale gold mining law in Ghana.

According to Ghana legal (2013) small-scale gold mining (SSGM) is governed by the 1989 mining Acts (PNDCL 218). And anybody who mine without abiding by this law mine illegally. The law states that,

- No person shall engage in any small-scale gold mining operation unless a licence is granted by the secretary for Lands and Natural Resources.
- An application for licence may be issue under the directive of the relevant District centre of the designated area.
- A person may qualify for mining licence if the person is a citizen of Ghana and not a foreigner. The person has to attain the age of eighteen (18) years and has registered by the district centre in the designated area.
- The duration of the licences to any person or group of persons shall not exceed three (3) years from the date of issue and may be renewed when it expires. If the licence is granted to co-operative society it will not exceed five years.
- The size of area in respect of which a licence may be granted under this Law shall not exceed
 - a) Three acres in the case of grant to any person or group of persons not exceeding four in number.
 - b) Group of persons not exceeding nine in number will be granted five acres.
 - c) Twenty-five acres in a case of grant to a co-operative society of ten or more persons.

2.9 Food Security and Gold Mining.

Food security in Ghana continues to be threatened by seasonal and unstable domestic food production and high prices (Asumang-Brempong and Nyenteng, 2003).

Research discloses that surface mining implies the major cause for land use change from croplands to mining lands (Ocansey, 2013). Illegal mining is a treat to food security because it affects farmlands. There are various reasons that account for food insecurity especially at the household level where it can easily be felt to the effects of mining activities. These activities includes deforestation leading to soil erosion, destruction of agriculture lands, polluting of water bodies (Akabzaa and Darimani, 2001).

Food security will be lost as many more farm lands are being exposed bare without the steps required. Miththapala (2008) reported that land degradation leads to loss of farmlands and reduced food security.

Land degradation has caused the removal of top soils, vegetation and trees with the use of heavy machines for mining gold deposits. This has rundown the nutrients of the soil and reduced it fertility for agriculture purposes affecting food production leading to food insecurity. Available lands are contaminated by mining activities (Yeboah, 2008). Land loss led to less food being produced, which try to cause higher food prices local. Farmers including subsistence farmers can not sufficiently supply to the market and food has to be imported in larger quantities possible at a price that may be unreasonable for poorer households (Business Day, 2012).

According to Akabza and Darimani (2001) extension areas of land and vegetation in Tarkwa district in Ghana have been cleared to make way for mining activities reducing farmland size of farmers. Large areas of land used for cultivation are polluted through gold mining activities. The cultivation of fruit and vegetables such as local crops on polluted lands poses a threat to people's health and avoids them from selling their produce in the local market (Action aid, 2006) This is affecting poor people's food security and right to food. A study by Mishra and Pujari (2008) showed that productivity of agriculture decreased as a result of mining activities and all also farm labour when people switch from agriculture to mining. These threatening food security.

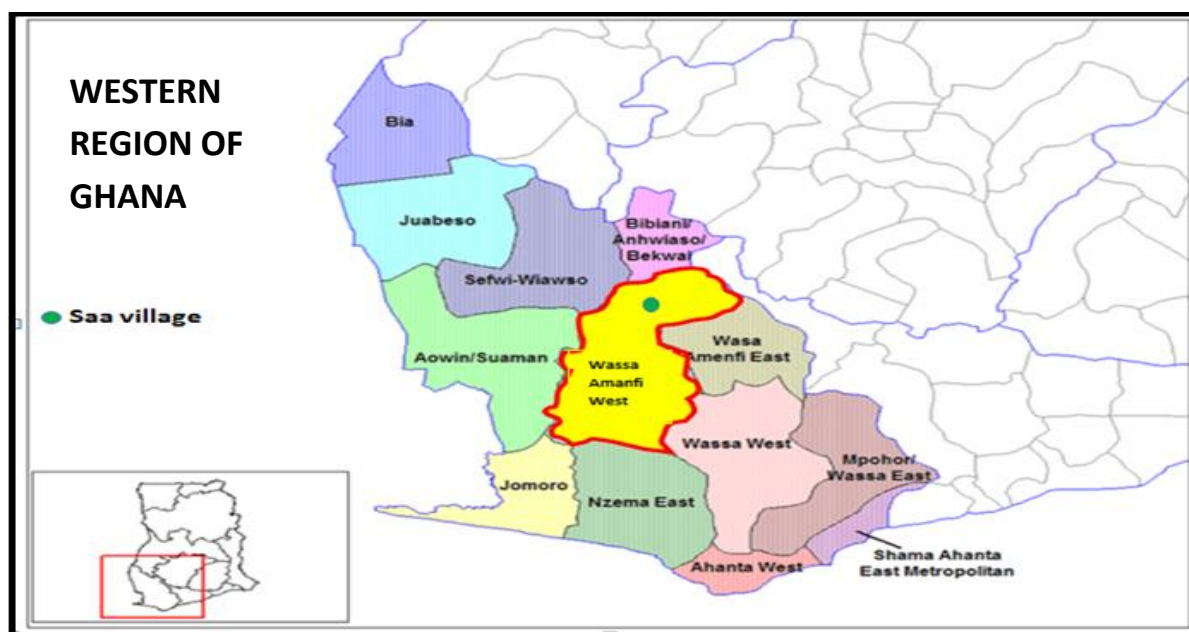
Kitula (2005) mentioned that improper disposal of mine waste from cyanide and mercury spillage can poison farmlands and the fishes in water bodies rendering them dead affecting source of protein in home. This also reduced the quality of crops. Crop performance are also affected because areas such as forest which control micro climate are being used for mining activities. Mining has long term effects on the soil declining the sustainability of land for agriculture activities such as food production and food is an essential element in people's life as everybody has a right to food.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 The Study Area.

The Wassa Amanfi West District is one of the Districts in the Western Region of Ghana. It is bounded to the west by Sefwi Wiawso and Aowin Districts, to the south by Jomoro and Ellembele, to the south east by Prestea-Huni Valley and to the north by Bibiani-Anhwiaso-Bekwai and north-east by Wassa Amenfi East Districts. It lies between Latitude 400'N and 500 40'N and Longitude 10 45 'W and 20 10'W. The District has a total land area of 3,464.61 (km²) made up of over 250 communities (MOFA 2003). There is a good network of rivers and streams and notably among them are Tano and Anokobra rivers. Vegetable farmers use the rivers and streams in the dry season as a source of water for irrigation.

Figure 2 Map of Ghana showing the study area (Saa).



