

Effects of Illegal Mining on Human Security in Ghana

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Abstract

The environmental and socioeconomic effects of mining and human security challenges are a source of worry to most governments all over the world. It is a known fact that the extractive industry - mainly gold, diamond, manganese and crude petroleum contributes significantly to the national economy of most countries in Africa inclusive of Ghana. However, in spite of its importance to the national economy, its effects especially on the environment, the health of the people, food security, fundamental human rights of people in communities where illegal mining occurs affects the human security of the citizenry. Uncontrolled illegal mining is prevalent in Ghana even though there is a legal regime to check and control artisanal and small-scale mining. In view of its destructive consequences, a securitisation approach is usually used to justify the deployment of "security forces" to deal with the menace in view of the multiple dimensions of insecurities that is associated with illegal mining. The adoption and use of human security paradigm allows for the taking of a more integrative and holistic approach in dealing with the problem in the country. Studies on illegal mining in Ghana confirm that, poverty accounts for the main reason why people risk their lives to engage in the practice. This paper provides a review of the effects of illegal mining on human security in Ghana. It aims to reveal the multiple insecurities surrounding illegal gold mining in Ghana from a human security perspective. Further, the paper make recommendations for governance and policy reform in finding solution to the insecurities associated with the practice.

Keywords: illegal mining; human security; 'Galamsey'; securitisation; poverty and governance

Introduction

The social, economic, political as well as environmental insecurities associated with mining has been a source of concern for both the citizenry and policy makers globally. The extractive industry made up of 'gold, diamond, manganese, bauxite and crude petroleum' contributes significantly to the economies of countries all over the world (Kervankiran et al., 2016). Gibson (2018) have also revealed that some of the minerals that are extracted in the African continent include 'copper, nickel, silver, iron, uranium and coal which all provide the needed support for the economies of countries where they are found. It is significantly an important economic venture in many African countries that are endowed with these natural resources (Alhassan, 2014). Undoubtedly, mining is one of the most important economic activities for various countries growth worldwide. Kahhat et al. (2019) have emphasised the significance of Artisanal Small-scale Mining (ASM) in most developing countries in the world that are rich in gold. Globally, it is estimated that about thirteen million people in over thirty different countries are employed in the ASM sector, and another eighty to hundred million dependants on those employed there. This has been buttressed by the World Bank (2013) which has stated that about hundred million people depend on ASM for their livelihood worldwide.

In the view of Alkire and Foster (2011) mining also has impact on the livelihood of poor people, while Gamu et al. (2015) have intimated that illegal mining is associated with poverty. Even though the sector contributes quite substantially to the development of African countries that have these resources, the associated effects on health, education, food and the environment is documented by several studies. In view of the fact that, mining can pose severe danger to the environment, regulations have been put in place to manage the extraction of minerals. Those who conform to the regime are known to be engaging in the industry legally while those who do not go according to the policy framework are deemed as illegal miners. Gibson (2018) have opined that, illegal mining could be seen as those who flout the legal regime put in place with impunity, whereas those that are legal conform to laid down processes to protect the environment.

The Law Insider Inc. (2020) sees illegal mining as “the manner of undertaking mining inconsistent with mining plan/scheme of mining, clearances, permissions including transportation and storage of minerals as required under Act and Rules made thereunder”. The International Labour Organisation (1999) defines small-scale mining as less intense and operated with basic or low-level machinery. ASM mining is usually done by private individuals without any income and no prior knowledge about mining (Aboka et al., 2018). Hentschelet et al. (2003) sees ASM as mining undertaken by ‘individuals, groups, families or cooperatives’ where there is little use of machinery and mostly occur in the informal economy. It is pervasive in less developed countries and also those with middle income status (Hentschel et al., 2002). Africa has the second largest number worldwide out of the 80 countries where there are ASM with 9.9 percent of people deriving their livelihood from it (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, 2017).

United Nations Environmental Programme (UNEP) (2009) has also added that, ASM in many parts of the world is composed of people who do not have the appropriate licences as well as permits that goes with the prospecting and mining of minerals. The exploitation of all minerals must be done in consonance with the existing legislative framework (Phillipe, 2019) under the rule of law as pertains in a democratic society. Most advocates and experts in the mining industry have emphasised that, illegal mining is interlinked with the poverty of the host communities where it occurs, and this is what precipitates the destruction of lands meant for farming, inclusive of cocoa which is a key source of employment for the people in rural communities (Domina and de Dieu, 2021). Illegal mining also known as ‘galamsey’ was coined from the English phrase ‘gather and sell’ by the whites who ruled the country before independence after they observed how gold was being gathered easily for sale with simple implements by the local people (Mantey et al., 2018).

Ghana which is endowed with a lot of gold is situated in the ‘West African Craton’, where it is believed stabilised some ‘two billion years ago’ in the early ‘Proterozoic Period’ (Minerals Commission, 2000). Experts in the industry are of the view that, the suitable ‘geological setting’ has propelled the widespread operations of naturally artisanal small-scale gold mining. Out of several ‘tectonic’ activities most areas got ‘folded, faulted and metamorphosed’ then exposed to ‘igneous activity’ through ‘erosion and sedimentary processes’ resulting in the increase of several ‘gold belts’ (Lunt et al., 1995). The concentration of the gold deposits occurs in the ‘Birimian and Tarkwian’ gold belts in the “Western, Central and Ashanti regions” (Hilson, 2002).

The main objective of this paper is to bring to the fore the insecurities that results from the negative effects of illegal mining on the citizenry. Further, the paper makes recommendations for governance and policy reform in finding a lasting solution to the insecurities associated with the practice. In a narrow perspective, security studies used to focus mainly on the threats to the sovereignty of the state as well as international relations and politics (Williams, 2012), which neglected the negative impact of events on the lives of people. The dangers that come with illegal mining has serious implications on national security and development since it affects all facets of societies (Alhassan, 2014). In spite of the destructive effects of mining on the environment, gold is one of the precious minerals which support the economies of most developing economies (Mensah et al., 2021).

The political economy of mining in Ghana

Between the years 1493 and 1600, the Gold Coast which is the earlier name for Ghana accounted for 36 percent of the world’s gold export hence earning the name Gold Coast, till independence on 4th March, 1957. Gold has been mined in the country from pre-inde-

pendence through to the present leadership. Ghana is ranked second to South Africa in the production of gold in the African continent. The country earns about 40 percent of its income from mining operations (Airo, 2009; Berger, 2008). The mining industry inclusive of quarries contributed about 7.2 percent of GDP per annum in the period spanning 2006 - 2014 (Gilber and Osei-Bonsu, 2016). In terms of foreign exchange earnings, the country earned USD 10 billion from earnings in gold as compared to crude petroleum, which earned the country USD4.65 billion (OECD, 2021; Adu-Gyamfi, 2014). Moreover, in respect of contribution to the Gross Domestic Product (GDP) of the country, the mining sector contributes 4.5 percent outpacing cocoa which is another important cash crop of the country, but contributes only 1.4 percent to GDP (Miriam et al., 2021).

On employment, the mining sector formally employs 42,576 people far less than the people in the cocoa industry which numbers about 800,000 families, but when ASM is added the number of workers in the mining sector rises to about 1.1 million (GSS, 2019; Hilson, 2016). It has been supporting rural livelihoods and employment for many centuries now (Mantey et al., 2016). Since the Economic Recovery Programme (ERP) reforms implemented in 1983 where the mining sector was reformed, there has been a steady rise in the significance of ASM to gold production in the country (Azumah et al., 2021). It contributed 2.2 percent of gold production in the country in 1989 (Ghana Chamber of Mines, 2019). This figure has risen to 34.4 and 41.1 percent as at 2014 and 2018 respectively (Akpalu and Wong, 2020). Akabzaa and Darimani (2001) in a study have reported that Gold constitutes about 90 percent of the country's total mineral output.

