



SPILLOVER EFFECT OF SURFACE MINING ON COCOA FARMING IN THE WASSA AMENFI EAST AND WEST DISTRICTS, GHANA.

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ABSTRACT

Purpose: Based on the resource curse paradox, we argued that farmers are crowded out due to their lower marginal propensity to bargain, making them vulnerable to livelihood shocks. Consequently, we examined the spillover effect of surface mining on cocoa farmers in the Wassa Amenfi East and West districts.

Design/Methodology/Approach: Using a mixed research design, a total sample of 758 farmers were proportionately sampled from 14 purposively selected communities from Wassa Amenfi East and West districts. In addition, community extension agents, chief farmers and opinion leaders were formed into a focus group for discussion. The quantitative data were presented using descriptive statistics and the Wilcoxon Sign Ranked test and triangulated with emergent issues from the focus group discussions.

Research Implications/Limitations: The study largely focused on cocoa farmers who were affected by surface mining. As a result, the findings of this study were interpreted within that scope unless they are confirmed by studies that involve a cross-section of cocoa farmers.

Findings: We found that the livelihoods of cocoa farmers have deteriorated due to significant reductions in cocoa farm sizes and yields attributed to surface mining activities in the districts. Generally, cocoa farmers willingly gave out farmlands to miners to receive a bulk sum of money. The processes involved in the computation and payment of compensation were not in line with protocols enshrined in the Minerals and Mining Act 703 of Ghana and the tenets of the entitlement theory of justice.

Practical Implications: Sustainable land-use planning is a crucial element in mitigating the negative impacts and fostering resilient cocoa-farming communities in the affected districts. Based on this the study highlights the need for a comprehensive approach that addresses environmental and economic challenges.

Social Implications: The social implication of the study lies in the ability of cocoa farmer groups to advise their members against giving out their cocoa farms to surface miners and to make them aware that cocoa trees are heritage cash crops that are for use by current and future generations.

Originality/Value: The paper contributes to the debate on the weakness of mining laws in protecting vulnerable groups with a focus on surface mining that crowds out farmers from the land market and dislocates them from their livelihood activities.

Keywords: *Cocoa. farmers. Ghana. mining. spillover*

ISSN: 2408-7920

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INTRODUCTION

The majority of people in developing countries primarily rely on land for their livelihoods and subsistence; therefore, any competition over the use of land not only threatens their way of life but also makes them more vulnerable (Aha & Ayitey, 2017). In mineral-rich countries, individuals, communities and the state can suffer from the resource curse paradox as espoused by Auty's (1993) resource curse theory and Nozick's (1974) entitlement theory of justice. A basis for this argument, as supported by Darko (2017) is that despite abundant minerals deposits and substantial exploration of these resources in several areas in Ghana, the majority of the people within these mineral-rich communities live in poverty possibly due to a loss of farmlands and other livelihoods in their communities.

Auty's (1993) resource curse theory, which Karl (1997) refers to as the paradox of plenty, is explained by Shagarova, Muratova, and Akyzbekova (2016) as the failure of many resource-rich countries and or communities to fully benefit from their natural resource wealth, as well as the failure of governments in these countries to respond effectively to public welfare needs. One of the tenets in Nozick's (1974) entitlement theory of justice, as explained by [39], indicates how owners of holdings should be sufficiently compensated during the acquisition and transfer of property to avoid them becoming worse and exposing them to decreased livelihoods as supported by Sustainable Development Goals, Goals 1, 2, and 3, which advocate for no poverty, zero hunger and good health and wellbeing respectively.

The concept of livelihood is a subject of utmost importance because of its intrinsic relevance in human existence (Scoones, 2009). It includes a wide variety of activities that individuals perform for a living. In many rural communities, livelihoods are often explained by age, and household size, including the number of adults, youth, and children (Osei-Bagyina, 2012).

Therefore, understanding rural livelihoods is crucial for combating rural poverty (Lillywhite et al., 2015), because for most rural populations in developing nations, agriculture is the primary source of income, and land resources are their main sources of livelihood (Kidido, Ayitey, Kuusaana, & Gavu, 2015). Aside from providing indigenous groups in developing nations with a means of subsistence, security, and spiritual and cultural linkages, (Doso, Ayensu-Ntim, Twumasi-Ankrah, & Twum Barimah, 2015), the availability of land lessens rural folk's vulnerability to hunger and poverty, enable them to invest in productive activities (Maura, Ainslie, & Shackleton, 2003). Hence, depriving farmers of their lands, anywhere, including Ghana, therefore, requires payment of compensation as enshrined in the entitlement theory of justice.

In Ghana, land is a major source of livelihood for many rural dwellers (Barclay & Salam (2015). However, aside from the fact that these lands are exceptionally fertile and suitable for agriculture, they are also quite rich in minerals (Boateng, Cudjoe, & Ofori, 2014). Since Ghana's mineral investment rules were liberalised in 1989, there has been an influx of mining companies and multinationals attracted by the myriad mineral deposits (Agbesinyale, Tenkorang & Dankwah, 2012).

