



Illegal Small Scale Mining (Galamsay) Awareness and Impact on Cocoa Production: A Case Study in Atiwa District of Ghana

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Abstract

The mining sector is a very important segment of the extractive sector but has one of the most serious and disastrous environmental consequences conflicting with the livelihood (cocoa farming) and survival of resident communities. The study was conducted in the Atiwa district to assess farmer's awareness of galamsay, its impact on cocoa production and livelihoods in the mining communities and on the youth as well. Snowball sampling techniques was used. Data collected was analysed with the Statistical Package for Social Scientist (SPSS) software. Descriptive statistics tools were used for the data analysis and results presented in frequencies, percentages and graphs. The study revealed that farmers in the communities face several challenges from mining activities such as water pollution from excessive use of chemicals, air pollution and land degradation from indiscriminate heavy use of machines. Farmers have also observed early dropping of immature pods, wilting, yellowing of leaves and low yield on cocoa farms closer to mined areas. Majority of the farmers opined that their engagement in the galamsay activities is as a result of unemployment; desire to get quick money and the fact that cocoa farming is seen as a job or business that does not pay well. The study advocates for a lot of adverts on Television and radio to create awareness on the dangers that galamsay poses to the cocoa sector which is the mainstay of the economy and aggressive land reclamation campaign through the public private partnership (PPP) extension system.

Keywords: Cocoa farmers, illegal small scale mining (Galamsay), snowball sampling, SPSS and Atiwa district

Ghana can be considered a relative success story in Africa. Six variables are cited-peace and stability, democracy and governance, control of corruption, macroeconomic management, poverty reduction, and signs of an emerging social contract-to suggest the country's admirable political and economic progress. Gold mining and cocoa are the major sectors of the economy for more than a century now (Moss and Young, 2009).

The agricultural sector (Cocoa Production) might be the most affected by illegal small scale mining boom and bust cycle since cocoa is one of the top foreign exchange for Ghana. Given the high social return and pro-poor impact of investing in agriculture, cocoa farming, greater than ever attention should be paid to support the provision of various public goods for agriculture, including feeder roads, research, extension services, water and power supplies, storage capacities, irrigation for smallholders and safety standards (Moss and Young, 2009).

Cocoa is a tree crop that provides livelihoods for millions of smallholder farmers in over 50 countries across Africa, Latin America, the Caribbean and Asia. It grows best in humid, tropical zones located roughly 10 degrees north and south of the equator (COCOBOD SCRA report 2011).

Cocoa Production

The cocoa tree "*Theobroma cacao*" grows only under very humid conditions. It needs a climate of humid, warm and preferably constant temperatures between 25°C never over 35 C. Sufficient rainfall is essential. Soil requirements must be humid and rich in nutrients. Its colour depends on variety that is yellow, red or reddish-brown when matured [Wikipedia.com].

During harvesting, only healthy pod should be harvested for fermentation. Diseased pods are discarded. Frequent harvesting may be dictated by pod disease, but, where it is not, long intervals between harvests should be avoided since this can lead to the collection of pods of varying ripeness. It is preferable to open pods by striking them with a wooden batten rather than a machete. Subramanyam, B.H. *et al.*

Global annual production has roughly doubled in recent decades, reaching 3.6 million tons in 2009-10 and increasingly concentrated in a handful of countries. Over the last 10 years, Africa has firmly established itself as the leading cocoa supplier. Since 2000/2001, Africa's production has expanded at an average annual rate of 2.7%, according to the International Cocoa Organization (ICCO, 2010). Much of this growth has come from Ghana, which achieved the largest increase in output (up by 269,000 tons). Farmers across West and Central Africa's cocoa belt now account for more than two-thirds of global production. The ICCO forecasts that annual global production will reach 4.5 million tons by 2013; this growth will primarily come from West Africa (ICCO 2008). In 2009-10, Ghana was the second biggest producer after Cote d'Ivoire, representing 21% of global production (World Cocoa Foundation, 2010).

Cocoa production in Ghana is focused nearly exclusively in the forest agro-ecological zones of the country—Ashanti Region, Brong-Ahafo Region, Central Region, Eastern Region, Western Region, and Volta Region—where climatic conditions are ideal for cocoa production. The earliest cocoa farms were largely established in the southeast. Ever since, the epicenter of production has gradually shifted to the west. By the early 1980s, the Ashanti Region and Brong Ahafo Region accounted for 35.5% and 18.5%, respectively, of total output. Today, the Western Region alone supplies more than half (56.5%) of the total annual cocoa crop.

Mining in Ghana

The resurgence in the mining industry in Ghana since 1989 cannot be considered an isolated phenomenon. It is driven by the global paradigm which emphasises private sector-led development as the engine of economic recovery in developing countries. In these economic programmes, African countries with important mining sectors were obliged to shift their policy emphasis towards a primary objective of maximising tax revenue from mining over the long term (which remains largely a mirage), rather than pursuing other economic or political objectives such as control of resources or enhancement of employment. According to the World Bank, this primary objective could only be achieved by a new division of labour where by governments focus on industry regulation and promotion while private companies take the lead in operating, managing and owning mineral enterprises (World Bank, 2010).

Between 1984 and 1995, there were significant institutional development and policy changes to reflect the new paradigm, from the establishment of the Minerals Commission in 1984 and the promulgation of the Minerals and Mining Code in 1986 to the promulgation of the Small-Scale Mining Law in 1989 and the establishment of the Environmental Protection Agency in 1994.

The historical importance of mining in the economic development of Ghana is considerable and well documented, with the country's colonial name — Gold Coast — reflecting the importance of the mining sector. Gold dominates the mining sector and Ghana is Africa's second most important producer of gold after South Africa, the third largest producer of manganese and aluminium and a significant producer of bauxite and diamonds (Coakley G. J., 1999).