The mining sector distinguishes between largescale mining (LSM) and ASM. LSM is made up of 14 companies as at 2016, where they operate from eleven mining sites that extracts 'gold, bauxite, manganese, oil and gas' (Hilson, 2019; Ministry of Finance, 2018). Large-scale multinational companies in the mining industry are from Australia, Canada, South Africa and the United States and control about 85 percent of the industry in the country. They employ about 28,000 people. The remainder of 15 percent is made up of small-scale miners of which some are legal and others illegal. The small-scale mining sector employs a little over one million people who are employed directly who intend with additional dependents number up to 4,400,000 (Drechsler, 2001). Moreover, the number of people employed in the illegal mining sector is estimated to be over 1.1 million people (McQuilken and Hilson, 2016).

The Ghana Chamber of Mines (2011) has stated that, Ghana's mining industry contributes about 38.3 percent directly to the country's total tax earnings from the corporate sector. 27.6 percent went directly into revenue accrued by government, 6 percent to the GDP, and accounted for over 40 percent of totals from foreign exchange earnings (Ghana Chamber of Mines, 2011). The Minerals Commission in Ghana and Human Rights Watch (2015) have also reported that small scale and artisanal mining provides 34 percent of gold mined in Ghana. The sector is composed of indigenes from the communities where the mining is done, economic migrants, roaming people, farmers who work seasonally and retrenched miners from the LSM sector (Hilson and Potter, 2005). During the peak of the COVID-19 pandemic in January 2020, the mining industry contributed GH¢6290.59 million to GDP, since its highest peak of GH¢7410.50 million in 2006. The mining sector contributed GH¢5840.2 million in January 2019, GH¢4868.27 million in January 2018 and GH¢4612.18 million for January, 2017.

<i>Period</i>	<i>Jan. 2017</i>	<i>Jul. 2017</i>	<i>Jan.2018</i>	<i>Jul. 2018</i>	<i>Jan. 2019</i>	<i>Jul. 2019</i>	<i>Jan. 2020</i>
GDP	4612.18	5099.51	4868.27	6357.49	5840.2	7247.54	6290.59

Source: Trading Economics (2020). Ghana GDP from Mining.

Table 1. Mining's contribution to Ghana's GDP from 2017 (in million GH¢).

Mining and poverty in Ghana

Ghana is a country with economic difficulties and struggling to find solutions to a myriad of problems such as unemployment, poverty, educational infrastructure, health challenges in addition to the adverse effects of illegal mining (Miriam et al., 2021). Small scale mining activities in Ghana is known to have started more than 2,000 years ago (Hilson, 2001). ASM mining is usually done by private individuals without any income and no prior knowledge about mining (Aboka et al., 2018). Hentschelet et al. (2003) sees ASM

as mining undertaken by 'individuals, groups, families or cooperatives' where there is little use of machinery and mostly occur in the informal economy. Further, at the illegal mining sites children receive more than the stipulated wage of a person below the poverty line (Hentschelet et al., 2003). So, this accounts for why a lot of children drop out of school since the returns are more rewarding after being employed at the mining site (Azumah et al., 2019).

According to Ferring et al. (2016), ASM consists mainly of informal and illegal miners as well as other category of workers. In the view of Yankson and Gough (2019) it is composed of many forms with various levels of operation, mostly labour intensive which ranges from the use of pans in 'river beds' to other highly sophisticated machinery such as trommel. It employs the easiest approach of 'dig and wash' which is also referred to as 'tally panning' (Ferring et al., 2016). With this approach, usually a 'gang' of about three or more people retrieve gold from sand dug from the surface of the soil. Perforated cloth is used to separate the gold from the sand from either the surface of the earth or brought from pits (Mirjam, 2021). Teschner (2012), has opined that the distinction between legal and illegal SSM is not clear because of the similarity in the operations.

According to Domina and de Dieu (2021), accounts from many scholars and policy makers lend credence to the fact that illegal mining flourishes due to poverty of the people in the local communities where these minerals are found. The socioeconomic significance of ASM lies in its contribution to the country's income (Shen and Gunson, 2006) through taxes, export earnings, and provision of raw materials for local industries for jewellery making. Mensah et al. (2020) have intimated that, indeed it is due to individual and communal notions of 'socio-economic and political insecurity' that motivates most community people to engage in illegal mining. Lack of proper regulation has also accounted for the multiplier effects of illegal mining. This consequently leads to the destruction of water bodies which threatens human life due to contaminated drinking water; invariably affecting the health of people. Bluntly speaking, it is due to the absence of security for local communities that has led to the increasing rate of illegal mining operations (Mensah et al., 2020).

Duncan (2020) in a study has emphasised that, it looks like the rich minerals that African countries have been endowed with has become one of a curse than a blessing. Africa is one of the richest continents in the world, if not the richest as stated by Ali Mazrui since it has the largest number of mineral reserves such as gold, diamond, platinum, chromite, manganese and vanadium unmatched by any other region of the world (African Union, 2009). But this has been a curse, since the African continent has the worst environmental record when it comes to the mining of these resources which invariably negate whatever proceeds that come in (Kuhndt et al., 2008). The legacy left by several years of mining of these minerals has been abandoned pits, heaps of sand on large stretch of land which cannot be used for farming unless reclaimed (Duncan, 2020). Another major issue in the African continent has been the uncontrolled mining activities of the ASM which has produced a lot of negative effects on the continent (Duncan, 2020).

It is believed that, small-scale mining operations in Ghana has been in existence for over 2000 years from the 7th and 8th centuries. Its activities keep on attracting the youth because of the quick returns in terms of income. Good Governance Africa (2021) has stated that, the current discourse on illegal mining is generally negative, since their operations are deemed as lawless and destructive of the environment and a threat to national security. The rapid decline of the country's forests reserves is as a result of 'galamsey'. Forests vegetation as a natural resource habitat, protect land and river bodies, it also aids the recycling of nutrients and serve as wildlife conservation (CSIR-Forestry Research Institute, 2017).

Miners associated with illegal mining activities use open cast techniques in addition to primitive equipment such as pick-axes, shovels, water pumps and obnoxious chemicals such as mercury and cyanide (Danyo and Osei-Bonsu, 2016). The practice is not only detrimental to human life, but to other living creatures and biodiversity found within the ecosystem (Adu et al., 2016). Those involved in the venture dig small pits, tunnels with simple implements using the hand to mine for gold (Ackah, 2019). Many people in Africa, see the mining sector especially the illegal small scale sector as a matter of survival (Andrew, 2015). There are a myriad of factors that contributes to the persistent flourishing of ASM activities in Ghana, which can easily be put into social, economic and political (Bansah, et al., 2018).

Legal framework for the regulation of the mining industry in Ghana

The passage of PNDCL 218, the Small-scale Gold Mining Law, 1989 led to the legalisation of small-scale mining giving assurance to Ghanaians that the government was committed to developing the sector after several years of control by foreign firms. This led to the registration of three hundred mining concessions in three years (Amankwah and Anim-Sackey, 2003). With the coming in of the 1992 Constitution, article 257 (5) vested all minerals in the President for and on behalf of the people of Ghana (Constitution, 1992). Flowing from this, once all minerals per law have been vested in the President, any person who wanted to prospect or mine could do so only under the existing legal regime and according to law. Mining can therefore be done by people who have sought the appropriate permits as well as licenses (Phillipe, 2019). Challenges associated with registration and the acquisition of permits and licenses with hefty costs have compelled about 60 to 80 percent of prospective miners to undertake the venture illegally.