In tandem with an increase in large-scale mining (LSM) companies, the informal artisanal and small-scale mining (ASM) sector has also expanded substantially over the last couple of

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decades. Gold is by far the most important mineral currently being exploited, accounting for around 90 percent of the total mineral value (Ghana Chamber of Mines, 2016). The fast growth of the mining sector, notably gold extraction, has drawn both private people and businesses interested in mineral prospecting and has necessitated the exploitation of cultivated areas in the country with its implications for poverty, hunger, health and wellbeing, clean water and sanitation as espoused by Sustainable Development Goals 1, 2, 3, and 6 respectively.

This puts the mining sector in direct competition with agriculture for usage and ownership of land and potentially crowding it out; and is particularly pertinent due to the mining sector's connection to land grabbing and potentially crowding out cocoa, which is the most important agricultural commodity in Ghana's economy (Hainmueller et al., 2015). Ghana is the second-largest producer of cocoa in the world, with farmers producing an estimated 20 percent of the crop, which contributes 8–12% of the nation's GDP (AGRA, 2017).

The mining-agricultural competition for land is prevalent in the Western Region of Ghana which, besides its agricultural capacities, is endowed with wide-ranging mineral deposits. While surface mining and cocoa farming have coexisted in the region for several years, in recent years the competition for available land has become rife (GSS, 2016).

The situation in Wassa Amenfi West and Wassa Amenfi East Districts mirrors the national and regional outlook. The two districts have seen a significant decline in cocoa output, which is concomitant with increasing surface mining activities, albeit with compensation for denying farmers the usage of their land.

Furthermore, the processes involved in negotiations between host communities and surface mining companies on crop and land compensations, deprivation of land/immovable property use, and displacement/resettlement entitlements are often characterized by tensions and stalemates (Adonteng-Kissi & Adonteng-Kissi, 2017), which contradict the tenets of the entitlement theory of justice.

Existing studies have primarily focused on the relationship between the "resource curse" and the sustainable development of industries, leaving a gap that combines different capital investments with the resource curse theory. It is difficult to tell the extent to which cocoa farmers are involved during the acquisition and transfer of their cocoa farmlands to surface miners within the framework of Nozick's (1974) entitlement theory of justice.

We, therefore, examined the conditions under which cocoa farmers made their livelihoods after losing their farmland to surface mining, as well as the opportunities and challenges that they encountered in the aftermath. In subsequent sections of this paper, the discussions focused on conceptual discussions on surface mining and livelihoods, the methodology that guided the study and the results and discussion of the processes involved in the acquisition of cocoa lands and its effect on cocoa farmers' livelihoods in the two study districts. The last section of the paper captures the conclusions and policy implications.



THEORIES UNDERPINNING THE STUDY

Surface mining is described as the process of obtaining minerals and ores from the soil by excavating them from an open pit or a dugout. Its operations need a huge area of land (Amponsah-Tawiah & Dartey-Baah, 2011). Though Bullock, Childs and Picken (2009) reported that technical advancements have allowed surface technologies to be used for deeper and leaner deposits, Alliot, et al. (2017) have observed that surface mining renders the most productive area of the land unusable for agricultural and other non-mining operations. Copper (2018) concluded that surface mining contaminants harm sensitive vegetative cell membranes and affect water bodies (Osei-Bagyina, 2012; Mihaye, 2013) as well as impact plant metabolism, growth, and development. Gold exploitation within the region of interest can affect the forest, which often acts as a windbreak, controls local rainfall and humidity levels, and provides a habitat for a variety of species. This often leads to conflict between land used for agrarian activities, particularly cocoa production, and land needed for surface mining.

Up until the 1980s, deep underground mining, primarily gold mining, accounted for roughly 90 percent of all mineral extraction in Ghana with surface open-cast mining accounting for the remaining 10 percent (Agbesinyale, Tenkorang & Dankwah, 2012). However, after Ghana's mining industry was liberalised, locals and foreigners actively engaged in legal and illicit surface mining, which has since increased (Antwi, 2014). Since 2007, about 68,795.93 square kilometres of open forest areas have been leased to mining corporations for exploration and precious metal extraction (Owusu-Ansah & Smardon, 2015). The Ghanaian government has also allowed large-scale miners access to 70 percent of the nation's agricultural lands, which has resulted in increased surface mining activities with adverse implications for livelihoods (Ofosu-Mensah, 2016). The direct consequences of this development are the degradation of agricultural lands, periodic food shortages, famine, and a reduction in land available for agricultural production.

The concept of livelihood has been variously defined in the literature. Common themes used to describe livelihood include “Making a living”, “supporting a family”, or “my job” among others (FAO, 2007). The concept is well-known because people are wired to generate and implement survival strategies (Qadir, 2015). Liu et al. (2018) indicate that when governments, civil society and external organizations try to help individuals whose means of generating a living are endangered, damaged, or destroyed, the hidden complexity of livelihood emerges. Chambers' work from 1985 placed the topic of livelihood into the limelight, to contribute towards poverty reduction.

