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Social impacts of small-scale mining activities in some communities in the East Akim Municipality of Ghana

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Abstract

Investigations were conducted to assess the effects of small-scale (artisanal) gold mining and its socio-economic impacts on the people of Ghana. Three predominantly artisanal gold mining communities, namely in the East Akim municipality of Ghana were selected for the study. One hundred and sixty (160) respondents were randomly selected in households and interviewed using a structured questionnaire. The result indicated that youth aged between 21-30 were more likely to participate in illegal mining operations. The influx of migrant workers has led to high cost of living more especially food prices and housing rents, dislocation of communities and distortions in cultural values. The study, revealed that farmlands had been destroyed affecting farming and food production. It is evident from the study that dug out pits from mining serves as breeding grounds for mosquitoes and death trap to humans. The study therefore accentuates the need for illegal small-scale gold mining to be formalised to enable close monitoring and ensure adherence to mining regulations. Furthermore, community members should be involved in policy making and environmental protection issues in order to help control the menace of landscape destruction.

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Introduction

Sustainable development of mineral resources has proven to be a global management process for promoting economic, social and environmental sustainability (WED, 1997 cited in Amankwah & Anim-Sackey, 2004). However, Hilson (2001) has indicated that small-scale mining has become an indispensable industry in every developing country.

Ghana's mineral potential is hosted in rock formations such as the Tarkwaian and Birimian rocks which cover over 40% of the country (Kesse, 1975). Small-scale mining has traditionally played an important role in the economy of Ghana and has existed over 2,000 years (Hilson, 2001). As an activity requiring modest investment and minimal technical skills, small-scale gold mining has been an attractive activity for a growing number of people in Ghana and is noted to occur in several communities including; Bibiani, Dunkwa, Asankragwa, Assin Fosu, Bolgantanga, Akim Oda, Tarkwa and mostly along the shores of the Gulf of Guinea which contain substantial gold deposits (Babut *et al*., 2003).

Like other developing countries, small-scale mining in Ghana was recognised as an informal industrial activity until the coming into force of the small-scale Mining Law (PNDCL 218) in 1989. PNDCL 218 provided a legislative framework for the operation of the small-scale mines. The passing of the law encouraged a boost in the small-scale mining sector particularly with youth, women and children being engaged in many of its related activities featuring largely rudimentary, unmonitored and uncontrolled practices in many parts of the country. Since 1989, the small-scale mining industry has contributed more than US$ 117 million worth of gold to the Ghanaian economy (Hilson, 2001). Ghana's geological space is prospective with different kinds of natural minerals mainly gold, bauxite, diamond and manganese that are mined on commercial basis whiles kaoline, salt, limestone, mica feldspar are partially exploited (Aubynn, 2016). Notwithstanding, mining including quarrying contributes approximately 7.2% to GDP growth annually (2006-2014) and employs a fairly large proportion of the labour force (Ghana statistical service, 2014).

Like any other mineral extraction process, small-scale gold mining presents some negative and positive impacts and effects on socio-economic, health and environmental facets of society. The socio-economic effect of small-scale mining has been extensively studied globally (Hentschel *et al*., 2002; Hilso, 2001; Aryee *et al*., 2003; Stefan *et al*., 2011). Other studies have focused on the role of women and gender rights protection in small-scale mining (Hinton *et al*., 2003) while Yelpaala and Ali (2005) have studied the human development impact of small-scale mining. Labour and employment issues relating to the sector in Ghana have been documented (Ednie, 2002, Anon, 2002, Hilson, 2001) where alternative jobs and livelihoods are scarce and low paying. Nyame and Blocher (2010) noted the influence of land tenure practice on artisanal small-scale mining activity in Ghana.

The Minerals and Mining Act, 2006 (Act 703) captures key requirements for the development and operation of small-scale mining in the Ghana. Under Section 82 (1) of the Act, a person shall not engage in or undertake a small-scale mining operation for a mineral unless there is an existence of the mining operation license granted by the Minister for Mines or by an officer authorized by the Minister (Minerals Commission, 2006). Under Section 93 of the Act, a licensed holder 'may win, mine and produce minerals by an effective and efficient method and shall observe good mining practices, health and safety rules and pay due regard to the protection of the environment during mining operations'.

