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The Impact of Environmental Degradation by Surface Mining on Sustainable Agriculture in Ghana

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Abstract

Surface mining requires large tracts of land for mining and human labour, causing issues such as rapid deforestation, farmland depletion, soil erosion, water pollution and public health. This paper examines the impacts of small-scale mining on food security. It also investigates the environmental problems associated with small-scale mining in the Western Region of Ghana. We found out that, in places where small-scale mining is dominant, agricultural performance generally has experienced significant shortfalls in food production. Most cash crop farms have been replaced with gold mining operations. Furthermore, Small-scale miners discharged effluents that directly or indirectly contaminated land and surface water bodies in the Western Region. Some laboratory analysis of blood samples collected from farmers and individuals in some mining communities found high levels of heavy metals in their blood.

Keywords: *Environmental degradation; Surface mining; Sustainable agriculture*

Introduction

In Ghana, small-scale mining, or *galamsey* in local language, mostly operates in pits by using rudimentary hand equipment. The miners are mostly not licensed. They are widespread, making it difficult for law enforcement to control. In contrast, large-scale gold mining operations involve industrialized processes and usually have direct ties to international markets [1]. Mining activities and operations, whether small-scale or large-scale, are potentially harmful to the environment and human health. This is especially the case in Ghana, where inappropriate and dangerous working practices are rampant [2-3].

Several studies investigated the environmental consequences of small-scale mining, but very few looked at its effect on food production and food security. Most studies on the impacts of small-scale mining in Ghana focused on the pollution and contamination of water bodies with heavy metals, including mercury and cyanide [4-7]. Other studies also investigated land use conflicts in mining areas mostly between farmers, small-scale miners and large-scale mining enterprises [1]. Studies that looked at agricultural commodities investigated impacts on cash crops such as oil palm, cocoa and coconut [8-10].

This paper, however, examines the impacts of small-scale mining on the environment and the production of six main food crops in the Western Region. The examination is based on data we collected from the regional office in the Western Region under the Department of Food and Agriculture regarding dropped land, agricultural production, labor cost and agricultural food prices from 2006 to 2016. The data was analyzed through trend analysis for the period. Kutah, the principal author, has served as an officer for the Ministry of Food and Agriculture for nine years, and we used his insider opinion and observation in conducting in-depth interpretation of the collected data.

Mining in the Western Region of Ghana

The Western Region is the third populous region in Ghana partly due to its fertile environment. It covers an area of approximately 23,921 square kilometers, representing about 10% of the country. The region is located in the southern part of Ghana, sharing boarders with Ivory Coast

in the west and the Central Region in the east. It is endowed with several forest reserves such as the Ankasa Nini Suhyien Forest and Game Reserve, Bia Forest Reserve, and Cape Three Points National Park. About 40% of the total forest cover in Ghana is in the Western Region [11]. The Ankobra, Bia, Tano, and Pra rivers have nourished diverse ecosystems and supplied water to residents. This makes the region one of the largest producers of sawn and raw timber.

The Western Region has fertile soils and the highest average rainfall in Ghana. It is arguably the largest producer of such cash crops as cocoa, rubber, oil palm and coconut. Its vegetation is evergreen with rich tropical forests. Food crops mostly grown are rice, plantain, maize, cassava, cocoyam, yam and vegetables.

The region can be said to be the second most endowed region with mineral resources. Most common minerals mined are gold, bauxite, iron, diamond, and manganese. Although its contribution remains to be marginal to the total share of national GDP, the mining sector has attracted a large amount of foreign investments and mineral production has increased. The bulk of the mineral products are exported [2,3].

In Ghana, mining is regulated by the Minerals and Mining Act of 2006 (amended in 2015) and the Minerals Commission Act of 1993. These acts established mineral rights and licensing processes for mine operations. They also clarify and define powers of regulatory institutions. In essence, the state holds the ownership right to minerals. Mining operations are categorized based on the size. Small-scale operations occur on the site of 25 acres or less in size. Large-scale operation is on the land above 25 acres. Sometimes the mine covers several hundred square kilometers. In principle, only Ghanaian citizens are permitted to mine, but Ghanaians can establish partnerships with foreign interests. Small-scale concession licenses are usually valid for five years.

According to the Ghana Investment Promotion Centre Act of 2013 (Act 865), foreign investors in partnership with Ghanaians are required to have a minimum investment of at least US$200,000 to the equity of the entity. The Ghanaian partner must hold not less than 10% of the equity. However, any foreign investor wishing to solely engage in industrial mining must commit more than US$10 million.

Though the legal framework for governing large-scale mining appears to be rigid, the one for small-scale mining is somehow loose. Several so-called “mining gangs” emerged. Although mining is prohibited in forests, game reserves, riparian areas, and public infrastructure and residential areas, but the gangs and others do not observe this. Their activities have escalated deforestation, land erosion, and water pollution. The Western region, for example, urgently requires at least $100 million to reclaim or remediate lands destroyed by illegal mining activities [12].