Chambers and Conway's (1992) publications, according to Levine (2014), provide the most accepted description of a livelihood system. They defined livelihood as the tangible and intangible capabilities and assets as well as activities required for a means of living. Ellis (1998) expanded upon the notion of livelihood proposed by Chambers and Conway (1992) to define it as the activities, the assets (natural, physical, human, social and financial capital), and the access, facilitated by institutions and social relations, that together determine the living gained by an individual or household”. Young et al. (2002) look at livelihood from a broader and long-term or sustainable perspective. They claimed that livelihoods are "means through which individuals' access and mobilize resources that enable them to pursue goals important for their survival and long-term well-being and thereby lessen the vulnerability generated and

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aggravated by conflict". Similarly, Oxfam (2010) reports that a livelihood entails the talents, assets, and activities necessary for survival. The definition of livelihood by Oxfam agrees with the commonly accepted view by Chambers and Conway (1992). However, the focus in contemporary development discourse has been on sustainable livelihood as a means of poverty eradication.

The notion of sustainable livelihoods is an attempt to move beyond traditional poverty eradication concepts and tactics. The concept of livelihood proposed by Ashley and Carney (1999) placed a greater emphasis on sustainability and poverty alleviation by identifying the primary concern of individuals living in poverty. Embedded in their definition, sustainable livelihood is a way of thinking about development's objectives, scope, and priorities in order to expedite efforts to reduce poverty. Likewise, a livelihood is sustainable, according to Chambers and Conway (1992) and Grech (2009), if it can withstand shocks and strains, recover from them, and maintain or enhance its assets and capacities going forward without depleting the base of natural resources. Regardless of whether they operate legally or illegally, surface mining companies, both large-scale and small-scale, need land for them to operate. Farmers likewise require the same area for their farming endeavours similarly. The utilisation of land is therefore subject to competition. Various empirical studies (Adonteng-Kissi & Adonteng-Kissi, 2017, Hainmueller et al., 2015) indicate that because surface mining firms have the resources and other financial muscles, farmers are always competing.

METHODOLOGY

We employed the pragmatist epistemology to examine how surface gold mining alienates cocoa farmers making them susceptible to livelihood shocks. The approach involved the collection of quantitative and qualitative data from cocoa farmers, miners, and other stakeholders on issues of surface mining and farmer livelihoods, analysing them and interpreting the results. The design was both descriptive and analytical. The study population comprised cocoa farmers from the Wassa Amenfi West and Wassa Amenfi East Districts. These districts were widely recognised for producing cocoa before the recent discovery of significant gold deposits. The Wassa Amenfi West District had a total cocoa farmer population of 42,578 while the Wassa Amenfi West District had 26,500 cocoa farmers, according to the 2019 database of Cocoa Health and Extension Division (CHED) of COCOBOD. The farmers in the two districts were treated as sub-populations and the samples were determined using the Krejcie and Morgan (1970) formula based on an error margin of 5 percent. This resulted in a sample size of 377, out of 26500, for Wassa Amenfi West and 381, out of 54809, for Wassa Amenfi East, yielding a total sample of 758 proportionately distributed across 14 cocoa-growing communities where surface gold mining is practised.

The farmers were randomly selected from six communities, Asankragwa, Oda Kotoamso, Wassa Dunkwa, Ankasie, and Moseaso Pantooso, in the Wassa Amenfi West District, and eight communities, Abesewa Gyaman, Abenabena, Bawdie, Japa, Nkonya, Nsuaem, Wassa Akropong, and Wassa Saa, in the Wassa Amenfi West District. The communities selected were the highest cocoa-producing communities that have come under surface gold mining threats. In addition to the sampled farmers, five affected cocoa farmers who were not part of the selected farmers, one opinion leader, one cocoa officer and a community chief farmer were

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purposely selected from each community under the guidance of community extension agents and constituted into discussion groups.

Quantitative data were collected using an interview schedule. The issues generally covered farm size, yield, involvement in the determination of compensation, satisfaction with compensation paid and wellbeing. Farm size and yield were measured on the ratio scale whilst involvement in the determination and satisfaction with compensation paid and wellbeing were measured on a five-point interval scale. Five items were aggregated to create a wellbeing index. The items were net income, ability to pay bills, ability to be safe, fulfillment of work, and state of life.

The University of Cape Coast's Institutional Review Board (IRB) was consulted for ethical approval (UCCIRB/CHLS/2020/38). Before beginning the fieldwork, authorization was acquired from numerous stakeholders, including Traditional Councils of the respective districts and communities. The data collection exercise took place from Tuesday 21st July 2020 to Friday, 25th September 2020. An interview schedule was used to obtain information from the farmers. The issues covered background characteristics, livelihoods of cocoa farmers, compensations and the general wellbeing of cocoa farmers. The issues were generally measured on the ratio and interval scale and analysed using descriptive statistics and the Wilcoxon Sign Rank test. The qualitative data were collected using an interview guide and a group discussion guide. We also observed the flooding and destruction of some cocoa farms.