The country's mineral laws reserve the small-scale mining exclusively for Ghanaians, but increases in gold prices during the year 2000 and the laxity and lack of enforcement of the mineral laws brought in a lot of foreigners in the industry especially the Chinese (Women In International Security (WIIS) (Policy Brief, 2021). Under PNDCL 218, one of the laws used to regulate small-scale in the country, ASM is the extraction of gold by an individual or group of people not more than nine, using a simple technique not high in expenditure or by a supportive society of about ten or more people (Small-Scale Gold Mining Law, 1989). There have been several mining laws which preceded these, but most of them have been repealed. Currently, there is the Minerals Commission Act, 1993, Act 450, Precious Minerals Marketing Corporation Law, 1989 (PNDCL 219), Environmental Protection Agency Act, 1994 (Act 490) and Water Resources Commission Act, 1996, Act 552.

There are other relevant Codes of Practice aside the legislative enactments. This includes Code of Practice for Small-scale Gold-mining Operations, Ghana's Mining and Environmental Guidelines, Minerals and Mining (General) Regulations, 2012 (L.I. 2173). The Minerals and Mining (Amendment) Act, 2015, Act 900 also provided guidelines that regulated the payment of royalties, confiscation of equipment used for illegal mining related matters and the Minerals Development Fund Act, 2016 Act 912 which established a fund to make funds available for developmental purposes in mining communities. Even though, these are laudable pieces of legislation for the industry, its intended core object of propelling the needed development in host communities where mining is undertaken leading to a lot of negative effects on the environment and on human security are yet to be realised.

Effects of illegal gold mining on human security

The governance as well as the social, economic and environmental challenges of mining is a source of concern globally. The ever increasing literature and the current national discourse on the subject points to the fact that, the issue is of concern to both the citizenry and policy makers. Illegal mining operations and its potential adverse effects on health, the environment and national security cannot be understated (Ros-Tonen et al., 2021). The negative consequences of illegal mining on health and the country's water bodies as well as the environment in general is very pervasive. This is due mainly to pollution from mercury (Hg), which is associated with ASM. In a study by Miriam et al., they observed that 44 percent of the documents they studied with environmental focus reported environmental degradation by mercury. 21 percent also indicated that illegal mining is the cause of destruction of the forest and ecosystem.

Other studies have also reported radioactivity which constituted 8 percent, hydrological changes 3 percent, greenhouse gas emissions 1.4 percent and contamination by oil and grease 1.4 percent. Seven studies which constituted 10 percent stipulated multiple environmental problems (Miriam et al., 2021). Some of the reviews done consisted mainly of 'environmental impacts' of illegal mining namely noise and air pollution, contamination of water and the soil, destruction of forests vegetation cover and agricultural lands (Aboka et al., 2018). In another study by Duncan (2020), it was revealed that 'Nemerow's pollution index' showed that cadmium, lead and iron were the major metals that had polluted water bodies and the soil in mining areas. Artisanal and small scale miners employ the use of techniques that produces a very high stress on the environment, with dire economic and health consequences that are inimical to human security with its attendant 'mortality and morbidity' (Akpalu, 2020).

Environmental effects

Most of the human insecurities discussed in this paper stem from the environmental effects from the mining of gold, especially that of the ASM. Kumah and Adum Nyarko (2018) buttressed this when they stated that removal of forest vegetation, degradation of land, contamination of water bodies and hydrological effects are caused mainly by illegal mining. Antwi et al. (2017) also in their study emphasised that, LSM account for depletion of the forests and degradation of the ecosystem due to the use of heavy equipment which removes vegetation, the soil, rocks in surface mining, discharge of cyanide from blasting operations and lastly, leaching of metals from piled up wastes - tailings from the mining activities. ASM further negatively affect the drainage system through the 'sluicing processes', where a lot of water is used to wash lighter gravel away which then flows to pollute rivers and streams (Kumah and Adum Nyarko, 2018). Further, illegal miners involved in small scale mining usually use mercury which is the easiest and cheapest means to separate the gold from the ore through amalgamation (Akabzaa and Yidana, 2012; Ahiamadjie et al., 2011). The negative environmental impact is all very visible to see in most mining areas (Owusu Boateng et al., 2014).

Undoubtedly, the greatest victim of illegal mining in the country is the environment. These effects on the environment can be found in the various scholarly literature on the subject. These includes the degradation of the land including biodiversity, pollution of the air as well as heavy contamination of the soil and water due to the use of heavy metals (Samuel, et al., 2012). When the top vegetation cover is removed, it strips the land bare where it becomes easily prone to erosion. The main cause of water pollution in the country is the 'dredging and washing' of mineral ore in Ghana's most important rivers and streams (Aryee, 2003). When gold is separated from the ore, the "amalgam of gold and mercury" is then heated to extract the gold while the mercury is left to evaporate into the air which consequently flow into rivers in the form of acid rain polluting the air as well as the freshwater meant for drinking (Gyamfi et al., 2020). Before gold can be mined, the vegetation cover has to be removed to make the land bare, which causes soil erosion which leads to the siltation of rivers (Kumah and Adum Nyarko, 2018).



In instances where heavy equipment such as excavators as well as bulldozers are used, a lot of damage is done to the forests and ecosystem (Eduful et al., 2020). Mantey et al. (2020) have observed that, ASM results in a lot of spillages of oil and grease due to leakages of petro-chemicals from pumps, processing plants as well as other equipment used in the process of prospecting for gold. Even though the environment in which we live in present mankind with countless opportunities, human activities have tended to affect the environment negatively due to cultural and technological advancements (Ostergren and Le Bossé, 2011). Human being's attitudes towards the environment has posed serious and persistent challenges due to degradation of the environment and climate change (Suglo et al., 2021). It is the chemicals used for illegal mining that destroys the ecological balance of the environment by causing damage on the landscape, ecosystem, human health and water bodies (Martinez, 2002).

Akabzaa and Darimani (2001) have also intimated that illegal mining has left many rural host communities without clean air and potable water in addition to other existential threats to the environment. There is overwhelming evidence that points to the fact that mercury and arsenic pollution of biodiversity samples occur in areas that are closer to mining operations in Ghana (Obuasi Municipal Assembly Medium Term Development, 2006). Boadi et al. (2016) have stated that illegal mining activities the last five years has caused a degradation of the forest reserve in two communities within the country that spans about 2.5km² (4.4%) of the forest reserve that serves as the shelter belt for the Offin River. It is in evidence that, the destruction of the forest reserve that acts as canopy for the Offin River was destroyed at an alarming rate of 0.88 percent annually through illegal mining (Boadi et al., 2016). The threat posed by illegal mining operations in forest reserves affects the sustainability of the forests and impacts negatively on the livelihood of host communities. This consequently will affect agricultural production (Boadi et al., 2016). Surface mining, which is very pervasive removes the surface soil and vegetation cover rendering the land infertile for agricultural production (Schueler et al., 2011).

A study by Schueler et al. (2011) has shown that, surface mining has caused deforestation of about 58 percent, and 45 percent to farmlands within mining communities with associated effects such as farmers entering forests enclaves to farm because they do not have lands to grow their crops. This lends credence to the fact that, communities in areas of illegal mining are losing their livelihood pointing to the fact that the rich resources endowed the country are fast depleting with careless abandon (Schueler et al., 2011). The use of dynamite to blast rocks also results in the release of dust particles which affect air quality. Further, the use of obnoxious substances for mining such as lead, mercury, copper, selenium, cadmium, arsenic and chromium which are heavy metals are mining's most important pollutants (Sen and Chakrabarti, 2009). These invariably inhibits the activities of biodiversity particularly when the concentrations are high (Lipton et al., 1994). Some of these metals through bonding form chemical compounds that are poisonous, 'carcinogenic or mutagenic' even when the concentrations are low (Picardo et al., 2009).