In addition, inventories of iron, limestone, kaolin, salt and other industrial mineral resources exist but are not exploited on a large scale. From the inception of Ghana's economic policy changes in 1983 to date, the mining sector has witnessed a considerable investment boom and increased production, particularly in the gold sector. There has been considerable growth in the number of new mines and exploration companies. The sector has also attracted a significant number of sector support companies such as catering and transport companies, explosive manufacturers, mineral assay laboratories, etc. The sector has increased its contribution to gross foreign exchange earnings and appears to have attracted substantial foreign direct investment funds over the years (Feeney, P., 1998).

Despite this boom, there is growing unease with regard to the real benefits accruing to the ordinary Ghanaian in the mining communities and to the country as a whole, in the light of the extremely generous fiscal and other incentives given to mining companies under the mining sector reforms. As observed by Patricia Feeney, the World Bank strategy is surprisingly silent on measures that might be required to protect the rights of vulnerable segments of the society during the economic transition (Coakley G.J. 1999).

Other relevant factors include the negative environmental impact of illegal small scale mining (galamsay) and the growing redundancies associated with the privatisation of state-owned mining companies. Thus, the growing incidence of conflict between mining communities and their chiefs on one hand and illegal small scale mining companies on the other hand echoes the growing disquiet about the effects on our poor cocoa farmers in the rural areas.

Fears have been expressed by some Ghanaians that illegal small scale mining in Ghana might be a resource curse rather than a blessing. Much has been written of late about Ghana's illegal small scale mining and the negative impact that this is having on our agriculture specifically cocoa production.

However, this perceived negative impact should not be taken for granted because this has not been the story of other mining-rich African countries. The question therefore, may be asked; is Ghana's illegal small scale mining (Galamsay) a threat or complement to the cocoa industry?

It is for this reason that this research is being undertaken in order to provide a record of the views and perception of cocoa farmers to help understand farmers' attitude and serve as a reference source in participatory decision making. Therefore, the following research questions need to be answered;

1. Are cocoa farmers aware of illegal small scale mining in the study area?
2. What are the socio-economic characteristics of farmers in the study area?
3. Do cocoa farmers perceive illegal small scale mining as a complement to cocoa industry?
4. Are cocoa farmers ready to lease or release lands for galamsey operations?
5. How do cocoa farmers perceive the general effect of illegal mining on cocoa production?
6. What are cocoa farmer's recommendations and strategies on how best illegal mining can become a blessing and not a curse?

Adequate knowledge on the impact of illegal small scale mining would benefit the cocoa farmers and the economy as a whole through the following:

1. The involvement of the farmers in the research will go a long way to inform them, the impact of illegal small scale mining on cocoa production.

2. The research will help the farmer to know the effect of land degradation on cocoa areas.
3. This research will contribute to natural resource management by providing concepts, scientific information and applied tools that are valuable to formulating and implementing policies that would support sustainable management of natural resources for cocoa production.
4. Furthermore, this research will provide practical models, methodologies, best practices and empirical resource for students, applied researchers in government or private research organizations interested in natural resource management and policy analysis.
5. Lastly, the research would also serve as a valuable source of information for anyone seeking to be informed about the impact of illegal small scale mining on cocoa

Methodology

Study Area

The Eastern Region is one of Ghana's ten administrative regions. It covers an area of 19,323 square kilometres, which is about 8.1% of Ghana's total land area. The region is divided into administrative districts. The total number of districts was increased from 17 districts to 21. Atiwa District is named after the Atiwa Mountain Range that has a beautiful evergreen forest cover. The mountain is again the source of rivers Birim and Densu and a number of streams. There are also attractions like waterfalls, butterfly sanctuary and the mausoleum for the burial of Akyem Abuakwa Kings in the forest. The name Atiwa therefore connotes wealth or richness. The Atiwa District is one of the twenty one Districts in the Eastern Region and located in the North-Western part of the Eastern Region. The District was carved out of the East Akim Municipal by Legislative Instrument (L.I) 1784 of 20th February 2004 in pursuance of the Government's Decentralization policy. Kwabeng is the District Capital. The District shares boundaries with five (5) Districts as follows; To the North by Kwahu West Municipal, To the South by East Akim Municipal, To the West by Birim Central Municipal to the East by Fantekwa and To the South West by Kwaebibirim. Other major towns in the District are Anyinam, Sekyere New Jejeti, Abomосу, Kadewaso, Akropong, and Asaman-Tamfoe. The district is also a farming area in Ghana and a priority for the inhabitants.

Data Collection

Primary data for the study was collected through the administering of structured questionnaires as well as interviewing sample of farmers and key informants in the study area. In order to get the relevant respondents (cocoa farmers) for all the stated objectives, purposive sampling technique was used to select ten (10) cocoa-growing communities in the district, this is because apart from these communities being cocoa growing ones, galamsay is permanent. These communities are Abomосу, Akrofufu, Akwabooso, Asmama, Asunafo, Awenare, Bomaa, Juaso, Kwabeng and osino. Within each community, ten (10) farmers were interviewed using the Snowball Sampling Technique, which is a technique whereby a researcher identifies someone (from the population) who meets the criteria for inclusion in the study as a respondent- in this case, a cocoa farmer. After interviewing each respondent, the researcher is directed by the respondent to the next person (cocoa farmer) who meets the criteria, until the sample population is exhausted. A sample size of 100 farmers was selected across the communities in the study. The questionnaire was designed to collect information on the following:

- Personal and background characteristics such as age, education, marital status and number of dependants;
- Farm characteristics;
- Farmers perception on how illegal mining affects cocoa production in the study area, farm size, farmer's livelihood etc.

- Farmer's strategies for coping and recommendations about illegal mining.

Secondary data was also taken from the Atiwa District Assembly and other relevant institutions and sources.

Data Analysis

Based on the nature of the research and data collected, descriptive analysis was used to pursue the objectives of this research. Statistical tools such frequency distribution, percentages and means were also used to analyse and describe the perception of cocoa farmers. Results were presented in tables and graphs. The statistical tool used to arrive at the results of this study is the Statistical Package for Social Sciences (SPSS).

Results and Discussion

Socio-economic characteristics of cocoa farmers in the area

Cocoa farming in the study area appears to be a male dominated activity, with 75.0% of the respondents being men and 25.0% being female. This may be attributed to the exertion of physical energy required in cocoa cultivation.