The mining site has witnessed an increase in small-scale gold mining in recent past. Notable negative impacts and effects from small-scale mining operations in the area include land degradation and unprecedented pollution of water bodies. Small-scale miners work near major rivers such as the Birim and its tributaries, Ankobirim and Abohyensuo (East Akim Municipal Assembly, 2010). These important water bodies serve as sources of drinking water for some communities. Open pit mining is the major type of mining undertaken and these activities alter the landscape in ways that are potentially dangerous and costly to workers and indigenous people.

There have been reported cases of deaths to small-scale miners trapped in collapsed underground mines. Illegal small-scale gold has an adverse effect on the environment (land, water and air), the society (health and education) and the economy (livelihood and agriculture) of the country (Danyo, 2013). The aim of this study was to investigate the socio-economic impacts of small-scale mining activities in some selected communities in Ghana which represent some of the most chronic and endemic small-scale mining activities in the country. The study will improve understanding of the social impact of mining related activities on the socio-economic dynamics on the people and assist in decision-making by policy makers.

Materials and methods

Study area and Location

The study areas cover some selected communities in East-Akim Municipality of Ghana as shown in Fig. 1. The Municipality is in the central portion of Eastern Region with a total land area of approximately 725 Km^2. The natural resources that abound in the municipality are mainly mineral and forest products as well as water bodies (Dickson & Benneh, 2004). Mineral resources include deposits of gold, diamond; bauxite and kaolin are found in the area (East Akim Municipal Assembly, 2010). The activities of small-scale miners dominate the mining sector in the Municipality. Bauxite mining is anticipated to commence soon and its impact along the small-scale gold mining on the people cannot be predicted. The study area is drained by rivers which have their catchments areas within the Atiwa and Apedwa forest ranges (Fig 1).