Source: Google Map

Agriculture is the major economic activity in the district and employs about 85.5% of the people, most of whom are subsistence farmers. Plantain, cassava, cocoyam, rice, cocoa and oil palm are the major food and cash crops produced in the district. The district produced about 20% of the country's cocoa, and production of rice and cassava is about 1.25 tonnes and 9.3 tonnes per hectare respectively in 2004 (Ghana district, 2006). The main Ministry responsible for Agriculture performance is the Ministry of Food and Agriculture and has divided the district into four agricultural (4) zones. These are Samreboi, Manso Amenfi, Agona Amenfi and Asankrangwa. The Zones are regrouped into 25 operational areas which are supervised and coordinated by the Agriculture Extension agents (AEA zone).

The district abounds in gold belts having two gold belts which are the Wassa Akropong and Asankrangwa-Manso gold belts. Saa the study area is located in the Asankrangwa –Manso gold belt. Currently six (6) large mining companies currently undertaking mining activities in the

district. There are 12 active small scale mining groups. Land in the district is being owned by chiefs and families and mostly on leaseholds.

3.2 Research Design.

The researcher used a qualitative approach and employed a case study method to get an in-depth knowledge about the research topic.

3.3 Data Collection.

The sources of data were primary data and desk study. The desk study was done through reviewing relevant literatures on the study from the internet, articles, journals and reports from related organisations. Field work was the main source of the primary data. Purposive sampling was used to select the study area to represent the district because that is where the illegal mining activities are on-going and the intensity is high. Semi-structured interviews with the use of checklist as shown in **annex 1** was conducted. 15 households who leased their lands out for mining, 5 food crop traders, 10 illegal miners and (5) key informants were interviewed to get an in-depth information about the study. The checklist was pre-tested at the community before administering. After pre-testing, some of the questions were modified to suit the context and objectives of the study.



Photo 1: Researcher conducting individual interviews



PHOTO 2: Researcher with some of the community members conducting transect walk at the mining site.

Participatory Rural Appraisal (PRA) tool, transect walk was used with a check list to identify and explain the cause and effect relations among topography, soil and the natural vegetation in the area. Personal observations at the mining sites to know the activities of the miners, and in the local market to observe the availability of food was employed to get information.

3.4 Sampling procedure.

In all thirty (35) respondents were selected for the research. Fifteen (15) households were selected based on the fact that they leased out their lands for mining and who were willing to

take part in the interview. Heads of those households were interviewed in order to achieve the research objective. Ten (10) illegal miners who were willing to take part of the interview were also selected from the 8 existing mining sites to know their operations. Five market women who trade in food crops were also selected randomly for the interview to prevent biases. Also five (5) key informants were selected to interview for clarification of the information that were gathered from the respondents. These were the District Director of Food and Agriculture who has worked in the district for more than 5 years to get information and secondary data on trends of food production in the district, District Director of Minerals commission who is responsible for the regulation and management of the utilisation of natural resources and implementation of policies relating to mining, Assembly man, chief and elders of Saa community who are the custodians of the land.

3.5 Data Analysis.

Data analysis was done through thematic analysis. As the empirical data was in a descriptive and narrative form, key themes significant to the objectives of this research were extracted from the raw data. The information derived from the raw data was matched with literature for matching and differences. Personal observations at individual households (on the number of times they have meals and availability of physical food) and at the mining sites (on how gold is being extracted) was an additional tool for analysis.

3.6 Self-Reflection .

The topic was a sensitive one since illegal gold mining was an issue for discussion in Ghana because of the recent increase in their number and the hazards they are producing. The fact that the researcher was also coming from the Ministry of Food and Agriculture, was a challenge because people perceived her as a government representative.

The time the researcher went to the field most of the illegal miners have already left the community. The reason for their leaving was that the Government of Ghana had deployed a task force for the arrest of the illegal miners from the country and the community was not an exception. The fact that the government was arresting them put some fear in the people so given information out was difficult since the people perceived the researcher to be a journalist who needed information for their arrest. The researcher was not welcome the first day she visited the mining sites. She was chased out from the place but later went back and explained things to them with some of the community members before she could be accepted for the interview and also allowed to observe their activities and take photographs.

Despite the topic been sensitive the researcher seeks to produce knowledge that is based on explanations given by individual households in the selected community where illegal mining is on-going. The researcher will not formulate the ideas of individuals interviewed but rather ascribe to the ideals and explanations of research participants about the events and their experiences to be able to understand their actions without making guesses.