About 21.0% of the farmers had no dependant, 13.0% had dependants ranging from 1 to 3, 48.0% had dependants ranging from 4-7, 13.0% had 8-10 dependants and 5.0% had above 10 dependants. This shows that most cocoa farmers have families to care for.

None of the farmers fell below age 18, about 4.0% of the farmers are in the age range of 18-25years, 20.0% falling within the age range of 26-35years, while 76.0% of the farmers are in the age range of 35years and above. By implication, because of the demographic structure of the study area, older people generally stay in the villages and relatively younger people go to the cities to find work explaining why we have a higher group of that age bracket thus, 35.0% and above. About 20.0% of the farmers have had no formal education, 23.0% of the farmers had formal education up to the Primary school level with 32.0% attaining Junior Secondary school (JSS) education followed by 17.0% who have had Senior Secondary School (SSS) education followed by only 8.0% of the farmers reaching tertiary education level. This diverse educational stands could somewhat affect farmers' knowledge and the way they look at new technologies (Codjoe *et al*). By implication this is so because at the village level, we only have primary and junior secondary schools being predominant.

About 14.0% of the farmers have their cocoa farms ranging between age 1- 5, indicating that this percentage of farmers are new entrants to cocoa cultivation in the study area hence require a lot of information and knowledge in cocoa cultivation. This is however, followed by 23.0% having their cocoa farm between ages 6-10 years, 25.0% of the cocoa farm between age 11-15 years while 29.0% had their cocoa age ranging between 16- 25 years which is the majority. 6.0 % of the cocoa farms had age ranging between 30-40 year and only (3.0%) of these farmers had farms above 40years in the study area. This shows that, most of the cocoa in the study area are below 40 years should be maintained to produce more other than giving the land to galamsay operators.

The issue of land tenure systems and litigation has necessitated to 55.0% of the farmers having land size ranging from 1-5 ha being the majority, followed by 24.0% having land size ranging from 6-10 ha, followed by 10.0% having land size ranging from 11- 15 ha and 1.0 % having land size above 20 ha. This could also be linked to land ownership system in the study area. 28.0% work on acquired land, 32.0% work on rented lands while 40.0% work on family lands.

Planting hybrid cocoa variety is dominant among respondents representing 60.0%, followed by mixed

cocoa (38.0%) while Amelonado was only 2.0% in their farms as a main variety that they cultivate. According to Codjoe *et al*, 2013, this phenomenon could be attribute to the fact that Amelonado which is the old variety is fading out of the system with the increase awareness about the other varieties most especially the hybrid which are early bearing, disease resistant and early maturing with regards to the Amelonado. This means that farmers would be increasing their productivity with the hybrid etc. *ceteris paribus*.

Looking at the major source of livelihood of the respondents in the study area, 85.0% of them use farming as their major source of livelihood, followed by Business (Petty trading) which is 6.0%, followed by any other occupation such as driving, electrician etc. being 5.0% and lastly Government work being 4.0%. This shows that farming is a well-known occupation in our rural areas and so should be maintained.

Most of the farmers have a lot of benefits from cocoa production. 63.0% responded that cocoa helps them take care of themselves and their families, 36.0% said it helps them pay their kids school fees and only 1.0% talked about other benefits like building of houses. For the smallholder cocoa farmers, cocoa contributes about 70-100% of their annual household income (Asamoah and Baah, 2002). Cocoa employs about 50% of the agricultural labour force in Ghana (Seini, 2002). This means that the cocoa sector should be supported and maintained. Table 1 show the numerical representation of the socio-economic characteristics of the farmer's in the communities within the district.

Determination of Cocoa Farmers Perception of Galamsay and its effect on Cocoa in the Study Area

Cocoa Farmers awareness of Galamsay operations within the study area

In seeking the general view of farmers about their awareness of illegal small scale mining (Galamsay) within the communities in the study area, 95.1 % of the farmers responded "YES" while 2.9% responded "NO" followed by 2% responding to "No Idea". This is depicted in figure 1, the results that most of the cocoa farmers interviewed are aware of the bad practice within the area. This should be taken in consideration by the Government and stakeholders in the cocoa industry.

Cocoa farmer's awareness about Chief's giving the land to galamsay operators

In seeking the views of cocoa farmers in the study area about Chief's giving the land out for illegal small scale mining (Galamsay operations), 48.1% of them said "YES" to that question, 12.7 % of the farmers said "NO" and 39.2% answered "No Idea" about chief giving the lands out for illegal small scale mining. From the data, cocoa farmers want to suggest that chief's or local authorities are mainly part of illegal small scale mining in the study area. This is represented in figure 2.

Farmer's knowledge about when galamsay started within the communities in the study area

Since most farmers were aware of illegal small scale mining operations within the area, it will be prudent for them to provide data on when the operation started in the communities. 45.1% of the cocoa farmers gave range of 1-3 years ago, 23.5% gave a range of 4-7years ago, 11.8% gave a range of 8-11years ago, 6.9% gave range of 12-15years ago and 5.9% said Galamsay started 16years ago and over. The rest of the respondents were not aware and did not know about galamsay in the study communities. This range show that for about 30 year to come, all our cocoa farm lands within the communities under study can be turned into illegal small scale mining site which may go a long way destroying the biotic and abiotic properties. This calls for an eagle eye on galamsay operations. Figure 3 represents range of years and percentage as stated by the farmers.

3.2.4 Respondent's view on why the farmers stop cocoa and goes into galamsay

The graph (Fig. 4) illustrates why some cocoa farmers will abandon their farm and go for mining

related business like Galamsay. Majority 76.4% said it because of quick money, 13.7% said because it pays better, and 6.9% said it is expensive to maintain cocoa farms and 2.9% said cocoa farms are not doing well. The perception of quick money is really a key factor leading to a lot of social violence like Child labour and women molestation. The government should take a drastic measure to rub away this perception by running more educational programs to encourage the youth to go into farming as well as caring for farm handed over to them by their old folks.