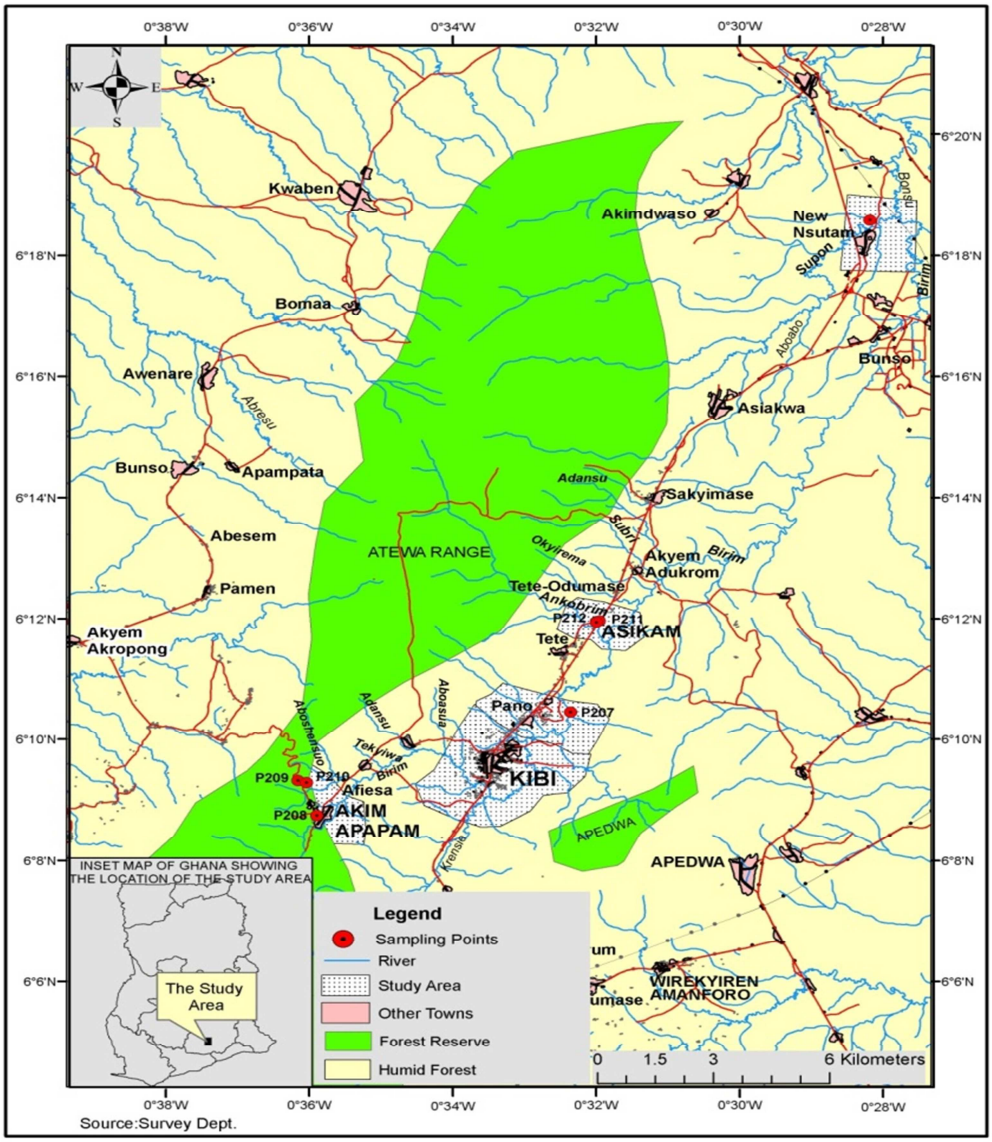

Fig. 1. Map of the study location.

Data Collection

To generate suitable and appropriate data for the study, reconnaissance field visits and initial surveys in small-scale mining communities was conducted. Open and closed ended questionnaires were used to collect data. Open-ended questions were put into themes by identifying common themes for analysis while close-ended questions were based on 5-point likert scale. Questionnaires were accompanied by consent forms which were signed-off and agreed by respondents before administration. Households were randomly selected and the head of the household determined as the main respondent for the study. Where heads of household were not available, the study relied on persons present who were of significant age as determined by the Ghanaian constitution to be adults above the age ranges of eighteen (18 years). Overall, 160 questionnaires were administered across the study area. Since most of the target respondents were illiterates, questions were read and translated into local languages during the administration and the answers translated into English. The questionnaire attempted to collect information on bio-data, socio-economic settings, migration, employment, income, health hazards, assessment of soil, biodiversity and water quality and suggestions and way forward by respondents. Consent was sought from all the study participants before administering the questionnaire. Potential study participants were made to understand that participation in the study was entirely voluntary.

The decision not to enter the study, failure to answer any question or termination of the interview were respected and duly considered.

Statistical Analysis

The data obtained were analysed using mean frequency counts and percentages. Chi-square was used to determine the association between dependent and independent variables and variables found to be statistically significant was entered into binary logistic regression to determine which variables are strongly associated. Statistical significance was accepted at $p \leq 0.05$.

Results and discussion

Social and demographic impacts

One hundred and sixty (160) respondents randomly selected and interviewed from the artisanal mining communities. In relation to the age distribution of respondents, approximately 4% were between 11 to 20 years, 32% from 21 to 30 years and 22% from 31 to 40 years and the remaining 42% were above 40years. The information gathered confirms that the youth in the study area participated fully in the illegal mining operation (East Akim Municipal Assembly, 2010). Majority of the youth according to the study were actively engaged in mining activities at the expense of attending school. This behaviour undermines the Sustainable Development Goals (SDG 4) which stipulates inclusive and equitable quality education that seeks to promote life-long learning opportunities for all. Furthermore, illegal small-scale gold mining employs child labour force resulting in high incidence of absenteeism and dropout rate in schools. The appeal of relatively fast-earned gold money is so strong that many children are lured away from school to engage in the mining activity. Traditional livelihoods characteristic of such rural communities such as agriculture, carpentry, auto mechanics, and electrician has become scarce due to the relatively low and unattractive earnings. It was revealed from the study that despite the dangers from mining, many impoverished families depend on their active children who are into mining for financial supports. Owing to this many children drop out of school at an early age. The result of which is an increasing number of uneducated and underpowered youth with little or no employable skills outside mining. Consequently, vices such as drug abuse, violent crimes, prostitution and teenage pregnancy among others are rife in these affected communities in the area.

Migration Trends of Respondents

About 58% of the sampled population had migrated to the respective study areas purposely to engage in small-scale mining from other neighbouring communities while 42% were natives of either one of the study communities. The study found a significant association between gender, age and migration to mining communities at 95% confidence level.