Health

Studies by Kumah and Adum Nyarko (2018), Afrifa et al. (2017) and Mensah et al. (2016) have all highlighted threats to health as the second factor causing human insecurity in the literature on the effects of the mining of gold in the country. In Miriam et al. (2021) study, 62 percent of the articles reviewed indicated environmental concerns as a key challenge by ASM. Metallic substances and mercury were the main causes of health challenges from illegal mining due to heavy metal pollution of drinking water and this constituted about 43 percent of articles they reviewed. Mercury alone contributed 23 percent of effects on health in all the works reviewed by the authors. The negative effects of radionuclides, that is radioactive materials that occur naturally constituted 7 percent, injuries due to illegal mining stood at 7 percent, injuries and deaths from abandoned mining pits indicated 5 percent, dust 3 percent and water stored in pits that breed mosquitoes causing malaria that is 2 percent were less addressed in the literature.

Six other studies in the literature that constituted 10 percent indicated multiple factors that accounts for health risks due to mining. The analysis revealed that the health risks from poisonous metallic substances are higher when primary data is considered. Health challenges resulting from the use of mercury in ASM included eyes that are itchy, persistent headache, numbness and rashes on the skin (Afrifa et al., 2017). Increased prevalence of 'respiratory infections and pulmonary related diseases' such as "asthma, pneumonia, bronchitis, emphysema and tuberculosis" have been reported in studies by Ayaaba et al. (2017) and Jonah and Abebe (2019). Nakua et al. (2019b) and Calys-Tagoe et al. (2017) have also documented injuries resulting from bruises, wounds, lacerations and fractures that occur due to falls, slips and the handling of mining equipment. Akabzaa and Darimani have intimated that, the increased rate of cold and flu' are due to contamination of the air caused by mining activities. Aboka et al. (2018) have intimated that artisanal small-scale miners are also exposed to the potential dangers of 'noise-induced hearing loss' (NIHL).

In a study by the Centre for Environmental Impact Analysis (2011), the authors disseminated their findings titled the "Human health risk assessment and epidemiological studies from exposure to toxic chemicals" in three areas, namely the Tarkwa-Nsuaem Municipality, Prestea Huni Valley District and Cape Coast Metropolis. It was found out that residents in two mining areas such as Tarkwa-Nsuaem and Prestea Huni Valley had high concentration of chemicals in their "blood and blood serum" as a result of the drinking of contami-

nated water polluted with 'arsenic, cadmium, cobalt, copper, lead, manganese, mercury and zinc when compared to their counterparts in Cape Coast. This was as a result of the taking in of contaminated water and cassava (Kusi-Ampofo and Boachie-Yiadom, 2012). Local communities close to mining areas such as Kenyasi and Asutifi north district suffered from health challenges as compared to their counterparts who live far away from the mines (Mensah et al., 2021).

Public health challenges from illegal mining during the extraction and processing of the mineral ore also poses a critical danger to human health. Skin infections such as rashes and itching, eye diseases as well as in some instances mental diseases occur due to the toxic nature of the heavy metals used (Adu-Yeboah and Obiri-Yeboah, 2008). The nails of some of the miner's hand and foot are "hardened, deformed or completely detached from the hands and feet". Diseases such as 'tuberculosis and silicosis' and water-borne infectious such as 'schistosomiasis and onchocerciasis' have also been associated with illegal mining (Nyamekye, 1996).



It is also on record that, the mining areas have had an increase in 'vector-borne diseases' among miners and inhabitants of mining communities' (Akabzaa and Darimani, 2001). In the view of Ahern and Stephens (2001), mining is considered as one of those occupations that is potentially dangerous worldwide and involves injury as well as loss of life and other associated respiratory and pulmonary diseases. The WHO (1989) report in Geneva on artisanal mining revealed that the use of mercury by small scale illegal miners poses a health risk to the miners as well as people living around those communities. In a study by Owusu Mensah and Darku (2021), about 90 percent of the respondents revealed that the colour and smell of the various freshwaters they used to drink has changed completely since the metals it contains exceed the levels that is safe for human consumption making it unfit generally for domestic use.

Ackah (2019) has reinforced the notion that illegal miners employ crude methods in their quest to mine gold and it is believed this poses a critical challenge to public health due to the use of toxic chemicals. Unlike corporate organisations or LSM where machinery is used, with illegal mining simple implements such as pickaxe and shovel are used which are exacting on the human body. Sometimes in order not to feel the stress on the body more, the miners resort to hard drugs such as marijuana. The continuous use of this makes them become addicts which has a negative toll on public health.

Education

According to Antwi-Boateng and Akudugu (2020), Azumah et al., (2020) and Eduful et al., (2020) child labour as well as school drop-out is rampant in all the communities where gold is mined which poses a significant challenge to sustainable human security. Since when people are educated, the prospects of employment in the formal sector becomes high and they can take care of their families who would intend become responsible citizens in the future. Teenage pregnancy affects girls of school going age and put them out of school

which invariably impact negatively on their future and their fundamental right to education. Many children do engage in ASM which has culminated into the loss of interest in education, academic performance that is poor and disrespect to education authorities. Four out of every ten children in school “drop out” from the educational system to undertake illegal small-scale mining and earn enough income more than their officials in school (Bansah et al., 2018).

The Education Management Information Service has indicated that, in 2017 two hundred pupil dropped out of school out of one thousand and eight hundred Junior High School pupil at Tutuka Central Circuit, Obuasi in the 2015/2016 academic year. Most of these finally ended up at illegal mining sites. Illegal mining has also contributed to the high turnover of students, rising rate of teenage pregnancy, rude attitude towards the elderly and other social vices such as the smoking of herbs and other harmful substances as marijuana (Owusu and Dwomoh, 2012). School dropout rate from the Education Office in Kade depicts a high incidence of students dropping out of school in Kade and Apinamang communities (Owusu and Dwomoh, 2012). In Akwatia, only 42 students out of a total of 88 that had been enrolled were able to complete the Junior High School. The percentage of the dropout stood at 52.27 percent. Further, of the 1,468 deliveries that occurred at the Government Hospital in Kade, 18 percent being 260 teenagers were among the number (Owusu and Dwomoh, 2012).

The myriad of effects of illegal mining on society have been well catalogued by both academics and many international institutions inclusive of the International Institute for Environment and Development (IIED), the World Bank and the International Labour Organisation (ILO) (World Bank, 2013). The social effects are felt largely in the educational as well as the public health sector. Issues of child labour has also been another key consequence of illegal gold mining on society due to high dropout rates together with absenteeism. The monetary returns from the mining operations are instant and juicy that many children who taste it become intoxicated with the accompanying wealth where they exchange knowledge with fleeting wealth even though knowledge is power. Even with stiff opposition from parents some of these children care less because they are able to take care of themselves from this high risk, but quick returns employment. Some acquire assets that their parents could not dream of having in their lifetime, and are thrown into social vices such as taking of hard drugs, violent criminal acts, teenage pregnancy and prostitution.

Food insecurity

Farming lands and the landscape become conspicuously destroyed after ASM with piles of waste and abandoned excavations stretching over long distances while the land becomes barren (Aryee et al., 2003). These lands on which the mining occurs are not reclaimed, especially in instances where the illegal miners move from one place to another (Nyame and Grant, 2014). It is this form of degradation of the land that affects the livelihood of farmers and invariably leads to food insecurity (Miriam et al., 2021). Various studies that document changes in the hydrological system that disrupts water systems through the pollution and diversion of streams all point to ASM (Botchwey et al., 2019). This reduces the capacity of the soil to stem run off water as a result of infiltration difficulties (Awotwi et al., 2019). This eventually leads to flooding during heavy rains, sedimentation and water pollution which becomes a challenge to human security (Awotwi et al., 2019; Botchwey et al., 2019). Miriam et al. (2021) invariably have concluded that heavy metal and poisonous substances then contaminate the soil, water and crops.