Galamsay Impact on Cocoa

Cocoa is a major source of revenue for the provision of various public infrastructure and an occupation mostly loved by Ghanaian farmers and some other countries. Cocoa by far has become Ghana's most important crop. It dominates the agricultural sector and is a major source of income for approximately 800,000 farmers and many others engaged in trade, transportation and processing of cocoa (COCOBOD SCRA REPORT, 2001). Ghana's cocoa sector has staged an impressive recovery in recent years. Ghana can boast of 1,000,000 metric tonnes of cocoa in the 2010/2011 crop year. Majority (86.0%) of the respondents are of the view that galamsay has great effect or impact on cocoa production. 5% of the farmers were of the view that galamsay has no impact on cocoa production, followed by 9% who responded "No Idea". They are unaware about galamsay having any impact on cocoa production.

The 86% of the farmers were on the view that galamsay has great impact on cocoa production and gave reason like; it causes crop loss. The crop loss happens when the galamsay is done right in the farm. These crops are destroyed with big machines like bulldozers. Another reason given was that, it also affects their crop yield and income. This normally happens when part of their lands are forcefully taken. This reduces their expectations on the yield. This also leads to loss of income. Furthermore, when the lands are taken from the farmers, some expect allocation of new land in form of compensation which sometime never happens. All these negatively affect the farmer's output. However, farmers are of the view that, they will not leave cocoa production and enter into any mining related business like galamsay. This is because; they know cocoa has a future for them as well as their generations unborn. Fig. 5 displays the respondents view in the impact of galamsay on cocoa production.

Galamsay Impact on cocoa Land size

The Atiwa district is highly degraded with the resultant loss of vegetation cover, fertile top soil and wild fauna species as a result of adverse climatic trends and negative factors influencing environmental degradation such as small-scale gold mining (Gyasi *et al.*, 2006). Desertification and land degradation are two closely interrelated processes; Land degradation refers to the progressive loss of the intrinsic or natural quality of the land and if this process occurs in arid or semi-arid areas, it is called desertification (Gyasi *et al.*, 2006). The issue of land sizes comes in here when the lands are forcibly taken from farmers and this also has great impact on cocoa yield. Some farmers responded that parts of their lands have been taken. 30.4% had an average of 1-5hectares of land taken, 18.6% also had an average of 6-10hectares taken, 5.9% had an average of 11-15hectares also taken and 3.9% also had an average of 16-20ha taken. In average, about 50ha of land has been taken from cocoa farmers in the study area, this is depicted in fig. 6. This affects the outputs which can later translate into the farmer's loss of income (Livelihood). Economic trees such as *Funtumia elastica* (Ofuntum), *Alstonia boonei* (Nyamedua), *Pycnanthus angolensis* (Otie), *Milicia excelsa* (Odum), *Spathodea campanulata* (Akuakuoninsuo) in the area are also lost through galamsay (Source: Bunso Cocoa College).

Galamsay Impact on the Environment

Illegal small scale mining as said by the farmers also poses some effect on the environment as well. All these factors also have negative impact on cocoa production. They talked about issues of:

Water contamination

Chemicals such as cyanide are released into water-bodies which turn to pollute the water and make it unsafe for human consumption. Dirt and soils are washed into water-bodies which tend to change the nature of water giving it a dirty colour and making it unsafe for domestic use. The death of frogs, fishes and other aquatic lives due to the release of chemicals make it unsafe for watering our crops. The direction of water-bodies is also redirected to enhance galamsay operations which therefore lead to the pollution of these water-bodies. In the course of redirecting water other objects such as tree stumps, leaves, plastic wastes, and empty chemical bottles are carried along and this intent pollutes the water.

Air contamination

Chemicals used for the galamsay operations find their way into the atmosphere which when inhaled, may pose serious health risks to living organisms. Dust from their operations pollute the air and makes it unhealthy for breathing. Chemicals or dust from the site when released into the air may find its way into one's eyes which can also lead to serious medical complications. When the farmers become ill, they will not be able to work in the farms.

Bush/Farm burning

When sites nearer to cocoa farms are released for galamsay operations, burning sometimes take place. This can spread to nearby farms and cause loss of some cocoa trees and other important economic trees as well. When electrical appliances used on the site catch fire, nearby farms are affected, this leads to land degradation which in turn affects crop loss and subsequent production.

Death of frogs, birds and fishes (loss of aquatic lives)

Chemicals released into water-bodies and the atmosphere can cause the death of frogs, fishes and birds which ends up polluting our water-bodies and also lead to various diseases from the death of these animals. A medical condition called zoonosis (transferring animal disease to human) can be very rampant. The use of heavy machines can kill the frogs and fishes living in the water and leave the water polluted. This causes health implication for cocoa farmers and other inhabitants. Other risk observed by farmers from galamsay operation in the communities is cracks in farm houses and buildings.

Determination of Cocoa Farmer Recommendation and Strategies to deal with Illegal Small Scale Mining (Galamsay)

Has the farmer participated in workshop concerning Galamsay

About 21.6% of the farmers responded that, they have attended meetings, trainings and workshop concerning galamsay. They had the training through farmer field schools, Radio and TV programmes. Majority (78.4%) of the farmers has not attended any meeting or workshop programme concerning galamsay as stated above. I will therefore recommend that such programmes will be intensified to make farmers know more about galamsay and its effect. Fig. 7 displays participation of respondents in galamsay decision meetings.

Do you think Farmers should be involved in decision making concerning galamsay

Participatory Learning and Action (PLA) is an approach for learning about and engaging with communities. It combines an ever-growing toolkit of participatory and visual methods with natural interviewing techniques and is intended to facilitate a process of collective analysis and learning. The approach can be used in identifying needs, planning, monitoring or evaluating projects and programmes.

Whilst it being a powerful consultation tool, it offers the opportunity to go beyond mere consultation and promote the active participation of communities in the issues and interventions that shape their lives (Pretty, J. *et al*, 1995).