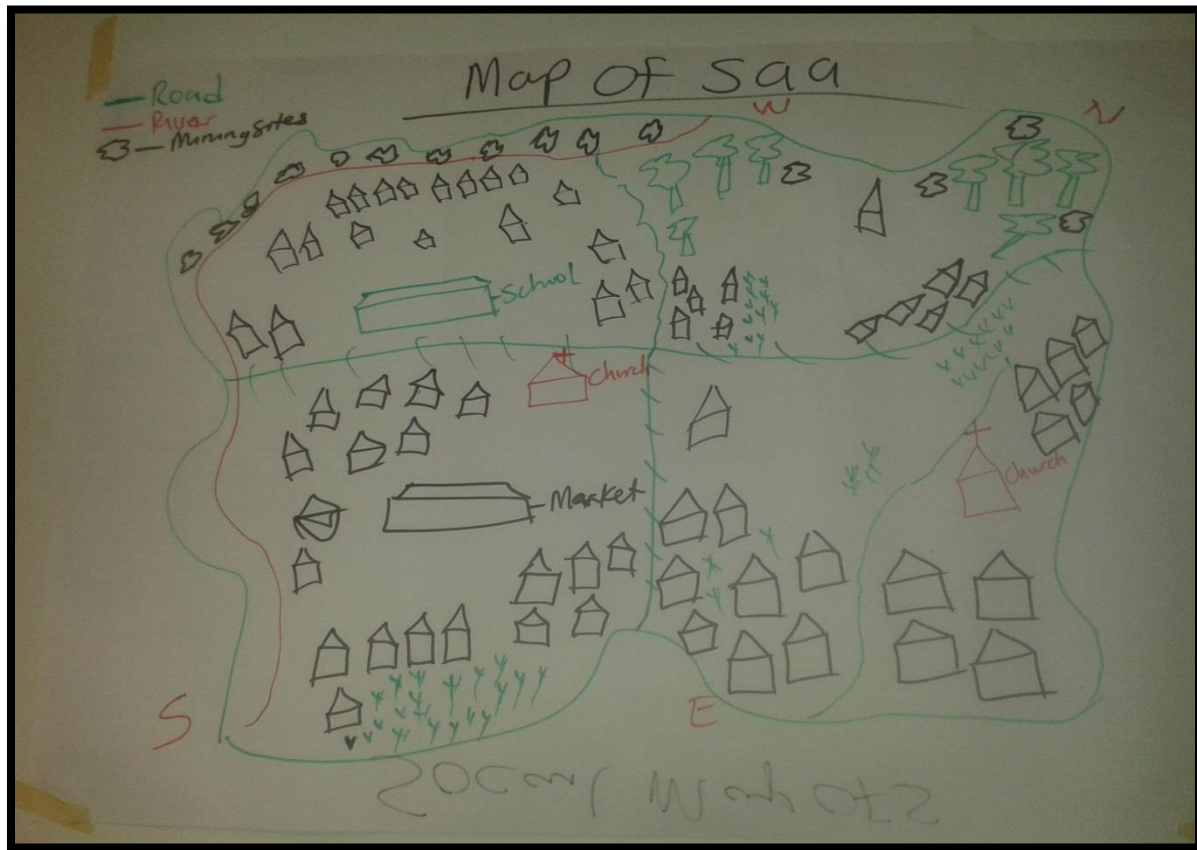
CHAPTER 4: RESEARCH FINDINGS

4.0 Introduction.

This chapter presents the findings of this study in relation to the objectives and research questions as discussed in chapter 1. Interviews were conducted with ten (10) illegal miners, 15 households who gave out their lands for mining, five (5) food stuff traders and (5) key informants. With the research approach of this investigation based on qualitative, and therefore the empirical data collected from the study is presented in a descriptive and narrative form. The data was structured in line with research questions structured earlier.

4.1 Background information about mining in the study area (Saa community).

Figure 3 the map of Saa Community showing the mining site.



Source: field data

Mining in Saa community started in the olden days when few people were using small equipment's like pick axe and shovels to dig for gold. But in 2010 when prices of gold increased at the world market. Small-scale miners from different parts of Ghana and the World including the Chinese also came into the area to mine for gold. The Chinese do not have licences but work through the small-scale miners who are Ghanaians and own concessions in the area because foreigners are not supposed to partake in small scale mining.

The miners (Chinese) came in to the area because it is rich in gold minerals. They came in using big equipment like the excavator to dig. Other group of people from the community and its surroundings are also mining in the area using the local method of which equipment like pick axe and shovels. Other groups of people also use “*Chanfa*” man power machines in the river bodies and the uncovered pit to also mine for gold. As indicted in figure 2 above most of the mining took place in the outskirts of the community along the rivers and the farm lands.

The information given to the researcher in the area was that people were not relocated from the community because of the mining activities but it was their lands that were leased out to the miners. The time the researcher entered the community it was observed that the Chinese were no more mining because the district taskforce employed by the government of Ghana were arresting the illegal miners and they have already left the community about two weeks when the researcher entered community. But the local people from all the parts of Ghana were still mining but been conscious about the taskforce.

Saa community is among one of the communities in the Asankrangwa operational area under MoFA. There is extension worker who stays in the community and gives technical support to farmers on improve technologies and help them to improve upon their agricultural productivity.

4.2 Mode of operation of illegal gold miners.

This subsection represents the data on the mode of operation of illegal gold miners, specifically how they acquire land for their operations and the processes they go through to extract the gold. Ten (10) miners were interviewed and this comprised of those who were the leaders of the group and have rented land and those who do not own lands but also work with them at the mining site. Their demographic information can be found in **annex 2**. All the ten respondents have had some form of formal education and with age range within twenty-two (22) and forty (40) years and 7 were men and 3 women.

The respondents were asked who were the people involved in the mining, four responded that they were Ghanaians from the Volta region of Ghana, two from the northern part of Ghana and six mention that they were from Saa community. They also said the Chinese were also around but have left the place about two weeks ago because the district task force were arresting them.

Responding to the research question, who offers the land to the miners, five (5) of the respondents said they contact the land owners to release the land to them on rental bases and the remaining 5 which includes the three females said they do not rent land, but work with those who have rented lands especially the Chinese who use the excavators to dig and the local people, after which they also enter the pit to dig for the gold. Furthermore, when asked under what condition they get land for mining, those who rented responded by saying they bargain with the land owners and pay a token between one hundred and five hundred Ghanaian cedi's (GHc100.00 - 500.00) before they prospect to see if there is enough gold in the land. They negotiate with the land owners when they realize there is enough gold in the land. Part payment of the fee is paid to the land owners and the rest is paid upon completion of the mining. Again, the miners pay an amount of money to the Chief who is the custodian of the land. No legal document is been signed.

With regard to the above question, the assembly man and the chief's elders also gave different view thus,

What the Assemblyman and Chief elders said about how the miners acquire land for their activities.

the miners (locals from Saa and other parts of Ghana) enter the community and surveys the area to see where gold is available and then contact the land owners without consulting the chief and the elders concern and pay money to the land owners. But under normal situation they should have consulted the chief and elders before seeing the land owners.

Notwithstanding this, three of the respondents said they acquire land from the land owners on rental basis. They pay money every two weeks to the land owners.

Also when asked how long they stay on the land, they all said they do not stay long at one particular place, but it depends on the richness of the land in terms of gold availability.

Responding to what the land owners were doing on their lands before leasing them out, five said it was a waterlogged area where they used to cultivate rice, and vegetables. The other five also answered that they were cultivating cassava and plantain on it.

Regarding the processes the illegal gold miners go through to extract the gold, they were asked to mention the equipment they were using, out of the ten respondents, five responded that they used “*Chanfa*” manpower machine, metal containers, blanket/carpet, metal bars, thrumbel machine for washing, hose and wooden boards. The other five also mentioned they use pick axe, shovels, calabash and blanket/carpet. However they responded that the Chinese were using heavy machinery like the excavator to mine. The respondents were asked what period of the day they normally mine the gold and all the ten said they do it any time of the day (day or night).

Also the respondents were asked to describe the processes they go through to extract the gold. The respondents mentioned that three methods are been used.

- **Alluvial Method:** They made mention that the Chinese were using the excavator to dig which is the alluvia method. The process they go through are, first the digging of the soil with the excavator to the layer that contains the gold gravels. The gravels are washed in the thrumbel which has a layer of carpet or blanket and it absorbs the gold particles as the mixture runs over it. After that, the carpet/blanket is washed out into a bowl to get the gold particles. Mercury is added to the particles of gold in the bowl and stirred to washed the gold particles. The content is poured into a handkerchief and squeezed to get the Mercury out leaving the gold.



- **Local Method:** After the excavator has finished digging and they have taken the gravels of gold particles out of the hole. Then they enter with pick axes and shovels to dig. The gold particles is washed with the use of the calabash after which mercury is used to washed the gold as in the first case.