In the Western Region, farmers experienced such serious threats to their food security as low soil fertility, lack of improved seed/planting materials, low crop yields, pests and diseases, high post-harvest losses, costly farm inputs, and dated agricultural equipment. More recently, these farmers have faced increasing threats from small-scale surface mining, urbanization and climatic change effects. One research reveals that surface mining constitutes the major cause of land use change from cropland to mining land [2].

The formalization of the small-scale mining sector ushered in an era of foreign investors, particularly Chinese. The illegal mining operations of foreign nationals allegedly earned $2.3 billion in 2016. This amount is about 72% of revenue from official gold exports from Ghana in 2015 [13]. These foreign investors use local unemployed youths. Chinese investors gained support from some Ghanaian politicians, chiefs, police and military personnel. Youths sometimes hide in the forests to carry out their mining operations. They often use heavy weapons to scare off local people and law enforcement officers.

Socio-economic Impacts of Small-Scale Mining on Agriculture

The competition for land has become fiercer where small-scale miners are grabbing tracts of land. As a result, most cash crop farms have been replaced with gold mining operations. (Figure 1) shows a decline in the farmland in the region. In places where small-scale mining is dominant, agricultural performance generally has experienced significant shortfalls in food production. The production decline has largely raised food prices.

The high labor demand for small-scale mining has negatively affected agriculture. (Figure 3) shows that most youths would rather work for Chinese mining operators rather than engaging in farming. Because agriculture in the Region is practically rain-fed, any attempts at mechanizing it require intensive labor.

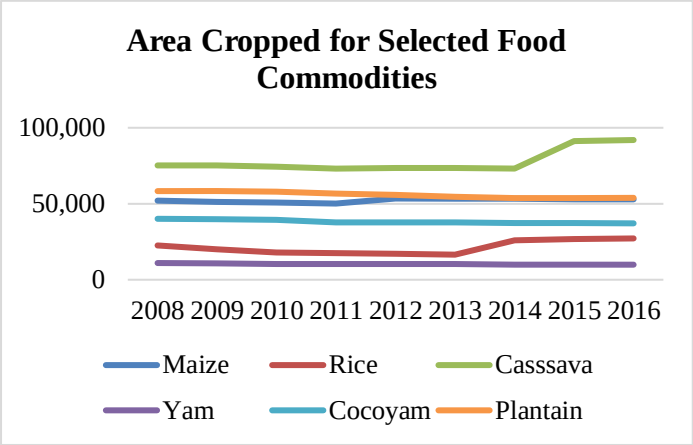

Figure 1: Average area cropped for selected food staples 2008-2016.

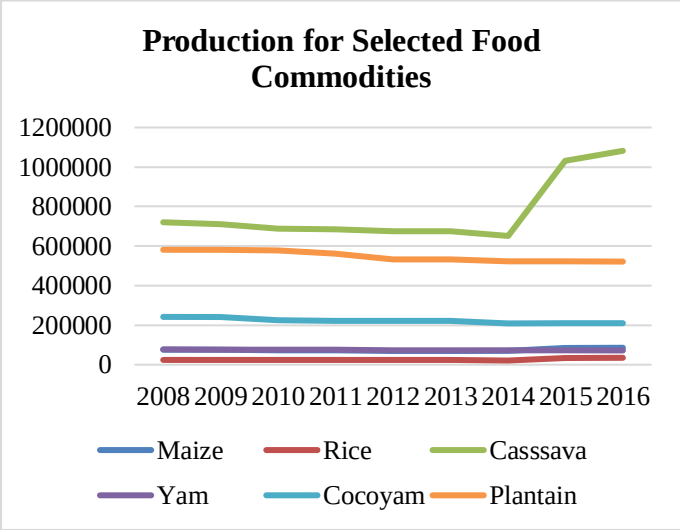

Figure 2: Average Production for selected food staples 2008-2016.

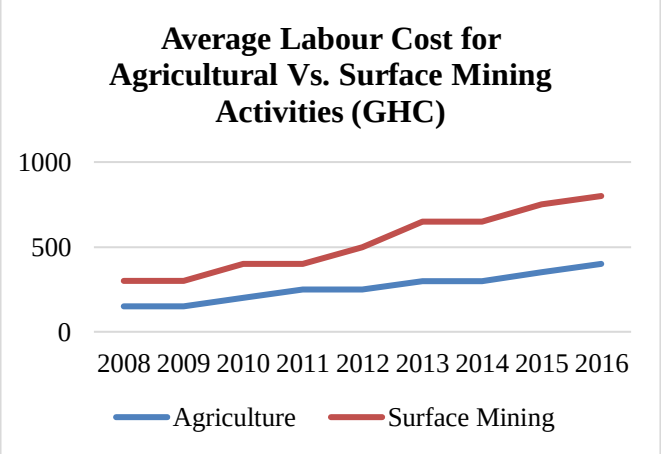

Figure 3: Average labour cost for agriculture and surface mining 2008-2016.