This is the reason why 97.1% of farmers are of the view that their consent should be listed. Farmers need to be involved in decisions on galamsay in order to come out with their displeasure in the operation. Through this, they can come out with the hazards and danger that the operations seem to pose on the environment and the inhabitants as a whole. Most of these operations are carried on lands very close to farmers' farm and therefore, there is the need for farmers to be involved. Sites close to farmers' farm pose many health risks to farmers. About 2.9% of the farmer's interviewed were of the view that, their consents are not taken with the reasons that, because the Chiefs are involved in giving lands out, whatever they say will not be taken. Galamsay operators often connive with the rulers of the community in order to take over farms/lands belonging to the farmers. It is therefore prudent they partake in such decision making other than convincing them with money. An acre of land is being bought by the illegal miners for about GH¢ 6,500, so the number of acres a farmer wishes to give up is multiplied by the said amount. Fig. 8 displays farmer's response about involving them in galamsay decision meetings.

Cocoa Farmers reason about stopping Illegal small scale Mining (Galamsay)

Most of the cocoa farmers (91%) said Galamsay is a bad practice and should be stopped. They gave reason that, it has detrimental effect on the environment by causing pollution in the environment. Water-bodies are affected, the land is degraded and the air becomes unsafe for breathing. When the land is polluted, inhabitants are exposed to numerous health risks which can even lead to death. Crops and other plants could be lost due to galamsay operations. There will be the lost of our forests which means the future generations will suffer the consequences. Most lives are lost when the dug pits are left uncovered especially, humans and wildlife. Properties such as buildings and farms may be destroyed or lost completely. Flora and fauna are destroyed. Galamsay operation is not sustainable compared to cocoa farming because it poses dangerous and very toxic risks. Some even said their churches and religious beliefs frown on any act that destroys the environment.

Conclusion

This study considered the perception of cocoa farmers on the impact of illegal small scale mining (Galamsay) on cocoa production using Atiwa District as a test case. The study established that all cocoa farmers irrespective of their locations are aware about galamsay and its multitudinal effect on their farming activities.

Despite this, efforts made by government and stakeholders have been very minimal in sensitizing and educating the youth and the farmers on risk involved in galamsay.

Illegal small scale mining (Galamsay) has really been the major factor which has affected the production of cocoa as a result of Land degradation, water contamination, Air contamination, diversion of water bodies, crack in farm houses etc.

Recommendations

From the foregoing, it is recommended that:

The government should increase subsidy on cocoa inputs to cocoa farmers to enable them purchase pesticides, fertilizers and the needed farm inputs that can help farmers cope with emerging pest and diseases that have emanated to prevent farmer from selling their land in order to improve production of cocoa.

Already existing policies and laws concerning galamsay exist but they should be strengthened by involving farmers in stakeholder's decision concerning galamsay so that offenders will be punished to serve as deterrent to others. To achieve this government should provide COCOBOD with structures to be able to function effectively and efficiently to place sanctions on illegal small scale mining.

The farmers recommended that government and stakeholders should put up educational programme through which will show the risk involved in illegal small scale mining to help them cope with the emerging challenges to enhance production. This can be achieved through increasing television, documentary, advertisement, radio etc.

Acknowledge

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Table1a: Distribution of farmers by their Socio economic characteristics

Characteristic	Frequency	Percent
Sex		
Male	75	75
female	25	25
Age		
18-25yrs	4	4
26-35yrs	20	20
Above 35 yrs	76	76
Level of Education		
None	20	20
Primary	23	23
JSS	32	32
SSS	17	17
Tertiary	8	8
Marital Status		
Single	15	15
Married	85	85
No. of dependent		
None	21	21
1-3	13	13
4-7	48	48
8-10	13	13
Above 10	5	5
Age of Farm		
1-5yrs	14	14
6-10yrs	23	23
11-15yrs	25	25
16-20yrs	29	29
30-40 yrs	6	6
Above 40yrs	3	3

Table 1b: Distribution of farmers by their Socio-economic characteristics

Characteristic	Frequency	Percent
Farm Sizes		
1-5 hectares	55	55
6-10 hectares	24	24
11-15 hectares	10	10
16-20 hectares	10	10
Above 20 hectares	1	1
Land Ownership		
Acquired it My self	27.5	28
Rented	31.4	32
Family land	39.2	40
Cocoa variety		
Amelonado	2	2
Hybrid	60	60
Mixed	38	38
Major source of income		
Farming	85	85
Gov't work	4	4
Business	6	6
Any other work	5	5
Benefit from cocoa		
Pay my kids school fee	36	36
Take care of my self	63	63
Other benefits	1	1
Total	100	100