Studies by Amoakwah et al. (2020) as well as Bempah and Ewusi (2016) reported of food poisoning due to “lead, cadmium or cyanide” and the high concentration of metallic substances in sea foods and farm crops. Antwi-Boateng and Akudugu (2020) have also indicated low yields from farm lands and rising prices in food (Agyei-Okyere et al., 2019; Botchwey et al., 2019) as some of the issues on food insecurity resulting from illegal mining. This affects vulnerable people such as women and the disabled (Arthur-Holmes and Abrefa Busia, 2020). Hauserman et al. (2018) have also indicated a chain of issues that leads to food insecurity such as destruction of the soil structure and hydrology as a result of the use of heavy equipment such as excavators. Further, the destruction of farm lands, farmers abandoning farming and moving to illegal mining because of the immediate returns, leading to shortages of food in markets with accompanying higher prices affects the expenditure of consumers.

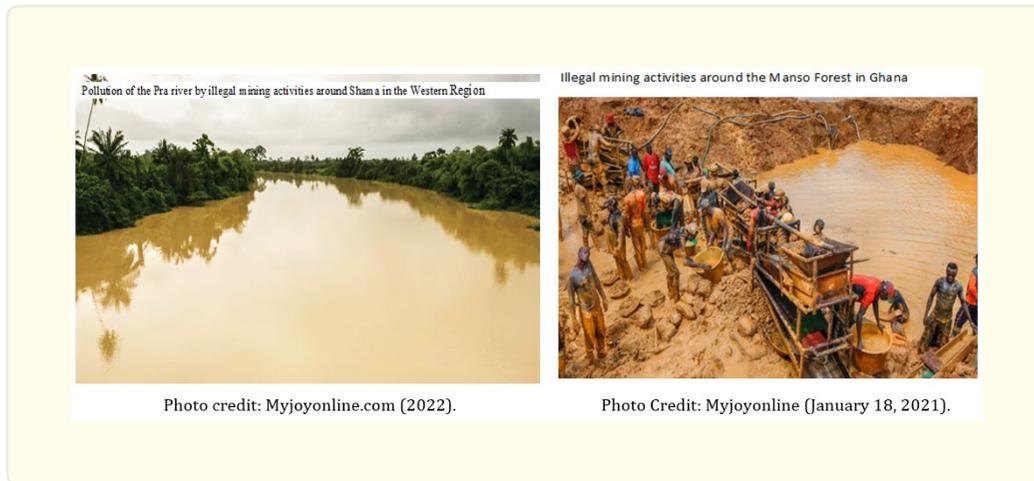
The activities associated with illegal mining places it in a situation where a lot of water is used, rivers and streams polluted and diverted downstream to serve as drinking water for nearby communities (Safe Drinking Water Foundation, n.d). In the view of the World Bank and the Mining Reform Report (2003), water is seen as mining's worst victim. Before the government commenced its war on the operations of illegal mining in 2017, the Ghana Broadcasting Corporation (GBC) in one of its commentaries on the negative impact of illegal mining on the 'environment and the economy' stressed that River Tano, drinking water for over 60 percent of the people in the then Brong Ahafo region of Ghana, had been severely affected by illegal mining (Ghana Broadcasting Corporation, 2017).

Freshwater used for domestic activities is heavily affected by mining, in view of the fact that large volumes of it are used during the processing of the mineral ore (Asklund and Eldvall, 2005). It is estimated that about five tons of dangerous chemicals such as mercury is released into rivers and streams annually by small scale mining in the country. 'Acid mine drainage, heavy metal pollution, erosion and sedimentation' are some of the negative impacts of illegal mining on the quality of freshwater meant for drinking and domestic use (Safe Drinking Water Foundation, n.d). In 2011, Ghana Water Company Limited (GWCL) reported that it was temporarily shutting down the treatment plant at Kyebi which provides water for surrounding communities in the Eastern Region due to extreme contamination of the Birim River from illegal mining operations which is the main source of water for the company (Modernghana news, 2011). In the cause of writing this paper, Kyebi one of the areas deeply affected by illegal mining had been flooded after the Birim River overflowed its banks in October, 2022. Opoku-Ware (2010) has stated further that the chemicals that are used for blasting escape into the atmosphere getting the air polluted. Consequently, neighbouring communities have been advised not to use rain water due to its contamination.

Aboka et al. (2018) have also intimated that Kwabrafo, Pompo, Nyam, Jimi, Akapori, Wheaseammo and Kunka the most significant streams and rivers in the Obuasi municipality have all been heavily contaminated due to mining and other activities by humans. This has left the local community with no freshwater for drinking and domestic use because they are polluted while others have dried up. Yeboah (2008) has opined that, rivers and streams in the Obuasi Municipality have all been heavily polluted as a result of illegal mining. Yeboah's study again showed that most freshwater resources, such as streams and rivers affected by chemical pollution have dried up. In some two communities Sanso and Abompe in Obuasi enclave where Aboka et al., (2018) conducted their study, community members complained that fresh water pumped from boreholes were contaminated. This has resulted due to underground water aquifers being polluted by chemicals (Aboka et al., 2018). The unregulated use of poisonous chemicals by illegal mining activities which leaves behind these dangerous substances consequently leach into nearby rivers and streams (Suglo et al, 2021).

In Kenyasi in the Ahafo region, it has been reported that haphazard operations in prospecting for gold has resulted in the destruction of several parcels of land which were meant for agriculture (Opoku-Ware, 2010). Moreover, some cocoa and cashew farmers are selling off their lands to illegal small-scale miners because of the instant returns (Ghana Broadcasting Corporation, 2017). Aborah (2016) have again stated that between 2008 and 2012, five years running farm produce in Amansie West has declined substantially. Further, the production of food staples within the local communities such as 'cassava, cocoyam and plantain' have reduced significantly because most farmers now prefer selling their lands to be used for illegal mining operations. It is estimated that, the yield of cassava reduced from '18,957 metric tons for the crop season in 2008 to 10,200 metric tons in 2011 (Aborah 2016).

It also came to the fore that, land for the cultivation of farm produce in the Amansie district reduced from 12,911 to 7,873 hectares, a reduction of about 39 percent between 2008 to 2011 (Aborah, 2016). About 50 percent of illegal miners had concessions of more than five acres, which were lands that were previously under cultivation (Aborah, 2016). Duncan (2020) has also reinforced the argument that, illegal mining activities results in the pollution of water through the discharge of cyanide and organic chemicals which are all toxic substances used for processing the mineral ore and these eventually seep into underground aquifers. This results in a health hazard for communities that depend on those sources of water for drinking (Duncan, 2020).



In a study by Kusi-Ampofo and Boachie-Yiadom (2018), one informant from the treatment section of the Ghana Water Company near the Bonsa River intake intimated that, “the soil is heavily scooped and processed for gold, after which debris is abandoned in and around the river”. There is overwhelming evidence to suggest clearly that, the colour of the Bonsa River currently is ‘opaque brown’ and it was revealed that this was not how it was previously (Aboka et al., 2018). In one study from the Talensi-Nabdam district it came to the fore that the Datuku River, one of the water sources for drinking in the Upper East region had ‘one nitrite-nitrogen turbidity, while borehole water in Accra had 447 nitrite-nitrogen turbidity midstream’ (Aboka et al., 2018). The required average ‘level of turbidity’ in all the sample sites were far in excess of what is required as the maximum for fresh drinking water required by the World Health Organization (WHO) in 2008 (Cobbina et al., 2013).