RESULTS AND DISCUSSION

Beginning with the respondents' background characteristics and moving on to the livelihoods in the study's communities, the field data results and discussion of the findings are presented following the study objectives. The livelihood situation of farmers who have lost their cocoa farms to gold miners is also discussed. The background variables were age, household size, number of children, number of adults and number of youths in households which, according to Osei-Bagyina (2012) are critical to livelihoods in cocoa farming communities. For age, the youngest farmer was 21 years whilst the oldest was 90. The mean age was 49.87 years (skewness = 0.25, Median = 50 years) with a standard deviation of 9.86 years. The household size of the farmers varied from a minimum of two to a maximum of twelve with a mean of 7.76 persons and a standard deviation of 1.92 (median = 8, skewness = 0.01). The number of adults, youth and children in a household are depicted in Table 1.

Table 1: Background Characteristics of Respondents

Variable	Mean	Median	SK	SD	QD	Min.	Max.
Age	49.87	50	0.25	9.86	6.5	21	90
Total Household Size	7.76	8	0.01	1.92	1	2	12
Adults Household Size	2.17	2	0.02	0.56	0.5	1	3
Youth Household Size	2.22	2	0.23	1.02	0.5	0	6
Children Household Size	3.36	3	0.54	1.65	1	0	9

Source: Survey (2020)



Livelihoods in the Study Communities

The study identified farm and off-farm activities as two major livelihood activities in the two districts. The farm activities include cocoa farming, crop farming, poultry rearing, livestock, small ruminants, and agro-processing. All the 758 farmers interviewed had cocoa farms with most of them relying on it as their major source of livelihoods. The cocoa farms were intercropped with yam, cocoyam, and plantain, though subsistence in nature. Surface mining, petty trading, artisan/crafts, and casual labour (by-day) were some of the off-farm livelihood activities which were used to cushion incomes from cocoa farming.

All the 758 farmers interviewed have had their farm size either reduced or completely lost to surface mining activities. The minimum farm size was two acres, and the maximum was 95 acres. The median cocoa farm size before the respondent farmers were affected by surface mining was 10 (Skewness = 2.585, Mean = 12.673 acres) with a quartile deviation of 4.5 acres. After the advent of surface mining, the median farm size was reduced to 5.750 acres (skewness = 3.233, mean = 6.748 acres) with a quartile deviation of 3 acres. The significance of the difference in the farm sizes before and after mining was tested using the Wilcoxon Signed Rank test. The details of the test (Table 2) show that cocoa farm sizes have reduced significantly due to gold mining activities ($Z = -23.86$, $p\text{-value} = 0.000$) with almost all the respondents, except one, having a reduced farm size.

Table 2: Total Cocoa Farmland Size before and after Mining

Group	Ranks	Frequency	Mean Rank	Sum of Ranks
Total cocoa farmland size after mining (Acres) - Total Cocoa Farm Size before Mining (Acres)	Negative Ranks	757	379.00	286,903
	Positive Ranks	0	0.00	0.00
	Ties	1		
	Total	758		

a. Total cocoa farmland size after mining (Acres) < Total Cocoa Farm Size before Mining (Acres)

($Z = -23.86$, $p\text{-value} = 0.000$)

Source: Field survey (2020)

The flexible land acquisition policies that permit mining companies to effortlessly grab farmlands for their operations are to blame for the loss of cocoa farmlands to surface mining (Darko, 2017). This has left many farmers without land, which has a negative impact on their ability to make a living (Kidido et al., 2015). It emerged during the group discussions that farmers did not only lose cocoa to surface mining but other crops on their farms as well. A loss of the cocoa farm also meant a loss of food crops as cocoa farms are intercropped with yam, cocoyam, plantain, and other vegetables. The discussion groups complained that farmers' cost of living had increased since they had to use extra money to buy food crops which were hitherto taken from their farms. The situation disempowers them and makes them more vulnerable.



Aside from farm sizes, the study also addressed the yield of cocoa measured in terms of bags of cocoa beans harvested before and after surface mining. While the lowest yield was seven bags, the highest was 300 bags. The median number of bags was 36 (Skewness = 2.430, Mean = 43.094) with a quartile deviation of 14.625 bags. The distributions of the yield of cocoa in the two districts before surface mining did not differ from the overall distribution. The post-surface mining results showed a maximum number of 140 bags of cocoa, a median of 18 bags (Skewness = 2.331, Mean = 21.803) with a quartile deviation of 8.5 bags.