Source: Compiled from survey data 2013

Graphs show responds of cocoa farmers for questionnaires administered

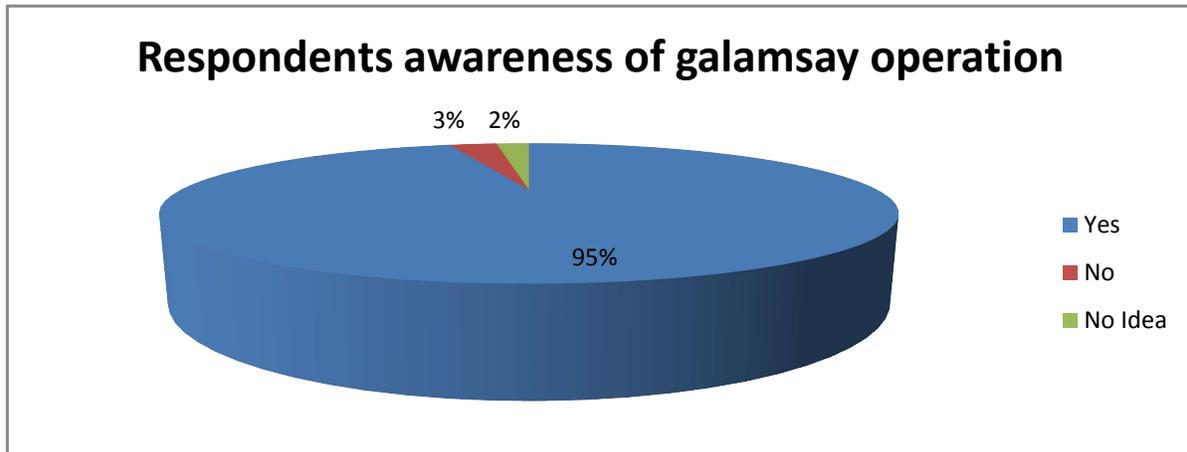


Fig. 1

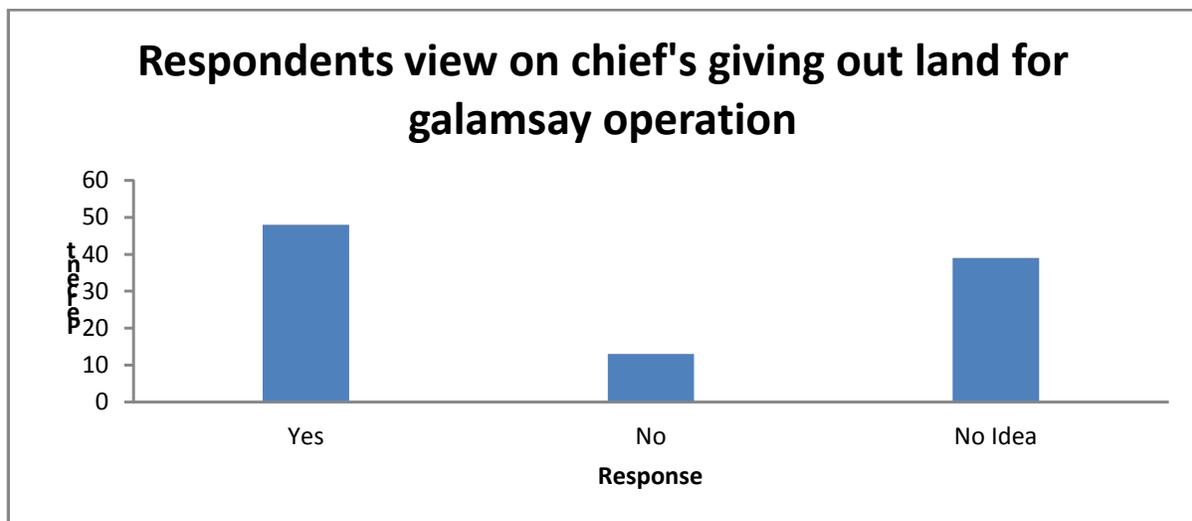


Fig. 2

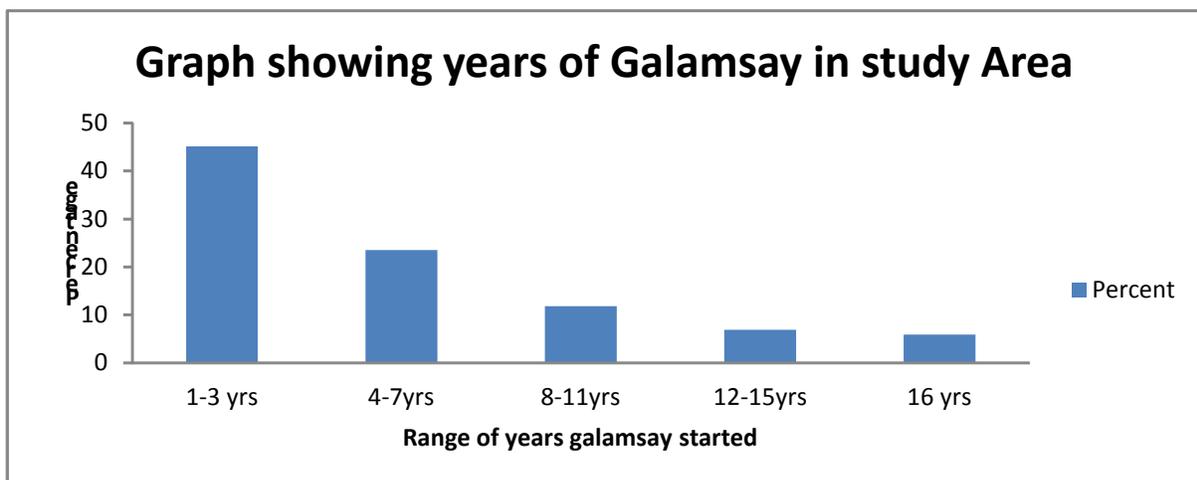


Fig. 3

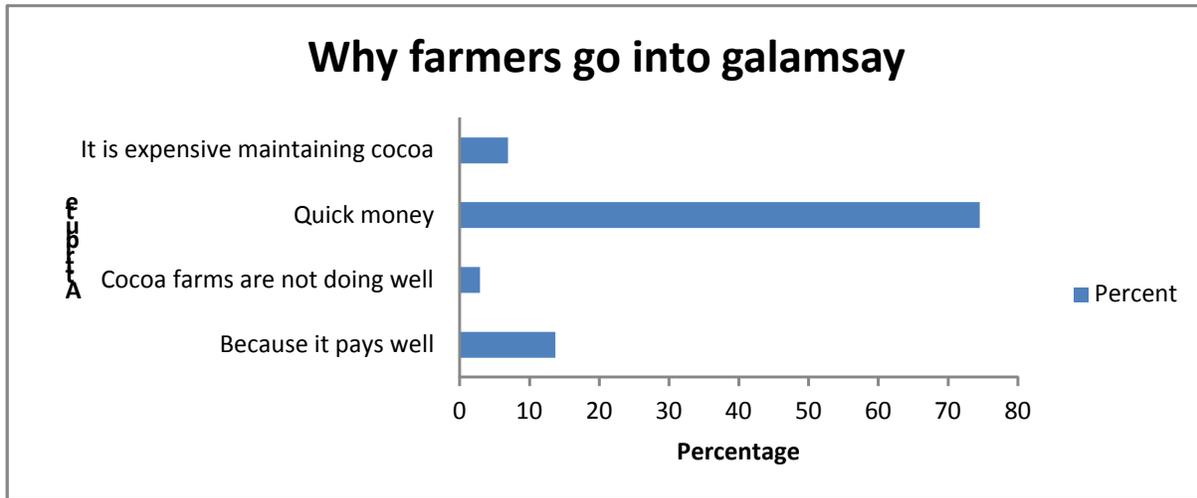


Fig. 4

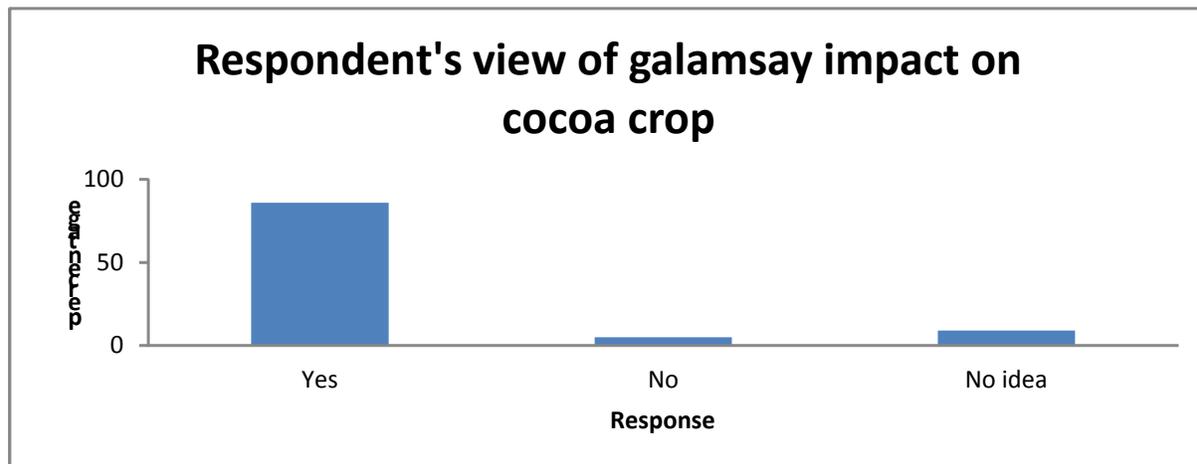


Fig. 5

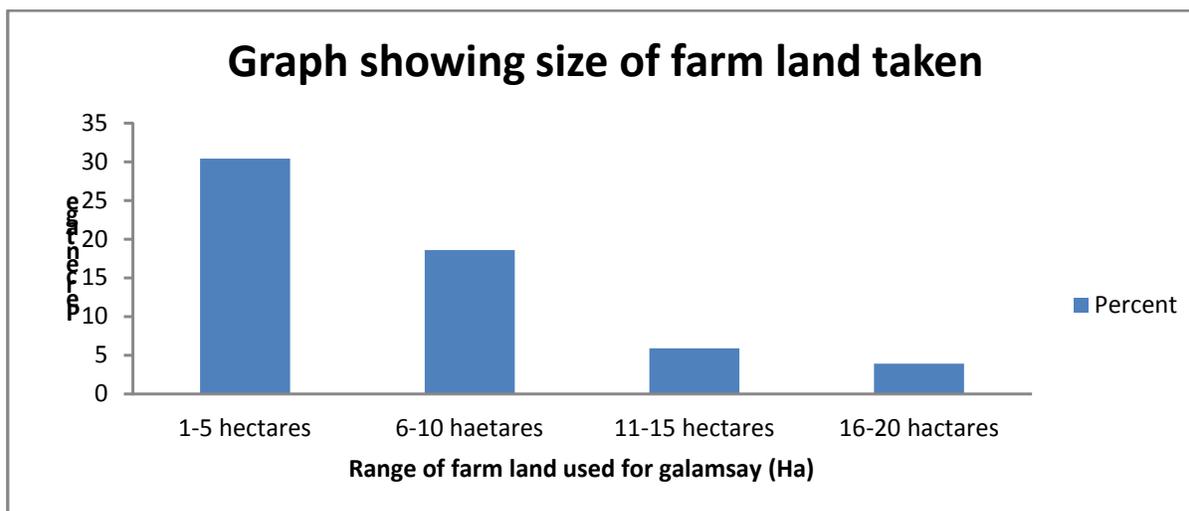


Fig. 6

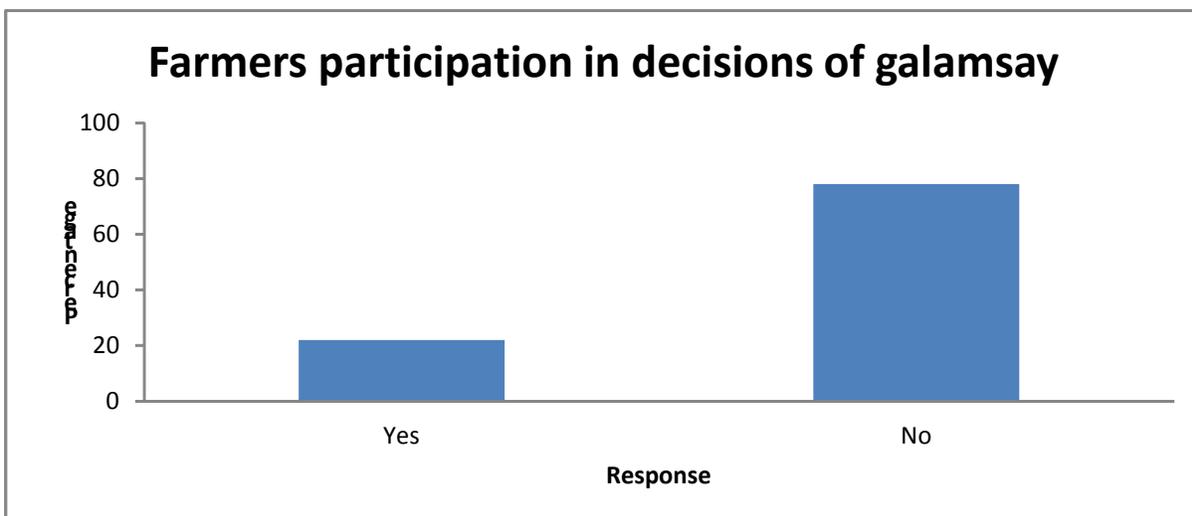


Fig. 7

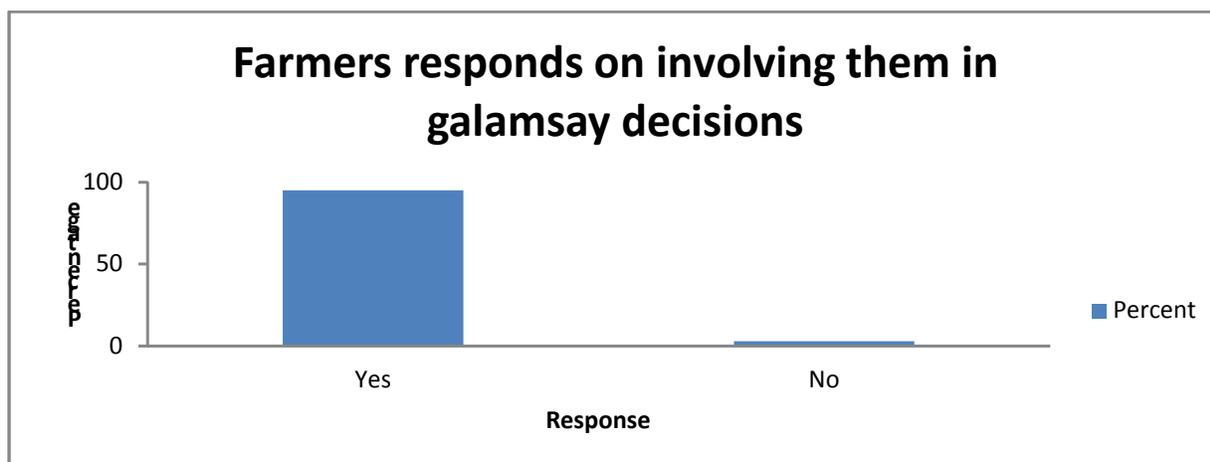


Fig. 8

References

- Akabzaa, T. and Darimani, A. 2001. Impact of mining sector investment in Ghana, A study of the Tarkwa mining region, draft report, pp. 34-63.
- Bird, D. 1994. *Gold in Ghana*. Mining Journal, January.
- Codjoe, F.N.Y., Ocansey, C.K., Boateng, D.O. and Ofori, J. 2013. *Climate Change Awareness and Coping Strategies of Cocoa Farmers in Rural Ghana*, *Journal of Biology, Agriculture and Healthcare*, **3**(11).
- Feeney, P. 1998. *The Human Rights Implications of Zambia's Privatisation Programme*.
- George, J.C. 1999. *The minerals industry of Ghana*, in the US Department of the Interior, US Geological Survey, Minerals Yearbook. Area Reports: International 1997, Africa and the Middle East, **3**.