In the study by Abokah et al. (2018), it was revealed by one official from the Obuasi municipality of the Ministry of Food and Agriculture that, cyanide and arsenic were present in the land used to cultivate food crops due to illegal mining and are not able to produce the expected yields when plants are grown on them. Those communities facing this challenge included ‘Sanso, Apetikoko, Dokiya and Ahansonyewode’. Schueler et al. (2011) again observed that in one town called Twiyaa, there was overwhelming evidence that there is lack of potable water and decreasing farmland caused by the Bogoso-Prestea mine. Most of the farmers in Twiyaa community complained about the negative effects of mining on their water bodies and the ecosystem.

Three rivers that provide drinking water for about 15,000 inhabitants of Awusu, Kutawani and Abugyisa and its surrounding villages are diverted in the search for gold by illegal miners making the water unwholesome (Ofori-Atta, 2015). The three water bodies have all been contaminated by cyanide and mercury (Ofosu-Mensah, 2017). Owusu Boateng et al. (2014) in a study at the Atiwa district have intimated that, farmers in local communities where illegal mining is practiced faced several risks. This includes contamination of water from toxic chemicals, air and soil pollution and destruction of the forest cover by the use of heavy machinery. Low productivity has also been observed by farmers from immature pods falling before maturity, leaves of plants getting dried up and becoming yellowish and cocoa farms closer to mines not performing up to capacity. Some farmers confessed that, they have been forced to join the illegal mining because they face unemployment (Owusu - Boateng et al., 2014).

Moreover, there has also been reports of loss of aquatic lives and a total destruction of the ecosystem. All of these have negative effect on cocoa yield (Owusu-Boateng et al., 2017). Snapir et al. (2017) in a study examined the effects of ASM in areas where cocoa is grown and their findings revealed that, illegal mining went up about three times between 2011 and 2015, which resulted in the ‘direct encroachment’ of 603 hectares of farm land in Apamprama and Atiwa forest reserves. Further, the study also observed that illegal mining was increasing at a fast pace in most major rivers in the country including the Offin, Ankobra, Birim, Anum and Tano with the

downstream land and water heavily polluted. In a study by Ofosu-Mensah, it came to the fore that illegal mining operations has led to the destruction of cocoa farmlands at Akrofufu, Adadientam, Asiakwa, Atiwa and Sadwumase. Cocoa is one of the country's foreign exchange earners, and if this happens it will affect the foreign exchange earnings of the country.

ASM has also led to the contamination of over 200 water bodies, including major rivers and streams in host communities (Akpalu, 2020). The degradation of fertile lands, pollution of air and soil, contamination of major water bodies and rendering farmers unemployed leading to price hikes in food are the order of the day in galamsey areas in Ghana (Danyo and Osei - Bonsu, 2016). Hands that could have been used on the farm are also diverted to illegal mining because of the quick returns there (Antwi et al., 2017; Aragon and Rud, 2016) which threatens sustainable livelihood.

National revenue

Government officials have emphasised that, local chiefs, officials in public offices and businessmen frustrate state institutions in their quest to ensure that people conform to the existing legal regime (GoG, 2011) thereby leading to the loss of revenue in the form of taxes that could have been got for national development. Illegal small scale mining affect host communities socio-economically. First, local government institutions lose revenue from rent, taxes and royalties (Alhassan, 2014). Endemic corruption is also associated with ASM also known as galamsey since those engaged in it are always willing to bribe their way through when caught in the cause of their destructive activities on the environment (Botchwey et al., 2019) at various levels (Antwi-Boateng and Akudugu, 2020).

On national discussions of restoration of degraded forests lands, the ex-Minister of Lands and Natural Resources in 2017, John Peter Amewu stated that it will require GH¢60,000 currently about \$3,000 to redeem each hectare of land destroyed as a result of illegal mining operations. Nationwide, about 238,000-kilometer square of land has been degraded which constitute about four percent of the total land size of the country will therefore require several millions of dollars to reclaim together with the polluted water bodies and alternative livelihood provided to farmers (GhanaWeb.com, 2017). Nwokolo (2019), has also intimated that the country will require about \$250 million to reclaim lands that have been degraded as well as water bodies contaminated by illegal mining operations alone in the Western region. This will impact negatively on resources that could have been used to provide other infrastructure such as schools, hospitals and roads to improve on national development in the country.

National security

The environmental degradation of the lands will eventually lead to land resource scarcity with the potential danger to trigger off conflicts (Wunder, 2005). Hilson (2002a, b) has intimated that this has the tendency to lead to conflict between host communities and miners on access and land use rights and eventually threaten national security and development (Maconachie and Binns, 2007). In view of the fact that, the extraction of gold is done by the illegal miners using toxic substances its impact on the environment has been very devastating (Sousa and Veiga, 2009). It has been chronicled that, the country is likely to face the resource curse that has bedeviled other African countries (Adler and Berke 2006). In the Western region of the country, it has been revealed that there is rapid degradation of the forest and urbanisation since the period 1986 to 2002 (Kusimi, 2008). Surface mining has also been eroding the livelihoods of farmers and lands meant for grazing by herders, this also has the potential to lead to conflict within those areas (Kumah, 2006).

In Wassa West District, about 3,168 hectares of forests vegetation cover have been removed due to the operations of three mining concessions between 1986 and 2002 (Schueler et al., 2011). Illegal mining is seen as a threat to national security in general, and more especially the host communities. Alhassan (2014) has intimated that, illegal mining can lead to a collapse of the governance structures in a country through bribery by the perpetrators of the act in order to be able to continue with their illegal acts as emphasised by the deep state theory (Akmei, 2014). It is abundantly clear in the mining communities that, as people make money illegally through 'galamsey' they become arrogant and disrespectful of public institutions such as the police and the environmental protection regime. This is an affront to the rule of law.

Illegal miners can threaten the security of the state as happened in Obuasi in March, 2013 when some illegal miners who were well-armed stormed the street firing guns while residents flee for their dear lives (Daily Graphic, 2013b). In addition to the above threats, in 2014 on March 19, in the same area where the 2013 incident occurred, an illegal miner used explosives on a patrol team that was providing security in the area, all geared towards scaring them away from where they undertake their illegal operations (Daily Graphic, 2014). Conflicts between chiefs, traditional authorities and illegal miners have also been reported in some mining communities (Boateng et al., 2014). Hilson (2002b) has emphasised that, no industry of man has induced more land conflicts than mining. Conflicts that emanate from the use of land for mining activities has been highlighted by Davis and Franks (2011) and Obara and Jenkins (2006).

It has been established clearly that, in situations where the land is degraded, it has the potential to trigger violent conflict because of the unavailability of arable land for other developmental purposes such as agriculture. This has been buttressed by Obi (2009), Okonta (2006) and Omeje (2006) as well as the World Bank (2000). Agbiboa (2013), has intimated that, protracted violent extremism in the Niger Delta in Nigeria is as a result of environmental degradation. Gleditsch (1997) on his part has emphasised that, lack of sustainable practices that leads to lands being degraded and harmful environmental practices are the main sources of violent conflict in the world.

Violation of fundamental human rights

Uncovered pits breeding mosquitoes and also serving as death traps from mining operations that are illegal have been reported by Ferring and Hausermann (2019), Kumah and Adum Nyarko (2018) and Baah-Ennumh and Forson (2017). Opare et al. (2012) in a study has reported that during an outbreak of cholera in East-Akim Municipality in the Eastern region 40 percent of the patients were galamsey workers. This is caused mainly by lack of clean drinking water and unhygienic sanitary conditions. This is an abuse of their right to safe and hygienic environment for their development. Injuries occurring among illegal miners is very high because of nonuse of Personal Protective Equipment (PPE) (Nakua et al., 2019a). Antabe et al. (2020) and Wan (2014) have also documented some psychological challenges resulting from work related stress, noise pollution and anxiety resulting from loss of farmland due to illegal mining.