The “Chanfa” Method: This involves the use of the “*Chanfa*” manpower machine which operates in the uncovered pits left and also in the river bodies. The process they go through to get the gold involves the use of two machines, one that pumps water called “water” and the one that brings gravels from the soil also called (loader). The “water” pumps water very deep into the soil and the loader brings gravels (soil particles that contain gold particles into the board which has been laid with carpet or blanket. The blanket or carpet is then washed in a container called “abom” to get the particles. The gold is washed gold out, washing powder and mercury is added to the final gold particles and stirred. Mercury is added to washed the gold as in the previous cases. The collected gold particles are then heated to get the gold colour.



With regards to the research question, whether the respondents have licence or not, all the respondents said they do not have license for the work they are undertaking because it takes a long procedure to obtain the license.

The Minerals Commission Director was also interviewed to get his view about the regulations of the small-scale mining industry. The respondent was asked regarding who qualifies to engage in small-scale mining and he said every Ghanaian who is 18 years and above and is a man or woman can. With regard to the question on the area they are supposed to mine, he said mining can take place everywhere there is minerals deposits and not restricted. However the following areas, for example, water bodies, dwellings for human, forest reserves, public insolation areas and where there are high tensions electricity poles. But the miners in the area are mining in the water bodies which is restricted.

He made mention that small scale mining is for only Ghanaians and not foreigners. 25 acres is the maximum for small scale mining. Regarding who is responsible for checking the illegal miners activities and he revealed that it is the responsibility of the district minerals commission to make sure they operate according to law. And they have to renew their license after every 5 years and failure to do so make their operations illegal. Responding to how often they check their activities it was made mention that as often as possible and when they see anybody mining illegally they report them to their secretariat and action is taken. He also made mention that if one want to acquire license first one have to identify an area which is not restricted, and the commission will find out if the place is free for mining and if it is free they are ready to issue the license.

4.3 Domestic food crop production.

This subsection presents the information on the trend of domestic food crop production for households who lease out their lands for mining. Specifically the hectares of land they have before the mining activities and the hectares left currently, trend of yields before the mining, currently the mining is on-going and the effect mining is having food production. The respondents were 15 households’ heads comprising 11 male and 4 female who lease out their land for the mining activities as their demographic characteristic is shown in **annex 3**. Farming

is the major occupation for all the 15 respondents except two who have additional occupation to farming. Their house hold size rangers from 4-16 with an average size of 8.

Table 3 Trends of Land for households before the mining activities and currently 2010- 26 July 2013

Respondents	Total land (hectares)	Land leased (hectares) for mining	Land left for Agriculture Production.	
			Food crops	Cash Crop (Cocoa)
1	3.5	1	1	1.5
2	10	1	2	7
3	6	2	1	3
4	2.5	0.5	0.5	1.5
5	2	1	0.5	1
6	3	1	0.5	1.5
7	6	2	2	2
8	5	2	1	2
9	1	0.5	0.5	-
10	4	1	1	2
11	8	1	1.5	5.5
12	8	4	1	3
13	11	1	2	8
14	6	1	1	4
15	4	1	1	2
Average	5.3	1.3	1.1	2.9
Percentage %		25	20	54

The table represents the trend of land for households who leased out their land for mining and it describes the total hectares of land they owned and how many land have been given out to the miners and total left for food production. The average total land own by households were 5.3 hectares, 1.3 hectares representing 25% of households land were leased out for mining, and

1.1 representing 20% were also left for food crop production. Cocoa which is a cash crop occupies 2.9 hectares representing 54% of total land own by households.

Out of the fifteen (15) respondents 14 of them have used part of their lands for cocoa production since most farmers in the area are engaged in both cash and food crops, with cocoa production being the main cash crop cultivated. None of the respondent leased their land for cocoa farming for mining activities. The reasons were that most of the households inherited the cocoa farm from their relatives who have passed away and it has become a family legacy so given out for mining can result to family dispute. And also cocoa is a cash crop which is a source of income to the family for a longer period so releasing it for short period benefits is great disadvantage. In responding to the usage of the land before given it out all the respondents gave reasons that they were cultivating crops like cassava, plantain, cocoyam, rice and vegetables. Only one was not cultivating cocoa in addition to these food crops. Responding to the research question why they lease the land out to the miners, the 15 respondents said this,

What the respondents said about why they leased out their land for mining activities.

- *We leased the lands out because of financial constraints to pay our children school fees and also to buy taxi.*
- *And because of family disputes.*

And even the miners refused to pay all the bargaining amount they have left without our knowledge and we cannot even trace them.(23-07-2013)



Table 4 Food crops cultivated by households and average yields before the mining activities and currently.

Respondents	Crops grown	Yield before mining (2009) 100kg/bag 52kg/crates	Land in (ha)	Yield after mining 100kg/bag 52kg/crates	Land in (ha)
1	a. Maize b. Plantain c. Cassava d. [Rice]	8 bags 40 bunches 8 bags 8 bags	1 1	6 bags 25 bunches 5 bags -	1
2	a. cassava b. maize c. plantain d. [Rice]	7 bags 10bags 20 bunches [8 bags]	2 [1]	6 bags 7 bags 12 bunches -	2
3	a. cassava b. plantain c. [Rice]	6 bags 30 bunches [15 bags]	1 [2]	5 bags 26 bunches - -	1
4	a. cassava b. maize	8 bags 7 bags	1	3 bag 3.5 bags	0.5
5	a. yam b. plantain c. maize	100 tubers 30 bunches 9 bags	1.5	40 tubers 20 bunches 3 bags	0.5
6	a. maize	15 bags	1.5	4 bags	0.5
7	a. plantain b. cassava c. [Rice]	100 bunches 15 bags [14]	2 [2]	60 bunches 8 bags -	2
8	a. cassava b. maize c. plantain	17 bags 9 bags 35 bunches	3	8 bags 5 bags 25 bunches	2
9	a. maize b. cassava	15 bags 12 bags	1	6 bags 7 bags	0.5
10	a. plantain b. cassava c. maize d. cocoyam	30 bunches 8 bags 7 bags 3 bags	2	14 bunches 6 bags 3 bags 1 bag	1
11	a. cassava b. plantain c. [Rice]	7 bags 3 bags [3]	1.5 [.5]	4 bags 10 bunches -	1
12	a. maize b. cassava	30 bags 20 bags	4	5 bags 6 bags	1
	c.				
13	a. Maize	20 bags	3	15 bags	2

	b. Cassava	15 bags		10 bags	
14	a. plantain b. cassava c. maize d. tomatoes	35 bunches 6 bags 5 bags 3 crates	2	15 bunches 4 bags 2 bags -	1
15	a. cassava b. plantain c. maize d. yam	5 bags 15 bunches 6 bags 20 tubers	2	3 bags 8 bunches 4 bags 15 tubers	1

Source: field data.