- Graham, R. 1982. *The Aluminium Industry and the third World: Multinational Cprporations and Underdevelopment*. Zed press London.
- Gunnarsson, C. 1978. *The Gold Coast Cocoa Industry 1900-1939. Production, prices and structural change* Lund Publisher.

- Gyasi, E.A. 2006. *Study of Climate Change Vulnerability and Adaptation Assessment Relative to Land Management in Ghana*. Reports of the Members of the Study Team, Accra, p. 91.
- Hainmueller, J., Hiscox, M. and Tampe, M. 2011. Sustainable Development for Cocoa Farmers in Ghana. MIT and Harvard University. January 2011.
- Hart, J. 2008. "Water Pollution." Microsoft® Student 2009 [DVD]. Redmond, WA: Microsoft Corporation, 2008.
- Hill, P. 1963. *The migrant cocoa farmers of Southern Ghana. A study in rural capitalism*. James Currey publisher.
- Kesse, G.O. 1985. *Statistics for the Mineral and Rock Resources of Ghana, 1925–83*.
- Konings, P. 1986. *The State and rural class formation in Ghana: A comparative analysis*. Monograph: African Studies Centre.
- Laura, I. 1991. *Euromoney*, September.
- Minerals Commission. 1995. Ghana – Project Implementation Plan: Mining Sector Development and Environment Project, (unpublished)