Males were about twice more likely to migrate to mining communities compared to females (OR 2.15 95% CI 0.42-4.32, P=0.352). Small-scale miners between the ages of 18-35 years were also three times more likely to migrate compared to those above 45 years and the association was statistically significant (OR 3.48 95% CI 0.54-6.27, P=0.028). The study showed that the majority of the small-scale miners came from different communities to look for jobs. According to Aidoo and Agyensaim (2002), in-migration of workers as a result of small-scale mining potentially lead to community stress in terms of increase in standard and cost of living. In this study, it was evident that, the influx and frequent migration of workers engaged in small-scale mining have resulted in hikes in food prices, accommodation, dislocation of communities and potential distortion in cultural values. Many people cannot meet the nutritional needs of their most vulnerable people potentially making these mining activities critical to achieving sustainable development goals (SGD 2). Interestingly, 54% of the sample population described the standard of living in the study areas as high while 33% described the standard of living as very high. Only 6% described the standard of living as low.

Approximately 6% of the respondents said the cost of living is low, 8% said is moderate, 54% representing the majority of the respondents said the cost of living is high whilst approximately 33% of the respondents said the living conditions in the community is very high. Mining activity was found to be significantly associated with a high cost of living. Communities, where small-scale miners are found are about two times more likely to experience high cost of living (OR 2.43 95% CI 0.14-2.345, *P*= 0.105) and the effect was statistically significant. The occupational profile of the community indicated that approximately 54% of the respondents engaged in mining activities which represented the vast majority of the people, 27% engaged in farming, 13% trading and 4.4% were into teaching and the others were unemployed. It was observed from the study that majority were actively involved in small-scale gold mining activities as the major source of livelihood.

Farmland destroyed by the operation of these small-scale gold miners has significantly reduced the potential for agricultural productivity as a viable alternative. Most farmers lose their lands because of the economic benefits of mining that far outweighs farming (Andoh, 2002).

Health and Safety Impacts

The analysis showed that 54% of small-scale miners use alcohol, cigarette and marijuana during working hours and 21% did not use any stimulant during working hours. The study found an association between the use of alcohol, cigarette, marijuana and snuff with small-scale gold miners during working hours. Though no causal association was established per this study, small-scale miners were about 1.4 times more likely to use alcohol, marijuana and cigarette compared to those who do not mine gold (OR 1.43 95% CI 0.14-2.345, *P*= 0.105) though the association was not statistically significant. Most small-scale operators asserted that they use substances during work which include alcohol, cigarette, marijuana and snuff to increase endurance and resistance to high-stress levels accompanying the intense physical exertion. According to Akabzaa (2001), cigarette smoking potentiates the effects of dust on the lungs making them more susceptible to diseases such as silicosis, tuberculosis and pneumonia. Furthermore, alcoholism is an important cause of accidents in mining communities. From the survey, the galamsey operators asserted they obtain their substances from friends on the field, sellers and from managers at their work place. These narcotic substances are used to alleviate the strenuous effect of the mining activity.

Concerning occupational health and safety practices, most small-scale miners (52%) use safety equipment such as hand gloves, eye goggles, safety boots and nose musk. About 48% of the labour force, however; did not use any of the safety equipment. The study found that small-scale miners who had worked for a period of five years and above had lesser odds of using safety equipment's compared to those who had worked for less than a year (OR 0.54, Cl: 0.25-0.92).

There was an association between training and the use of personal protective equipment. Furthermore, small-scale miners who had intermittent safety training (OR 2.06, Cl: 1.12-1.23, *P* = 0.001) had an increased odds of using personal protective equipment (PPE) compared to those who had no training and the association was statistically significant.

Land Use Impacts

Approximately 31% of the respondent asserted from the study that their land had lost its fertility because crops yields were poor on previously mined agricultural land. 47% indicated farm lands were full of dug pits, whilst 8% of reported eroded lands. In addition, 3% of respondents said their land was unsuitable for agriculture as it was composed of mostly gravels. However, 11% explained that the vegetation cover had been removed and destroyed (Fig 2).