An incident occurred where a mine caved -in on an illegal mining site in Dunkwa where almost hundred lives were lost near the Offin River (Adjei et al., 2012; Somuah, 2012). Further, another incident happened in the Ashanti region near a mining community at Attaso where twelve illegal miners were trapped in an abandoned mine pit in which they were prospecting for gold and it collapsed (Daily Guide Ghana, 2011). This happens all the time to illegal miners since they do not take any precautions before going for their hunt for the precious mineral, gold. This is a gross violation of their right to life as emphasised under international law and the 1992 Constitution of Ghana. On 13th November, 2009 a mining pit caved in at Dompouse, Ashanti region leading to the loss of 18 miners' lives, which included 13 women who were working as porters. It has been described as one of the worst in the country's mine disasters.

Illegal mining deaths in the country has become a daily occurrence (Gilbert and Osei-Bonsu, 2016). Newspaper reportage on 15th October, 2022 that an abandoned AngloGold Ashanti pit has taken the lives of ten people in Okyerekrom according to the chief of the town is one of the latest occurrences in the country. Increasing incidents of accidents where miners get trapped in pits and caved - ins are also a daily occurrence together with drowning in abandoned pits. This leads to the loss of breadwinners with its consequences on dependants who fall prey to social vices such as teenage pregnancy, alcoholism and drop out of school (GhanaWeb, 2022). On the same day, another expert warned that Galamsey will lead to a situation where Ghanaians will become sick and angry. There has been a protracted conflict between AngloGold Ashanti and some illegal miners operating in the concessions of the company and local people who have been displaced by the company's activities (Kotey and Poku Adusei, 2009).

Human security approach to illegal mining

Engwicht and Grabek (2019) have proposed a human security perspective on the whole discourse on mining. The authors propose a human security paradigm that examines the significance of mining to the lives and development in the conditions of people in areas where there are extractive resources as well as governance reforms. Johnson (2019) in a study on Sierra Leone and Ghana has concluded that, rather than protecting the security of the citizenry in areas where mining goes on, institutions instead have been doing

the opposite. Lack of an enforcement regime to protect the environment by institutions designated for this purpose has become detrimental to people's lives as well as the environment (Suglo et al., 2021). Human security approach has emerged as a security policy and analysis that lay emphasis on individuals as the primary beneficiaries as well as the main referent in all developmental activities (Hudson et al., 2013).

At its basic core, human security places emphasis on the individual and moves beyond the traditional approach that emphasised state-security and deal with broader notions especially development and human rights. The UN Human Development in 1994 stated that, policy making regarding security has been narrowly interpreted. The emphasis has always been on the military security of the state than to the people. And that security must be seen as being protected from 'diseases, hunger, unemployment, crime, social conflict, political repression and environmental hazards' (UNDP, 1994). Consequently, policies relating to security within the state must be widened to embrace not only 'the security of borders [but] also . . . the security of people's lives' (UNDP 1994: 23). The new paradigm places emphasis on the "legitimate concerns of ordinary people [for whom] a feeling of insecurity arises more from the worries of daily life than from the dread of a cataclysmic world event" (UNDP 1994: 22).

Seven key issues that were identified by the Report included the environment which has been very much abused by illegal mining due to the destruction of farm lands and people's livelihoods. The others included 'economic security, food security, health security, personal security, community security and political security'. Let me emphasise here that, the six mentioned here all depend on sustainable environmental practices. In fact, in view of the significance of these elements to human life, those who drafted the report were not interested in establishing any 'definitional boundaries' and were of the view that, the 'all- encompassing and integrative qualities of the human security concept' were the most important attributes of the new approach (Hudson et al., 2013). Security connotes the elimination of all threats to our civilised values, especially those that are deemed to have a certain level of "urgency and necessity about them" (Williams, 2007).

The Report placed emphasis on the fact that, human security 'is not a concern with weapons—it concerns human life and dignity' (UNDP 1994). Four crucial issues then emerge from this viewpoint on human security. First, it is universal, second, the elements contained therein are interdependent. Moreover, it can best be secured through the prevention of any threat to the seven key elements and lastly, but not the least, the point of reference must always be the people (Newman 2010, p. 78). Concentration was paid to economic security in relation to access to financial resources and international market to maintain the economic power of the state (Williams, 2012). This changed after the 'people -centered' definition was adopted by the 1993 and 1994 Human Development Reports of the United Nations Development Programme (UNDP, 1994, 1993).

Khagram et al. (2003) are of the view that, human security can only be realised in an environment which is conducive for developmental purposes. In the view of the Commission on Human Security (CHS) (2003), it is only when 'political, social, environmental, economic, military and cultural systems" that makes it possible for mankind to live a life that is worthy and dignified which ensures sustainable livelihood can human security be attained. Economic insecurity as well as challenges with respect to health exacerbates due to a polluted environment, climate change and environmental degradation which all affect food security. Health and economic insecurity can occur due to environmental pollution, climate change and degraded environment can also trigger food insecurity and threaten personal, community and political security of society (Umukoro, 2021).

It has been emphasised that in the 21st century, the security of most nations will be contingent on the natural resource endowments they possess or 'natural security' (Parthemore and Rogers, 2010). Globally, all countries both developed and developing ones rely on the availability of fresh drinking water, fertile lands, seafood, biodiversity, oil for energy, minerals as well as other natural resource endowments for use by their people (Parthemore and Rogers, 2010). It has been posited by the United Nations that, about eleven extreme violent conflicts in the world since 1990 have been precipitated by the depletion of natural resources (Halle, 2009). Resource driven conflicts may increase as natural resources get depleted as the population increases. By 2050, the world's population will reach nine billion while the land on which we live is fixed (Halle, 2009). This growth will put enormous pressure on the world's natural resources (Parthemore and Rogers, 2010).

The 'United Nations World of Water Report' has concluded that, increasing population and climate change will lead to increasing water stress by the year 2030 (World Water Assessment Programme, 2009). Agriculture accounts for about 80 percent of world water consumption with more than half of the crops of the world depending on irrigation (Water Encyclopedia, 2010). Taking into consideration population growth, it is estimated that the world will need between 14 to 17 percent of fresh water for irrigation by 2030 (Global International Water Assessment, 2003). According to Hobbes (1651), a secured "commonwealth" is one where violence may be present or other 'anxiety-producing events', but the people should not unnecessarily fear for their safety, inclusive of their property. Security is guaranteed because all the citizenry has agreed to give their 'natural liberty to a corporate entity' through the social contract whose duty is to ensure maximum security for all. In this sense, once power has been given to elected officials it is imperative that all the essentials of human security are protected for the maximization of the human potential. Consequently, illegal mining which tends to run the state into disaster must be checked by officials to ensure the safety of the people.

Governance and policy reform

It is incumbent on the state to enforce the regulatory regime put in place to ensure the control of the mining industry in the country. It is one thing promulgating the laws, and another implementing them. There must be strong political will to deal with the activities of illegal miners. Even though there have been military operations and other national security interventions towards dealing with people mining illegally, there must be a national consensus to drastically deal with the practice. Further, there must be a conscious effort on the part of government to ensure policies that promote sustainable environmental practices that do not compromise the environment. Obnoxious chemicals should be banned to ensure a mining regime that is free of chemicals such as mercury, arsenic, cadmium, copper and the others. It is these heavy metals that continue to contaminate drinking water and pollute the ecosystem with destructive effects on biodiversity.