The table above represents the types of food crops grown by the 15 respondents and the average yields before the mining activities and currently. Crops like plantain, cassava and maize were cultivated by the households as mixed crops, but crops like rice and vegetables were usually cultivated as mono crops.

The respondents were asked whether their yield has reduced because of the mining activities and they responded yes and the reasons given were that their land sizes have reduced after they leased part out to the miners. However crops like rice and vegetables are no longer cultivated by households because it was the land that was used for rice cultivation they leased out for mining. This has therefore reduced the number of crops cultivated by households who were cultivating rice and other crops together. The key informants (District Director of Ministry of Food and Agriculture, Wassa Amenfi West) also indicated that food crops production has gone down in the area due to reduction of land size apparently because of the mining activities, since staples like plantain, cocoyam and rice production has reduced based on the statistics that is available to their office.

Regards to the research question whether the mining has affected their food production, the respondents have the following to say:

All the 15 respondents indicated that the mining has brought a number of effects on their food production and these were their comments.

- *The land size for food crop production has reduced because we gave some out to the miners*
- *The land has been degraded and we cannot use it again since the miners refused to cover the pits*
- *Farm labour has become scarce since the youth prefer mining to farming.*
- *Water bodies have been polluted and we have to even carry water from the house when going to the farm. (24-07-13)*



With regards to the question of the effects of the mining on food production, the respondents also said despite the negative effects, there are other positive effects thus creation of employment for the youth, it has opened business opportunities and incomes of some households have increased such that they can even build their own houses. Key informants (assembly man and the chief's elders) also attested to that. However, a respondent had this to say;

"the people gave us money but now we are regretting for giving out our lands" (23-07-2013)

4.4 Local Market and Prices of Food.

This section presents data on food crops available in the market and prices. The researcher visited the local market on the market days which occur on Wednesday and other days which was not a market day to interviewed five (5) food traders and also observe food availability in the market. Food stuff of which the traders buy and sell in the market were the major staples which includes plantain, cassava, maize, rice (imported rice), yam and vegetables (pepper, tomatoes, garden eggs and onions). The demographic characteristics of the respondents are shown in **annex 3**. The food traders interviewed were those who have been selling food stuffs for four (4) to seven (7) years and know the trend of food situation in the market before the mining activities.

With reference to the interviews, the respondents were asked to mention the source of their food stuffs, and all the five (5) food stuff traders made mention that they are from the farmers and some in the nearby districts because they cannot get the quantity demanded from the community.

Also the respondents were asked to say something about the trend of quantity of food crops available in the market at certain period of the year and all of the respondents mention that availability of food crops in the market is not all year round. They sometimes experienced food shortages. They also said that its availability depends on the season, food shortage is eminent from the beginning of the farming season March-July but within September –December food quantity supplied to the market is high.

With regards to whether there has been increase or reduction in food crop supplied to the market by farmers, all the respondents response was yes, there has been a reduction because of the mining activities farmers are no longer cultivating food crops in large quantities as their

land size has reduced and also most of the people who are to cultivate crops prefer joining the miners. A respondent had this to say,

The quantity of food available in the market sometimes is not enough because we cannot get the quantity we want so we have to travel to other districts where food is available to buy food crops and this has made prices very high in the market because we have to add transportation cost. (8-08-2013).

The respondents were asked to comment on the prices of food crops in the market before the mining and during the mining. Four respondents who were selling plantain and cassava made mention that they use to sell 3 “fingers” of plantain for GH¢1.00 but now it is GH¢ 2.00, four tubers of cassava for GH¢1.00 and now GH¢2.00 because the illegal miners have money and any amount you sell they will buy it. One who is a maize seller said she use to sell a bowl of maize for GH¢2.00 but now it is GH¢5.00. The mining has made cost of food very high.

They were asked if there have been some changes in the areas they buy food crop from to the market, all the respondents said yes because they cannot get the quantities they need from the area community. The reason was that crop yield has reduced and farmers no longer cultivate food crops for instance the local rice. It was observed in the market that even the foods were available was in small quantities and prices were also very high and only one person was selling local rice.

The table below represents the prices of food at the period the researcher visited the local market on the market days.

Table 5 Prices of staple food crop in Saa community local market on 11th August 2013.

Commodity	Price (GH¢)	Euro(€)
Maize(100 kg)	195	78
Local rice (100kg)	288	115.2
Yam (250kg)	300	120
Cassava(91kg)	120	48
Plantain 99-11kg)	12	4.8

4.5 Food donations and gifts to households.

The respondents were asked if households receive food donations and gifts. Out of the 15 respondents 13 of them said they do not receive food in any form of donations from family, friends, relatives, projects and neighbours. And this was their comment:

“at first food was in abundant that your friend or relative can give it out to you as a gift from his /her own farm but now it is not like that. Things have change people do not give food out as they used to give previously because there is shortage of food” (24-07-2013)

Only two of the respondents a male and a female made mention that they received food from their children in the cities. The kind of food they received was rice.

4.6 Food Habit in the household.

In responding to the research question, if the households have food throughout the year, 13 respondents said no and 2 said yes. The reason the 13 gave was that, they experienced hunger from the beginning of the new farming season which is from March to July. The remaining 2 said that they have food all year round but very little. With regards to the sources of food available to the households, all the respondents replied that they depend on their own farms and the market for their source of food for the households.

The respondents were asked how many times in a day they normally eat in the households, 12 respondents said they eat twice in a day and even the quantity is small, but previously it was three and the reason been that there has been shortage of food. 2 respondents said they



Eat three times in a day but very small quantities. The 2 who said 3 times a day are those who mention they have food all year round. 1 respondent said only once in a day and the reason being that his yield has reduced and food is of short.

The respondents were also asked to mention the effects the mining has brought on their household food availability. All of them said there has been shortage of food in the house and the market, the quantities has reduced and because, the mining has attracted a lot people into the area there is overpopulation making people to rush for the little food available in the market causing prices to raised high.

Regarding the above question, the key informants (chief's elders and the assemblyman) confirmed it by saying because of the miners, population has increased and there is a rush for food which has caused food prices to go high leading to shortage. The respondents were also asked to mention the coping strategies for the effect it has brought on their households food availability, all the respondents said that they have to manage the little food available in their households.

CHAPTER FIVE: DISCUSSION

This chapter is to discuss and synthesise the empirical data presented in chapter four and compare with existing literatures. This is done by extracting key themes from chapter four in line with the objectives of the study and discussed as follows:

5.1 Mode of operation of illegal miners.

In this section, the focus is on analysing and discussing the findings of the study on the mode of operation of the illegal miners. Specifically how they acquired land for their operations and the processes they go through to extract the gold

The study showed that all the illegal gold miners interviewed had some form of formal education and could read and write. It was also revealed that both males and females were involved in the illegal mining with men dominating in terms of acquiring their own concessions.