Table 3: Total Number of Bags Harvested before and after Mining

Group	Ranks	Frequency	Mean Rank	Sum of Ranks
Number of bags harvested after mining -	Negative	754	378.50	285,386.50
Number of bags of cocoa harvested before surface mining	Positive	1	3.50	3.50
	Ties	3		
	Total	758		

Number of bags harvested after mining < Number of bags of cocoa harvested before surface mining ($Z = -23.806$, $p\text{-value} = 0.000$)

Source: Field survey (2020)

The total number of cocoa beans harvested before mining were 32,665 bags and this was reduced to 15,688.50 bags after the start of mining in the districts. The Wilcoxon Signed Rank test results showed a statistically significant decline ($Z = -23.806$, $p\text{-value} = 0.000$) in the bags of cocoa beans harvested after surface mining (Table 3). This shows evidence of a ‘resource curse’ with an anticipated further decline in yield as more cocoa farms are destroyed for the expansion of surface mining activities in the districts as espoused by Owusu-Ansah and Smardon (2015). Besides the destruction of cocoa farms by mining activities, it emerged from the group discussions that mining pits were not covered, collecting water when it rains thereby flooding cocoa farms and making harvesting difficult. Additionally, farmers use water from polluted streams with chemicals like mercury and cyanide to irrigate and disinfect their farms with their attendant harmful effects on cocoa production. Images from a mining pit near a cocoa farm (Plate 1) and Boateng et al. (2014) support this finding by arguing that all water bodies in and around cocoa farms within mining enclaves are polluted. The group members provided more depth regarding black pod infections, which they typically saw when fields were inundated with water from mining sites.



Plate 1: Flooded Cocoa Farm at Wassa Dunkwa
Photo Credit: Authors (2020)

It also emerged during group discussions that farmers' inability to increase the size of their cocoa farms and output was due to the unavailability of workers to assist with farm operations. The evidence in both districts was that the presence of surface mining operations constrained some of the farmers from accessing labour since workers preferred to work in high-income activities. The farmers indicated that the high and instant pay from surface miners attracts most of the available labour in rural mining communities. For example, while cocoa farmers offered no more than GH¢ 30 (\$2.5) daily wage, miners on the other hand paid a minimum of GH¢ 65 (\$5.4). The situation has contributed to the continuous fall of cocoa production within the two districts.

Livelihoods of cocoa farmers who have lost their farms to gold mining.

The main tenet of Nozick's (1974) entitlement theory of justice is the rectification of injustice. The theory indicates that when property is taken from someone unjustly, the preferred remedy is for the person to be restored to their formal position without being worse off. Nozick's (1974) view is captured in the Minerals and Mining Act of Ghana. Section 73 subsection 1 of Act 703 (page 41) indicates that "the owner or lawful occupier of any land subject to a mineral right is entitled to and may claim from the holder of the mineral right compensation for the disturbance of the rights of the owner or occupier, under section 74". Additionally, Section 73 sub-section 3 indicates that the amount of compensation payable shall be determined by agreement between the parties. Considering the provision in the Act, the study found that about 90 percent of the farmers were involved in the negotiations. However, their level of involvement was limited to only agreeing to dispose of their cocoa farms but not in the determination of the value of compensation, however, the level of satisfaction was below average (mean = 3.399, standard deviation value = 2.254, skewness = 0.303, median = 3). Thus, the assessed level of involvement in the land compensation determination and satisfaction with the amount of compensation were approximately normally distributed (Kolmogorov-Smirnov statistics for involvement = 0.203 with a p-value of 0.000, Kolmogorov-Smirnov statistics for satisfaction = .228 with a p-value of 0.000).

Concerning the receipt of compensation for destroyed farms, 90.6 percent of the 758 farmers had received compensation at the time of the study. Generally, most of the recipients of compensation diversified into trading (62.6%), cultivation of other crops (8.5%) and charcoal production (5.1%). The farmers were, however, dissatisfied with the compensation received similar to the findings of Adonteng-Kissi and Adonteng-Kissi (2017). The farmers assigned



reasons for their satisfaction or otherwise with the amount of compensation received. In this regard, 37.9 percent out of the 355 who were dissatisfied with the compensation indicated that it was solely determined by miners. Others (27.7%) indicated that the number of trees and the age of the farm were not considered in the computation. Some (30) of the farmers were unaware of the existence of the miners since they forcefully entered their farms. Other farmers (22) explained that their landlords took the compensation from the miners without recourse to them. Such occurrences are common since most of the farmers are migrants who do not own lands. The implication is that some cocoa farmers lost their livelihoods without any rectification contrary to the Minerals and Mining Act 703, which stipulates that “the compensation to which an owner or lawful occupier may be entitled, may include compensation for, (a) deprivation of the use or a particular use of the natural surface of the land or part of the land, (b) loss of or damage to immovable properties, (c) in the case of land under cultivation, loss of earnings or sustenance suffered by the owner or lawful occupier, having due regard to the nature of their interest in the land, (d) loss of expected income, depending on the nature of crops on the land and their life expectancy”. Based on the responses, it was discerned that details of the Act were not considered.

All the 758 farmers interviewed appeared not to have any knowledge of the Act or the law that enforces payment of compensation. Key informants from the Mineral Commission indicated that they were not involved with the computation of compensation. They explained that they only intervene when farmers lodge official complaints and express their level of dissatisfaction about the amount paid. They further explained that because most of the mining activities within the two districts were illegal, none of the parties were able to lodge official complaints. The officials assigned reasons such as inadequate human and logistical constraints to explain why they have not been able to run constant educational campaigns to sensitize farmers about their rights.