Some small-scale mining firms have paid a small amount of compensations to the affected farmers [14-16]. Some farmers used the monetary compensation to acquire different land. Some displaced farmers leased another tract of land. Or some cleared nearby area in a forests reserve [17]. In most cases, we found that farmer landowners became tenants. The location of the new or alternative farms is normally further away from the farmers residing community. Some farmers walk as far as 9km to get to their farmlands. The trenches small-scale miners digged sometimes prevented farmers from carting their farm products [17].

There were also those farmers who lost their livelihoods completely as a result of small-scale mining. Some farmers after being displaced from the farmlands found it difficult to get alternative land [17]. This situation mainly affected migrant farmers who did not own land.

Small-scale mining also has negatively affected miners' society. There is a high dropout rate and absenteeism among pupils in the mining communities. Considering the number of pupils who completed junior high school and the number that entered senior high schools are very low. The boys predominantly engaged in hazardous work like the crushing rocks, entering into tunnels and shafts while girls engaged in fetching water, washing minerals from ore, cooking and running errands. Due to poverty in most instances, some children divide their time between work and school to help them earn income which may enable them to continue their schooling [18].

3.1. Environment and Health Impacts of Small-Scale Mining

As small-scale miners use mercury to extract gold, some negative consequences on their health and farmlands have been observed. Small-scale miners discharged effluents that directly or indirectly contaminated land and surface water bodies in the Western Region. Several studies found that most water bodies in mining communities had beyond permissible levels of arsenic, iron, mercury, zinc, and lead in accordance with WHO and Ghana Environmental Protection Agency (GEPA) standards [1, 4-7]. The extensive use of water by small-scale miners also led to the rapid depletion of water [11].

Some laboratory analysis of blood samples collected from farmers and individuals in some mining communities found high levels of heavy metals in their blood. These were attributed to the oral ingestion and physical contact with heavy metals in water. Soil/sediments samples showed

mine effluent contamination. Another reason was the consumption of some root and tuber crops, particularly cassava, which had high levels of toxic chemicals. There were also reported cases of several skin complications in these mining areas [7, 11].

The Ghanaian Times, a local newspaper, reported on June 21, 2012, about increasing reported cases of kidney diseases in the country. Dr. Amoako Atta, then the head of the Renal Unit at Komfo Anokye Teaching Hospital said that these cases were largely attributable to the consumption of mercury-contaminated water.

There have been several arrests of small-scale miners suspected of using toxic substances, including zinc and cyanide in their operations. Some laboratory tests conducted by the EPA have revealed the presence of cyanide in water bodies close to communities in the Western Region. Some boreholes in these communities were contaminated with some concentrations of cyanide and not good for domestic purposes [12].

Most destroyed forest areas and polluted water by mining operations used to serve as a natural habitat for diverse plant and animal species. Because of this importance, these areas have been protected for conservation. However, the Bia and Boin Forest reserves, for example, have been encroached by illegal activities of small scale-scale miners. The Ankobra, Pra and Tano rivers that were important sources of domestic water supplies have been heavily contaminated. A report by the Wildlife Division of the Forestry Commission of Ghana found to a rapid decline in both flora and fauna in these natural ecosystems. A high concentration of mercury was found in fish sold in mining areas, sometimes even exceeding recommended limits of the United States Food and Drug Agency [1,5].

Efforts Put in Place at Curbing or Minimizing the Harmful Impacts of Small-Scale Mining

The hazards and negative impacts associated with small-scale mining gives credence to the "resource curse hypothesis." The hypothesis asserts that natural resource rich countries tend to suffer from negative socioeconomic impacts, such as lower growth, conflicts, weak institutions, and poor governance [19,20].

Ghana has attempted to control small-scale mining partly in response to public outcry against this destructive practice. A typical case is the involvement of the Chinese in small-scale mining businesses. Their presence appears to have violated Ghana's Minerals and Mining Act (Act 703) that prevents foreign nationals from purchasing or mining on plots of land smaller than 25 acres. In 2013, the Ghanaian government repatriated more than 4,500 Chinese nationals. This was followed by a temporary ban on all forms of small-scale mining.

The government also formed “Operation Vanguard,” an anti-galamsey unit. It is a joint police and the military task force to monitor and arrest illegal and small-scale miners. The activities of the unit have yielded positive results. To expedite prosecution processes of arrested miners, the government established 14 special courts, which consisted of seven high courts and seven circuit courts. Judges at these courts had adequate training to handle mining related cases swiftly and efficiently [12].

Conclusion

This paper illustrated impacts of small-scale mining activities on farms in the Western Region of Ghana. The effects ranged from lowered agricultural productivity, loss of livelihoods, environmental pollution, deforestation and health hazards, among others. Some good efforts have been made to curtain small-scale mining activities though much work is still yet to be done. In dealing with small-scale mining in Ghana a paradigm shift may be required, placing more emphasis on long-term environmental sustainability and agricultural productivity for future generations.

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