The miners have to contact and pay some amount of money to the land owners to release the lands to them for mining and they do not stay long (1-2 months) on the land depending on the richness of the land. There were other groups of people who also do not have to rent land for mining but depend on those who have rented land and they pay them based on the quantity of gold they get after mining. Most of the lands were being used for cultivation of food crops like rice, vegetables, cassava and plantain.

The research also found out that both locals (Ghanaians) of which some are natives from the community, other part of Ghana and foreigners (Chinese) were involved in the mining, men and women from the community were also involved in the mining but the percentage of women were not high compared to men and this is in line with Reisenberger (2010) who mention that 30 % of the illegal miners are women compared to the number of men interviewed.

The kind of equipment being used by the miners were pick axe, shovels, “chanfa” man power machines and excavators. As shown by the research this is in line with Edwin and Gabriel (2012) and Reisenberger (2010) who observed that the illegal miners use manual and traditional methods like pick-axes, shovels, barrel, head pans and nets. However in this research it was revealed that not only these equipment were used by the miners but additional equipment like the excavators, which make deep open pits into the soil and destroys the soil have also being introduced by the Chinese miners. “*Chanfa*” man power machine which operates in water bodies were also being used. The research revealed that three methods of gold mining takes place in the area. These are the alluvial method, chanfa manpower method and the local method. It all involved the use of mercury to separate the gold, this confirms the work of (Aryee, 2003) who mentioned that the miners add mercury to the concentration, mixed to form gold mixture, which is then heated to separate the gold.

The illegal miners work in groups of five to seven of which one among them is the leader and do not have licence as they revealed since the procedure to obtain licence is cumbersome. It was revealed by the Director of Minerals Commission of Wassa Amanfi West District that licences are given to only Ghanaians above 18 years of age. And the fellow has to also identify a place which is not a restricted area like forest reserve, water bodies and human dwellings. Probably this information is not been made aware to the miners.

5.2 Domestic food production.

In this section, the focus is on analysing and discussing the findings of the study on the domestic food production of households focusing on their trend of land, yield and the effect on food production.

The research revealed that more males gave out their lands than females and males were mostly the head of households and land owners in the area. This is in line with the Ghana government portal (2013) which specified that 72% household heads are male and 28% are female. Females do not however own lands but could be given from relatives as gift. Farming is the main source of livelihood for the households and they cultivate both cash (cocoa) and food crops.

It was revealed that the heads of households who offered part of their lands to the miners because of financial constraints and did not get enough money to sustain them for a longer period and also to buy food for their households. The miners did not pay all the bargained amount of money they were supposed to pay to some of the households. Akabza *et al.* (2005) observed that the mining activities have caused frequent destruction of farm lands without sufficient sum of money being paid to the affected farmers

The hectares of land for the households were not used for cultivation of food crops only but they used some for cash crop (cocoa production). The household in the area did not lease their cocoa farms for the mining activities but only part of the hectares of land for food crops were given out for the mining activities. The reasons were that most of the households inherited the cocoa farm from their relatives who have passed away and it has become family legacy. Also cocoa is a cash crop which serves as income to the family for a longer period and releasing it for a short period benefits was difficult. Releasing their lands for the mining activities have caused destruction of their lands which has led to reduction in their land size for cultivating food crops. Land for cultivating crops like rice and vegetables were no more available which has also resulted to unavailability of rice and vegetables in the households. This come to an agreement with research by (Schueler et al, 2011) who comments that impact of small-scale mining on farm lands are been loss due to the mining activities.

As indicated in table 3, the types of staples that were cultivated by the households were plantain, cassava, maize, rice and vegetables. It was shown in the study that the average yields of the staples which serve as a source of food for the households have reduced because of the mining activities. But it was also revealed as indicated in table 4 that yields of crops that were on the land that was not given out has also reduced perhaps due to other contributing factors like reduction in farm labour, farmers not enthusiastic about the agronomic practises like fertilizer application and weeding.

It was shown that crops like rice and vegetables were no more cultivated by the households because most of the lands they gave out were a swampy area where rice was cultivated. Rice was one of the food crops that was contributing to their household's food and the activities of the mining have resulted in unavailability of it in the household. They have to depend on the market for imported rice and vegetables which they could have harvested from their own farm. And this verify to the fact that that agriculture productivity has reduced as a result of mining activities due to struggle for key inputs like land and labour from the research conducted by Fernando and Juan (2012).

The study showed that mining activities have had some effects on their food production activities leading to affecting household food availability in the study area. It indicated that land size for food production has been reduced due to the fact that there is competition between

agriculture land and mining. Water bodies in the area has also been polluted because of the equipment's used such as the "*Chanfa*" manpower machine which operates in water bodies and the use of the chemicals for their processes, farmers has to carry water to the farm. This is in line with research conducted by Fernando and Juan (2012) who identified that productivity of agriculture has reduced because there is competition between land and mining, and water quality is also affected by mining processes when water infiltrate through surface materials into ground water and pollutes it with toxins such as sulphate, nitrates and metals.

It was also observed that the mining activities have resulted in land degradation of which the vegetative cover is been destroyed and soil degraded. Loss in the vegetative cover has led to lower yields. Uncovered pits breeds mosquitoes which could bring about malaria and this collaborates with the views of Anane (2003) and Ocansey (2013) who indicated that mining involves the clearing of large tracts of forest and agriculture land resulting in land degradation. Uncovered pits with filled water also breeds mosquitoes which are the main transmitters of malarial which can affect the health status of the farmers and their ability to produce and Soil degradation is one of the leading factors to low food productivity by mining activities Farm labour has also reduced, most of the youth that can be used as farm labour and also go into agriculture are no more available they prefer joining the miners of which they receive huge sum of money than money than what they would get from the farm (food production).

It was found through the study that although the mining might have some negative effects on their food production there were positive effects too that were observed in the research. Where by the mining activities have created employment for the people especially the youth, business is booming because a lot people have come to the area and households able to build their own houses.

5.3 Local market and food prices.

The findings of the study revealed that food crops traders in the area who buy and sell plantain, cassava, maize, cocoyam and vegetables have to travel to the nearby towns for food crop to sell in the local market. The reason being that quantity of food supplied to the local markets by the farmers in the area for them to sell in the market has reduced because of the mining activities and possibly other factors. They experienced shortage of food stuffs in the market at certain times of the year especially from March- July that is the beginning of the farming season. This is because the mining has affected farmer's lands and also farmers are no longer interested in farming.