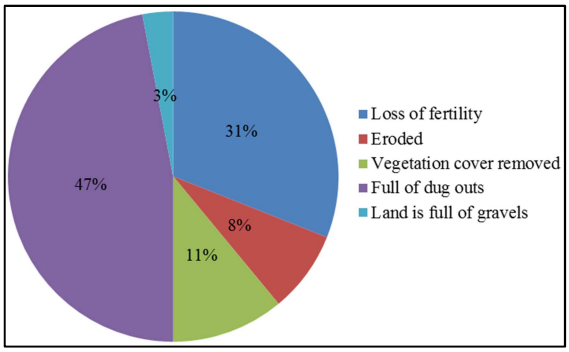

Fig. 2. Status of land use in the study area.

The activity of the small-scale gold miners emitted dust particles as a result of the excavation of land for mining activities which eventually pollutes the environment. They remove vegetation cover and topsoil throughout their activities degrading the environment through soil erosion. Soil compaction due to heavy machines destroys the topsoil and affects the ecology of beneficial microorganisms that are important for maintaining soil fertility. As noted by Akabzaa (2000), degradation of large tracts of land by the small-scale surface mining constitutes a major threat to agriculture in the communities and their economic survival. Moreover, studies conducted by Ayitey-Smith (1989) revealed that land degradation from illicit mining activities reduces biodiversity, and can subsequently decrease the availability of medicinal plants in the environment. World Bank (1995) indicated that one of the environmental effects of small-scale gold mining in Ghana is land degradation, more specifically clearing vast expanses of forest. The activities of the small-scale mining operators pollute the water bodies making them unfit to support aquatic life.

Access to Farm Land

Access to farm lands in the face of increased economic demand of land for gold mining is a major socio-economic issue in the studied communities. About one-third of the respondents (26%) had full rights to farm lands whilst 72% reported reduced opportunities to farm as a result of the conversion of lands for gold mining. Agriculture is the backbone for the attainment of the sustainable development goal (SDG 1) and (SGD 2) and the lack of critical land resources for the rural poor to produce food and create jobs through agriculture will affect food security and undermine the SDG. It is critical for the rural poor to have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 2016).

Effects of dug pit due to mining on the communities

From the survey, 53% indicated that dug pits from mining serve as breeding grounds for mosquitoes, 29% death trap, whilst 10% said dug pits from mining resulted in the destruction of farm lands. Eight (8%) of the respondents did not give any response. The study found a significant association between dug out pits and the breeding of mosquitoes. Communities found in areas where there are dug out pits had an increase odds of the prevalence of mosquitoes compared to communities without dug out pits although the effect was not statistically significant (OR 1.82 95% CI 0.543-5.72, *P*=0.471). There was however no significant associations between dug pits and the incidence of death (OR 1.35 95% CI 0.321-4.68, *P*=0.285). The study revealed that actual deaths of human beings from the dug pits had occurred in the past. A herbal medicine practitioner in the study area admitted that the activities of the small-scale gold miners had affected plant biodiversity by the

destruction of medicinal plants that were used for treating a variety of ailments including anaemia, asthma, gonorrhoea, measles, and typhoid in the area. Mining activities had significantly depleted local natural resources relevant to treating health problems of people in the surrounding areas (Agyemang, 2010).

Conclusions

The study revealed that the activities of the miners enhance their economic and financial strength and reduced rural-urban migration. Furthermore, small-scale gold mining activities have caused significant environmental degradation undermining the attainment of SDG's 1, 2, 3, 6, and 13 - no poverty, zero hunger, good health and well-being, clean water and sanitation and climate change respectively. This is supported by the World Bank (1995) which indicated that one of the environmental effects of small-scale gold mining in Ghana is land degradation, more specifically clearing vast expanses of the forest with consequences for reduced agricultural productivity and increased risk of food insecurity. The social survey revealed that the youth actively participate in small-scale mining activities in the selected study communities than farming. Youth aged between 21-30 were more likely to participate in illegal mining operations. The influx of migrant workers has led to high cost of living more especially food prices and housing rents, dislocation of communities and distortions in cultural values. The activities of these illegal gold miners were also found to be causing significant damages to the landscape through intense prospecting and excavation activities. This uncontrolled activity has rendered most farmlands uncultivable. Stream water pollution and creation of several dug pits serves as death trap for humans and animals as well as the breeding ground for mosquitoes.

The study therefore accentuates the need for intensive education aimed to minimize the environmental effects associated with the small-scale gold mining. The mining operations should also be regularized and monitored by the District Assembly to reduce environmental degradation, increase revenue for land reclamation.

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