Livelihood Situation and Wellbeing of Affected Farmers

This sub-section discusses the livelihood situation and wellbeing of farmers using descriptive statistics and triangulated with qualitative data. The median well-being index was 2.40 (Skewness = 0.787, Mean = 2.936), with a quartile deviation of 1.3. The disaggregated data show that Wassa Amenfi West District had a median index of 2.200 with a quartile deviation index of 0.9 (Skewness = 1.339, Mean = 2.392) while Wassa Amenfi East had a mean index of 3.474, a standard deviation of 1.805 (Skewness = 0.351, Median = 3.000). From the results, it can be realized that the median well-being index of farmers in Wassa Amenfi West was below the median index of the two districts and also lower than that of Wassa Amenfi East District. This was attributed to the well-structured mining operations in Wassa Amenfi East.

The study also considered the natural capital of the communities before and after the advent of surface mining. Indigenes within Wassa Amenfi West and Wassa Amenfi East Districts mainly use land, as their source of livelihood, for farming or minerals extraction. Most of the farmers (75%) said it was hard for them to get access to new farmlands. They explained that land had become scarce and expensive due to competition between miners and farmers motivating landowners to release their lands to miners rather than farmers due to the high propensity to pay of the latter. It emerged in almost all group discussion sections that land degradation and environmental destruction additionally contributed to farmland shortages. In

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effect, the difficulty in accessing land in farming/mining areas is an unfolding phenomenon that has become a challenge in the study communities.

It's crucial to remember that land is the most valuable resource for rural households in terms of livelihood empowerment and sustainability, and any indications that both indigenous people and migrants are having trouble accessing land put sustainable livelihoods at serious risk. The significance of this lies in the observation made by Barclay and Salam (2015) that the availability of land for farming can considerably lessen the susceptibility of landowners and operators to external shocks like job loss. Other types of natural or environmental capital that have been affected by mining operations are water bodies, forests, and the atmosphere. Additionally, all the study communities within the two districts suffered from land degradation and deforestation because of surface mining activities. During a group discussion at Pantooso community within Wassa Amenfi West District, it emerged that trees have been removed due to mining activities in the forest reserves. According to the group, this has created heat and has additionally affected the rainfall pattern in the communities with the resultant effect of low yield of crops and by extension its effect on farmers' income as espoused by Funoh (2014). Furthermore, uncovered trenches and unclaimed land have caused land degradation.

A written agreement concerning land reclamation was non-existence, however, 60.3 percent of the 758 farmers had an informal agreement with the miners to reclaim the land after mining. It emerged during group discussions in all the 14 communities that some miners gave initial promise of reclaiming the land after their exploration, but because there was no written or binding contract between them, the miners declined, an example of which is depicted in Plate 2, making the reuse of these lands impossible. The mining pits and trenches that were not covered became death traps for people as there have been recorded cases of death due to drowning in the pits.



Plate 2: Un-reclaimed Farmland at Oda Kotoamso in Wassa Amenfi West District
Photo Credit: Authors (2020)

The study also considered issues on water and sanitation, educational, health and social infrastructure provision and needs in the communities. Four main water sources are used for drinking and other household needs. Respondents in the community depended on pipe-borne water, boreholes, hand-dug wells and streams/rivers. More (45.5%) depended on boreholes built by the communities, while 30.6 percent depended on pipe-borne water. The remaining depended on rivers, streams and hand-dug wells. It emerged during group discussions that

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until recently when most of the water bodies became polluted, the majority of the community members were using streams and rivers as their main source of water supply. They explained that the pipe-borne water did not flow regularly leading to water shortages. The finding is consistent with what Osei-Bagyina (2012) indicated that the rise in the number of surface mining companies has led to stream contamination from tailings leaks, acid mine drainage, cyanide spills, and the disposal of mine waste. These assertions were confirmed by observation of the environment within the two districts (Plate 3).



Plate 3: Polluted River Subri at Asankra Saa in Wassa Amenfi West District
Photo Credit: Authors (2020)

Concerning sanitation, it was realized during a group discussion that almost all mine waste is deposited in nearby streams and water bodies making them become either muddy, brownish, or dried up, confirming the works of Mihaye (2013) that mining contaminants harm sensitive vegetative cell membrane and water bodies. As a result, people rely on sachet water and other sources of drinking water. It was also found that farmers, particularly those with new cocoa farms, have previously been utilising water pumping equipment from rivers and other water bodies to irrigate their land. However, the practice has stopped since the water bodies dried out.

The group discussions in all fourteen communities revealed that the pressure on roads resulting from mine trucks and heavy-duty machines was unbearable. Blockage of roads was common in these communities due to mining activities and broken-down vehicles. Health centres and other infrastructure were also not spared. The group discussant expressed concerns that the increase in mining operations had led to an influx of job seekers to their communities, placing undue strain on local healthcare systems. Even though the presence of the miners in the community seems to add pressure on the social and economic facilities in the mining areas, some communities including, Asankragwa, Oda Kotoamso in the Wassa Amenfi West as well as Abesewa Gyeman and Wassa Saa in Wassa Amenfi East Districts have received classroom blocks, community health centres, police post and community centres from individual miners and other mining firms as part of their corporate social responsibilities.