It was observed that prices of food crops in the market has gone high e.g. 3 "fingers" of plantain which was selling at GH¢1.00 is now GH¢ 2.00, due to less production of such crops as a results of reduction of land size, farmers no longer produce high quantity of food as they use to produce, and this collaborate with research done by Ocansey (2013) mentioning that food prices are been increased in mining communities mainly because strong men who were supposed to go into agriculture are being taking away by the mining industry, and most farmlands are also been taken over by the mining activities. Prices of food have increased compared to the same period previously years e.g. price of local rice at the time the researcher want into the market was Gh 288 but when it is compared to 2011 it was Gh 180 which was lower, and raised to Gh190 2012 as indicated in table 2 and 5.

The quantities farmers supplied to the market is also small making food unavailable in the market, and food stuff traders have to travel long distances to transport food at higher prices for the community and this has also caused high prices of food in the area, making households not able to purchase the quantity they need reducing their households food availability. This confirms with IFPRI (2013) and Braun *et al* (1992) stating that prices of food has increased

globally and this high food prices has reduced the household ability to purchase food forcing them to decrease the quantity of food and unexpected changes in incomes and prices affect the capacity of households, not at all times in the same way to obtain food that is available.

5.4 Donations and gifts.

Households mentioned they do not receive donations and gift of food like plantain, cassava and cocoyam from friends, relatives and neighbours as they used to. But those who received are few from their children in the cities send food to them occasionally. Donations and gift of food are no longer common in the area because there has been reduction in yield resulting in shortage of food because of the mining activities. Food is no long in abundance as it used to be previously for people to have and donate some as a gift.

5.5 Food Habit in the household.

It was revealed in the study that food unavailability is a problem among households who have given out part of their lands to mining activities in Saa community since they do not have food available in their households all year round. The months of March-July are considered to be the critical period of food shortage among these households that is the beginning of the farming season.

Farming is the primary source of food for households and also depend on the market for food. Managing the little food available is the coping strategy for the households.

The number of times households have meals have reduced and they no longer have meals three times in a day as they used to have previously, but now two times in a day. Quantity of the food at the households have also reduced and very small because of reduction in their land size and yield. Households do not have enough land available for cultivation of food crops like rice and vegetables due to the activities of the illegal gold miners.

This is in line with FAO (2012), who observed that domestic food production is one of the means for achieving adequate availability and food availability is closely interrelated to availability and use of natural, human and economic resources especially scarcity of natural resources (FAO 2012).

The literature available also observed that food availability tends to reduce as a result of productions failure related to labour constraints, and loss of assets (USAID and WFP 2007). Seasonal food insecurity occurs when there is recurring pattern of insufficient availability of food and food shortage, it may occur in the pre-harvest times when on-farm stocks are depleted and other source of food are not available(FAO 2008).

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

The chapter highlights the conclusion and recommendation of the study as drawn from the findings and discussions that came up from the research. The observations made by the researcher throughout the study have also been used.

6.1 Conclusion.

The discovery of gold in Saa community in the Wassa Amenfi West District has attracted a lot of people from the community, its environs and foreigners (Chinese) into the community to mine for gold and most of the miners mine illegally.

In conclusion the mode of operation of the illegal gold miners based on how they acquire land for their operations and the process they go through to extract the gold were, the miners contact the land owners and pay amount of money to them for the land to be released for the mining activities. Some of them work on rental bases of which they pay money every two weeks and others pay part of the money and after completion pay the rest. There are three methods used in the study area in terms of gold extraction. The local people use equipment like pick axe, shovel, “Chanfa” man power machine to dig the soil for gold and the Chinese also use excavators to dig. They all use mercury in the extraction of gold.

Farming is the main occupation of the people in the area. As revealed in the study about the trends of domestic food production in the area before the mining and currently. Household leased their lands out for the mining activities and land size for domestic crop production has reduced because of the mining activities. The average yields of the households before the mining has reduced because of the mining activities. Rice, one of the staple food is no longer cultivated by many because most of the farmers leased out the lands that was used for rice production for the mining activities. The mining activities have had some effects on their food production which are:

- The land size for food production has reduced due to constant demand on farmlands for mining activities in the area.
- Water bodies which serves as drinking water and also for irrigating crops has been polluted thereby households have to carry water to their farms.
- There is competition between farm labour and labour for mining
- Uncovered pits breeds mosquitoes which could bring about malaria cases.
- Farm land has been degraded.

The types of food crops available in the market are the staples which comprises of Cassava, Maize, plantain, cocoyam and vegetables. It was revealed that prices of food staff in the market has rising high e.g. 3 “fingers” of plantain which was selling at GH¢1.00 is now GH¢ 2.00, as compared to when the miners were not around due to less production of such crops since farmers are no more producing it in large quantities because their farm land size have reduced because of the mining. Food stuff traders have to travel long distances (other districts) to transport food at high price to the community and this has also caused high prices of food in the area. They experience shortage of food stuffs in the market at certain times of the year especially from March- July that is the beginning of the farming season. This is because the mining has have effected farmers lands and also farmers are no longer interested in farming.

Based on the study the mining has affected food availability in the households since they do not have food all year round as they used to have previously before the mining. They revealed that

the number of meals per day has been reduced and now they eat two times in a day instead of three times in a day. The quantity of food eaten by households have also reduced.

The mining has affected the source of food donations and gift to the households since households do not receive food as gift from friends, neighbour, relative and children.

This study has observed the effects of illegal gold mining on food availability .In spite of the fact that mining is not the primary occupation of the people it has provided supplementary income to the people. In terms of food availability, mining activities have affected domestic food production in reducing land size, resulting in low yields and unavailability of food crops like rice in the households. Water bodies polluted, land degraded, pits left uncovered and competition between farm labour and labour for mining. Prices of food in the local market has also gone high affecting household food availability resulting in reduction of the number of times household have meals. Food donations and gifts are not rare in the area because of the mining activities, the availability of food is also threatened.

MoFA Wassa Amenfi West District was having an ideal about the effect illegal gold mining have on food production, but was not aware of its intensity. The above conclusions have helped MoFA gain additional knowledge into the intensity of the effect.

6.2 Recommendations.

Based on the conclusion, the following strategic recommendation can be observed by Ministry of Food and Agriculture and other stakeholders.

- MoFA in collaboration with the Ministry of Mines and Energy is refilling the uncovered pits in the Tarkwa municipalities for farmers to reuse it again for food production. So therefore the Ministry should extend its activities to Wassa Amenfi West District in other for them to reuse the land again for food production especially rice production to promote food security
- Since most farmers are not well educated about the social and environmental consequences of small-scale mining, DADU MoFA through the District Minerals Commission should come together to intensify the education on the environmental consequences of illegal gold mining that might affect food production leading to food unavailability.
- As a strategy to eliminate illegal mining in the community, youth in agriculture and block farming programmes embarked by MoFA in other districts should be extended to the district to make agriculture attractive to boost food production leading to increase food availability in the area.