Policy makers should be reminded that, unless there are alternative livelihoods towards solving the bread-and-butter issues and dealing with poverty, illegal mining activities cannot be stopped. This is because, illegal small-scale mining is poverty driven. Further, land tenure rights must be improved to ensure that, people do not just get up, give out lands and do not have any responsibility to the community and mankind on what the land is used for. Those who give their lands out for the environment to be destroyed by illegal mining are tacit abettors, facilitators and instigators of the act. In addition, the legal regime should be fashioned out in such a way that, public officials that fail to implement approved policies towards dealing with the illegal act should also answer for their actions by being prosecuted in addition to the direct perpetrators.

Mining and forestry laws must be duly harmonised to improve on people's prospects for jobs that have the least effects on the environment. What is happening currently in the mining sector where forests lands have been encroached with the top vegetation removed causing erosion and pits being dug indiscriminately in protected forests that serve as shelter belts for rivers and other water bodies must be stopped by those charged with the responsibility of ensuring the protection of the environment. To reinforce this, the majority leader in Parliament on the 10th of November, 2022 called for a review of both the constitution and mineral laws to protect the natural resources of the country (Daily Graphic, 10th November, 2022).

It is imperative to ensure that, Environmental Impact Assessments (EIAs) as well as the social impacts of small-scale mining are thoroughly done and all stakeholders including the community involved and consensus reached before licenses and permits are issued. The Directive by the President that all mining licences shall be granted with the consent of the Paramount chiefs is laudable (Graphic, 14th October, 2022). Once licenses are issued, there must be an environmental regime that will audit and monitor what is being done to ensure sustainable environmental practices in tandem with the law. People should not mine and thereafter abandon the pits. It must be reclaimed for use by posterity. In view of the fact that, there is quick and high returns for illegal mining, perpetrators are often quick to bribe officials including the security personnel deployed to enforce the law. These personnel must be resourced and retooled enough to make it difficult for them to be compromised. Special mining levy should be paid by those engaged in it for use in reclaiming the land. Monies meant for this special exercise must be ring fenced to make sure that, it is always available to be used for the intended purpose that is reclamation of mining lands.

Prospective small-scale miners should be educated and informed about their rights and responsibilities under the mining laws, how to acquire permits and licenses and operate legally. When this is done and an efficient and effective monitoring regime is instituted it will reduce the number of miners who operate illegally. The associated costs, bottlenecks and bureaucratic impediments put up by officialdom should also stop to make sure that acquisition of licenses become friendly, decentralised but strictly legal. The Ministry of Lands and Natural Resources (MLNR), the Minerals Commission, the Ghana Chamber of Mines, chiefs in host communities where mining is undertaken and the Metropolitan, Municipal and District Assemblies (MMDAs) must all be tasked to ensure the strict enforcement of the regulatory framework governing the sector.

The Tarkwa University of Mines should also play a leading role in undertaking studies on practices that can be used to reduce the current stress on the environment especially mining, that is chemical free and the results disseminated. Special funds can be made to the institution from the mining tax to enable them deploy inspectors to mining sites to ensure compliance and enforcement of mining regulations. This can also be the contribution of the organisation to the development of the country. Some advocates argue that, ASM should be regularised and made formal because it serves as employment for a lot of people in Ghana (Akabzaa and Darimani, 2001), while some others have contrary opinion. Those who are against the activities of *galamsey* are of the view that, because it is unregistered and rely on simple and crude implements it is easy to be carried out by few people anywhere and the consequences on the environment is quite destructive (Armah et al., 2013). Further, the consequences for the destruction of the land is the unavailability of farmlands for agricultural purposes (Boateng et al., 2014).

Illegal mining and protracted public health challenges have also been documented by several studies (Armah et al., 2012). Opponents of the operations of illegal mining posit that quite a chunk of revenue is lost through tax and royalty payments to the state because the operations are illegal (Tschakert, 2009). This is a threat to the security of the state since if the state is denied the needed revenue it is supposed to have, it will not be able to carry out its intended developmental activities which could lead to agitation and invariably chaos in the country. It is trite that, as illegal mining continues to pose severe threats to the environment with dire consequences, the negative effects outweigh the benefits from the industry. It is these that have propelled attempts to provide a regulatory regime towards dealing with the myriad of challenges confronting the sector.

The country has one of the best legislative and policy frameworks. Indeed, some experts have argued that Ghana has some of the most dynamic and comprehensive laws on SSM (Hilson, 2017). Even though, there is a regulatory regime, illegal mining continues to increase, depicting that the legal regime has not been able to achieve the intended impact. Hilson et al. (2014) have argued that, the ineffectiveness in the operation of the laws are due to the fact that there is lack of political will to implement these laws, and then the narrow parochial self-interests of some individuals in the sector. The regulatory regime in force to control artisanal mining in the country duly stipulate the processes for the acquisition of license for the sector. However, the acquisition processes are cumbersome in addition to being expensive (Hilson and Potter, 2005). With little or no formal education, the procedures seem complex and no money to complete the processes (Bansah et al., 2018).

Moreover, the processes are accompanied by delays, and so with these challenges coupled with travelling from their villages to undertake them, the easiest cut is to get engaged in the illegal process (Hilson and Potter, 2005). Tschakert and Singha (2007) have again intimated that, the absence of assurances for permits to enable prospective miners undertake their mining have also pushed a lot of people into illegal mining. Added to the above, the availability of a ready market to buy these precious minerals also facilitate the practice.

Moreover, lack of appropriate enforcement regime makes it very easy for people to sell their gold to dealers who have been licensed by the Precious Minerals Marketing Company (PMMC), the agency responsible for the marketing of minerals. Poor enforcement regime of the ASM has also been emphasised by Macdonald et al. (2014). This is due mainly to the absence of qualified personnel to enforce the rules governing the sector due to staffing and logistics challenges (Bansah, et al., 2018). Hilson et al. (2017) have stated that, in view of the fact that illegal small-scale mining employs many people in the country, some policy makers as well as scholars are of the

view that the sector should be formalised to reap the potential contribution to human security and overall national development.

Conclusion

The study has shown that mining contributes significantly to the economic development of the country. In terms of its importance to the contribution of GDP, it is abundantly clear that data from the GSS depicts that a lot is realised from the sector. When it comes to employment, the sector employs quite a substantial number of people and together with a greater number who also depends on those employed in the sector for their livelihood. Without the sector giving sustenance to the large number of people employed together with their dependents, it would have been a big source of threat to the security of the state. It is also clear from the literature that, illegal mining is poverty driven, and that those who engage in it directly are those from host and neighbouring communities who usually do not have formal jobs. The sector has also persisted from the pre-independence period through to all governments after independence. The myriad of effects are being harnessed by the current generation. From the environment, to health, education, food insecurity, loss of national revenue, threats to national security and fundamental human rights it is manifestly clear that illegal mining affects all these critical aspects of human life. This affects the human security of the people in the country.

Policy reform is therefore advocated, that the political leadership shows political leadership and enforce the laws as well as the civilised norms established as a framework for the sector. In view of the fact that, illegal mining occurs in the rural areas the regulatory and enforcement regime must be decentralised, given the requisite manpower and retooled to enable them curtail the devastation being caused to the environment. Further, the processes associated with the licensing regime should be reduced, but not compromised or circumvented. It is also imperative that, a percentage of the taxes realised from the mining sector is set aside to help in the reclamation of abandoned pits which will invariably stem the breeding of vectors that cause malaria and other respiratory diseases from mining. It is only through some of these policy reforms that the consequences from the sector can be minimised. All the other areas of human security depend on the environment, so when the environment is destroyed then human life comes to an end. Institutions responsible for regulating the sector should also be schooled on sustainable mining practices to ensure the safety of the environment for human security.

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