- Moss, T. and Young, L. 2009. "Saving Ghana from its Oil: The Case for Direct Cash Distribution." CGD Working Paper 186. Washington, D.C.: Center for Global Development. <http://www.cgdev.org/content/publications/detail/1422981>
- Owusu, E.E. and Dwomoh, G. 2012. The Impact of Illegal Mining on the Ghanaian Youth: Evidence from Kwaebibirem District in Ghana. *Journal of Research on Humanities and Social Sciences*, **2**(6).
- Songsore, J., Yankson, P.W.K. and Tsikata G.K. 1994. *Mining and the Environmental: Towards a Win-Win Strategy (A study of the Tarkwa – Aboso – Nsuta Mining Complex in Ghana)*.
- Subramanyam, B.H., Becket, S.J. and Fields, P.G. 2007. *Theory and Practical, Heat treatment for post-harvest pest control*, CAB International, UK, p. 183.
- Supply Chain Risk Assessment Report. 2001. Ghana Cocoa Board.
- The Institute of Statistical, Social and Economic Research, (ISSER), 1998. *The State of the Ghanaian Economy*, ISSER, University of Ghana, Legon, June, pp. 67-68.
- Thomas Walde. 1983. *Permanent sovereignty over natural resources, recent developments in the mineral sector*. Natural Resources Forum, published by the United Nations, New York, July.
- Tsikata, F.S 1997. *The Vicissitudes of Mineral Policy in Ghana. Resources Policy*, **23**(1/2): 9.
- World Bank Report, 2010.
- World Cocoa foundation report, 2010.