Stakeholders

- The Wassa Amenfi West District taskforce should intensify the operation of arresting the illegal miners in the district so that illegal gold mining will be minimal in the area.

Although the study was to gain insight into the effect of illegal gold mining on food availability, further understanding was recognized on the health hazards it has brought to the people leaving around the mining sites. Future research can also look at the effects of mining on the health of the people.

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ANNEXES

ANNEX 1: Checklist for Interviews

BACKGROUND INFORMATION

Name of respondent..... Age () Date.....

Location..... Sex.....

Educational Level.....

1. Mode of Operation of Illegal Miners.

I. How do the Illegal Gold miners Acquire Land for their Operations?

- a. Who offers the land?
- b. Under what conditions do they get the land?
- c. How long do they stay on the land?
- d. What did the land owners do on their lands before giving them out

II. What Process do the Illegal Miners go through to Extract the Gold?

- a. Who are the people involved in the illegal mining?
- b. What are the equipment they use for mining?
- c. Which time do they normally operate?
- d. How do they extract the gold?
- e. Do they have licence? Yes/No if No why.

2. Domestic Food Production

- a. What is the household size?
- b. What is the sources of livelihoods for the households
- c. How many hectares of lands do they have?
- d. How many land have you given out to the miners?
- e. What were they doing on the land before giving it out to the miners?
- f. Has their land under food crops production reduced because of the mining activities?
Yes or No if Yes why?
- g. How many is left for food production?
- h. Which type of food crops are grown?
- i. What is the average yield of food crops before mining?
- j. What is the average yield of food after the mining
- k. Has their yield reduced because of mining activities? Yes or No if Yes why?

4 Local Market and Food Prices

- a. Number of years they have been selling food stuff?
- b. What type of food crops do traders buy and sell in the market?
- c. What are the sources of food supplied to the market? Is it from the community or different area?
- d. What is the quantity of food crops available at the market at certain period of the year?
- e. Has there been an increase or reduction of food stuff supplied to the market by farmers?
- f. What is the contributing factor to the reduction or increase in quantity of food supplied by farmers?

- g. What is the trend of food prices in the market over time?
- h. Have there been changes in the sources of food supply due to mining activities? Yes or No if yes why?

5 Sources of Food Donations and Gift of Households?

- a. Do households receive donations and gift of food?
(Donations and gifts from family members, relative, neighbours, projects).

6 Food Habit in the Household .

- a. Do household have food all year round? Yes /No if no why?
- b. What are the sources of food to the households?
- c. How many times does the household eat?
- d. What effects has the mining brought on food production?
- e. effects has the mining brought to household food availability?
- f. What are the coping strategies for the effects on food availability

7 Transect Walk

- a. Water bodies observed
- b. Degraded land

8 Interviews with key Informants

1. District Director of Minerals Commission

- a. Who qualifies to mine?
- b. Which areas should mine take place?
- c. Acreage per concession, nationality.
- d. Who verifies or certifies that miners operate according to the law?
- e. How often are illegal mining activities checked?
- f. How often do miners renew their license?

9 Chief Elders and Assembly man.

- a. How is land given out for mining?
- b. What are the effects of illegal gold mining?
- c. The effect of illegal mining on food availability

10 District Director of Food and Agriculture

- a. the effect of illegal mining on food production in the District.

ANNEX 2 Table 1 Demographic Characteristics of Respondents Illegal Miners.

Respondents	Age	Educational status	Sex
1	40	secondary	Male
2	35	Secondary	Male
3	36	Middle school	Male
4	28	Primary	Male
5	32	J.S.S	Female
6	23	Tertiary	Male
7	38	J.S.S	Female
8	25	Secondary school	Female
9	31	J.S.S	Male
10	22	Middle school	Male
Average	31		

ANNEX 3 Table 2 Demographic Characteristics

Respondents	Age	Sex	Educational status	Occupation	Household size
1	60	Male	Middle school	Farming/livestock	7
2	70	Male	Non-formal education	Farming	8
3	69	Male	Non-formal education	Farming/livestock	7
4	35	Female	Middle school	Farming/livestock	5
5	49	Male	Middle school	Farming/ livestock	6
6	47	Male	Middle school	Farming/Chain saw operator	6
7	77	Male	Middle school	Farming/ livestock	10
8	71	Male	Middle school	Farming	13
9	40	Female	Primary school	Farming/ livestock	4
10	40	Male	Middle school	Farming/ livestock	9
11	68	Male	Non-formal education	Farming /livestock	5
12	50	Female	Non-formal education	Farming/ livestock	16
13	68	Male	Non-formal education	Farming/ livestock	13
14	45	Male	Middle school	Farming	8
15	67	Female	Non-formal education	Farming/Fish monger	8
Average	57				8

Source: field data

ANNEX 4 Table 3. Food Crop Traders.

Respondents	No. of years in business	Food crops sold in the market
1	5	Plantain, Cassava, Vegetables e.g. Okra, pepper and garden eggs.
2	7	Yam and plantain
3	4	Plantain, tomatoes and garden eggs
4	7	Yam, cassava and plantain
5	5	Maize

Source field data.

ANNEX 5 Background of MoFA

The Ministry of Food and Agriculture (MOFA) is the lead agency and focal point of the Government of Ghana, responsible for developing and executing policies and strategies for the agriculture sector within the context of a coordinated national socio-economic growth and development agenda. By means of a sector-wide approach, the Ministry's plans and programmed are developed, coordinated and implemented through policy and strategy frameworks. In this regard, MOFA facilitated the preparation of the Food and Agriculture Sector Development Policy (FASDEP II) and the Medium Term Agriculture Sector Investment Plan (METASIP 2010-15).

Vision

The vision of the Ministry is a modernized agriculture culminating in a structurally transformed economy and evident in food security, employment opportunities and reduced poverty.

Mission

MOFA's Mission is to promote sustainable agriculture and thriving agribusiness through research and technology development, effective extension and other support services to farmers, processors and traders for improved livelihood.

Objectives

- Food security and emergency preparedness
- Improved growth in incomes
- Increased competitiveness and enhanced integration into domestic and international markets
- Sustainable management of land environment
- Science and Technology applied in food and agriculture development
- Improved institutional coordination

ANNEX 6 Land Tenure in Ghana

Land is owned by customary authorities (stools, skins, clans and families)

Together they owned 78% of all lands. The state owns about 20% and the remaining 2% is owned by the state and customary authorities in a form of partnership.