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For social issues, the discussants were concerned about the pressure on existing social facilities due to the influx of people with different backgrounds into their communities, therefore diluting the cultural practices of the mining communities with the resultant increase in social vices such as prostitution, teenage pregnancies, armed robbery, alcoholism and school dropout (Funoh, 2014). Group discussion sessions in all the communities showed that there was insecurity, and the pressure on existing social facilities was becoming unbearable. Teenage pregnancies had made families and households vulnerable, and the school dropout rates had derailed the youth in the community from furthering their education and getting formal employment. The majority (65%) of the 758 farmers indicated that increased social vices were the major social issues in the communities. Relate how the literature agrees or disagrees with the finding

The opinion leaders and other key informants complained that the maternal death rate was becoming alarming, and the issues of cholera and malaria were on the ascendancy. They explained that they had to travel long distances to access health services and additionally indicated the extent of high pressure on existing social facilities like public toilets, community health centres and inadequate proper drinking water. They attributed the cause of these problems to the emergence of surface mining in the communities. These social issues confirm what Auty (1993) talked about in his resource curse theory that communities suffer from an abundance of resources. The situation was also, at variance with the tenets of the entitlement theory of justice as the community had generally become worse off in terms of social capital with little to no avenue to seek redress.

CONCLUSION AND POLICY IMPLICATIONS

Based on the findings of the study it can be concluded that the mining sites were largely obtained from landowners who were cocoa farmers through a variety of means, including outright acquisition, partnership, and land leasing. The livelihoods of cocoa farmers have deteriorated due to a significant reduction in cocoa farm sizes and yield attributed to surface mining activities. Generally, cocoa farmers willingly gave out farmlands to miners to receive bulk money and invest it in capital projects and solving urgent financial problems. However, the processes involved in the computation and payment of compensation were not in line with protocols enshrined in the Minerals and Mining Act 703 of Ghana and the tenets of the entitlement theory of justice.

The study implies that the powers given to the Minerals Commission to enforce compensation laws as stipulated in the Minerals and Mining Act 703 are key in reducing the effects of surface mining on cocoa farmers. To this end, cocoa farmers should also abreast themselves with their rights on compensation issues and protections enshrined in the Minerals and Mining Act 703 to avoid being short-chained. Socially, the ability of cocoa farmer groups to advise their members against giving out their cocoa farms to surface miners is essential in preserving cocoa farms as heritage cash crops for current and future generations. In terms of its contribution to knowledge, the paper concludes that weak and lack of enforcement of mining laws, weak political, social and economic structures, and ignorance of farmers about the laws make them



vulnerable and susceptible to manipulation by surface miners that crowd them out the land market and dislocate them from their livelihood activities.

REFERENCES

- Adonteng-Kissi, O., & Adonteng-Kissi, B. (2017). Living with conflicts in Ghana's Prestea mining area: Is community engagement the answer? *Journal of Sustainable Mining*, 16 (4), 196-206.
- Agbesinyale, P. K., Tenkorang, E. Y., & Dankwah, M. (2012). *Extractive industries, the state and host communities: A study of the gold mining industry in Ghana*. IFAN/OXFAM-WARO Research Project on Assessment of Extractive Industries in West Africa.
- Aha, B., & Ayitey, J. Z. (2017). Biofuels and hazards of land grabbing: Tenure (in)security and indigenous farmers' investment decisions in Ghana. *Land Use Policy*, 60, 48-55.
- Alliance for a Green Revolution in Africa (AGRA). (2017). *2017 Africa Agriculture Status Report*. Nairobi: AGRA.
- Alliot, C., Cortin, M., Ly, S., Kurkjian, M., Grignard, C., Roeder, F., & Dagenais, Y. (2017). *Beyond transparency: Investigating the new extractive industry disclosures*. Sherpa: OXFAM.
- Amponsah-Tawiah, K., & Dartey-Baah, K. (2011). The mining industry in Ghana: A blessing or a curse. *International Journal of Business and Social Science*, 2 (12), 62-69.
- Antwi-Boasiako, A. (2003). *Proliferation of surface mining in Ghana: A threat or a blessing to the poor in the mining areas? A case study of Tarkwa mining area*. Unpublished Master's thesis. Department of Environmental Science, University of Lund.
- Ashley, C., & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience*. London: Department for International Development.
- Auty, R. M. (1993). *Sustainable development in mineral economies: The resource curse thesis*. New York: Routledge.
- Barclay, R., & Salam T. (2015). *Ahafo South resettlement and livelihood restoration completion audit final report for Newmont Ghana Gold Limited*. Ahafo South RAP Completion Audit Review 2 Final. 12-300, WP01. Ahafo South: Newmont Ghana Gold Limited.
- Boateng, D. O., Cudjoe, F. N. Y., & Ofori, J. (2014). Impact of illegal small-scale mining (Galamsey) on cocoa production in Atiwa district of Ghana. *International Journal of Advance Agricultural Research*, 2(6), 89-99.
- Bullock, S., Childs, M., & Picken, T. (2009). *A dangerous distraction. Why offsetting is failing the climate and people*. London: The Friends of the Earth.
- Chambers, R., & Conway, G. (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century*. Brighton: Institute of Development Studies.
- Copper, J. F. (2018). *Taiwan: Nation-state or province?* Oxfordshire: Routledge.
- Darko, F. (2017). *Assessing compensation packages and the sustainability of farmers' livelihood in the Ntotroso mining community (Central Ghana)*. A research project submitted to the Wageningen University.
- Doso, S. J., Ayensu-Ntim, A., Twumasi-Ankrah, B., & Twum-Barimah, P. (2015). Effects of loss of agricultural land due to large-scale gold mining on agriculture in Ghana: The case of the Western Region. *British Journal of Research*, 2(6), 196-221.

ISSN: 2408-7920

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- Ellis, F. (1998). Household strategies and rural livelihood diversification. *The Journal of Development Studies*, 35(1), 1-38.
- Food and Agriculture Organization (FAO). (2007). *Food security information for action: Livelihood's assessment and analysis lesson 1: Introduction to livelihoods*. Learner notes. European Union and the Food and Agriculture Organization of the United Nations.
- Funoh, K. N. (2014). *The impacts of artisanal gold mining on local livelihoods and the environment in the forested areas of Cameroon*. Working Paper 150. Bogor, Indonesia: CIFOR.
- Ghana Chamber of Mines. (2016). *Performance of the industry*. Retrieved through ghanachamberofmines.org/wp-content/uploads/2018/11/Fact_oid-2018.pdf.
- Ghana Statistical Service. (2016). *2016 GSS annual report*. Accra: Ghana Statistical Service.
- Grech, S. (2009). Disability, poverty and development: Critical reflections on the majority world debate. *Disability & Society*, 24(6), 771-784.
- Hainmueller, J., Hiscox, M. J., & Sequeira, S. (2015). Consumer demand for fair trade: Evidence from a multistore field experiment. *Review of Economics and Statistics*, 97(2), 242-256. <https://doi.org/10.2139/ssrn.1801942>.
- Karl, T. L. (1997). *The paradox of plenty: Oil booms and petro-states*. Berkeley: University of California Press.
- Kasanga, K., & Kotey, N. A. (2001). *Land management in Ghana: Building on tradition and modernity*. London: International Institute for Environment and Development.
- Kidido, J. K., Ayitey, J. Z., Kuusaana, E. D., & Gavu, E. K. (2015). Who is the rightful recipient of mining compensation for land use deprivation in Ghana? *Resources Policy*, 43, 19-27.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607-610.
- Levine, D. N. (2014). *Greater Ethiopia: The evolution of a multiethnic society*. Chicago, Illinois: University of Chicago Press.
- Lillywhite, S., Kemp, D., & Sturman, K., (2015). *Mining, resettlement and lost livelihoods: Listening to the voices of resettled communities in Mulaudzi, Mozambique*. Melbourne: Oxfam.
- Liu, H., Yu, Z., Chen, C., Hong, R., Jin, K., & Yang, C. (2018). Visualization and bibliometric analysis of research trends on human fatigue assessment. *Journal of Medical Systems*, 42(10), 1-12.
- Maura, A., Ainslie, A., & Shackleton, C. (2003). *Evaluating land and agrarian reform in South Africa: Land use and livelihoods*. Programme for land and agrarian studies, School of Government, University of the Western Cape.
- Mihaye, J. (2013). *Small-scale mining operations and their effects in the East Akim Municipal Assembly*. Thesis submitted to the Department of Geography and Resource Development, University of Ghana.
- Nozick, R. (1974). *Anarchy, state, and utopia*. New York: Basic Books.
- Ofosu-Mensah, E. A. (2016). Historical overview of traditional and modern gold mining in Ghana. *International Research Journal of Library, Information and Archival Studies*, 1(1), 006-022.
- Osei-Bagyina, A. (2012). *Assessment of the impact of mining on the land use systems and livelihoods in the Obuasi municipality*. Doctoral dissertation. Department of Materials

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Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

- Owusu-Ansah, F., & Smardon, R. C. (2015). Mining and agriculture in Ghana: A contested terrain. *International Journal of Environment and Sustainable Development*, 14(4), 371-397.
- Oxfam. (2010). *Annual Report 2010*. Canada: Oxfam.
- Qadir, U. (2015). United Nations Development Programme. Human Development Report 2015-work for human development. *Pakistan Development Review*, 54(3), 277-278.
- Rentmeester, C. (2014). Do no harm: A cross-disciplinary, cross-cultural climate ethics. *De Ethica*, 1(2), 5-21. <https://doi.org/10.3384/de-ethica.2001-8819.14125>.
- Scoones, I. (2009). Livelihood's perspectives and rural development. *The Journal of Peasant Studies*, 36(1), 171-196.
- Shagarova, L., Muratova, M., & Akylbekova, A. (2016). Oil interaction with components of the geological environment. *Surveying Geology & Mining Ecology Management*, 1, 921-928.