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Article

The Impact and Effect of Illegal Mining (galamsey) towards the Socio-economic Development of Mining Communities: A Case Study of Kenyasi in the Brong Ahafo Region

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Abstract: Mining has its benefits and effects especially on the people living in communities where minerals are found. This paper tries to identify and assess the impacts and effects of illegal mining (galamsey). The main impacts identified are on economic activities, health, social life and employment while the effects include those on economic activities, health, social life, environment, agriculture and education. It was then recommended that both the government and the public sector should legalize the galamsey as well as encourage them by means of assisting them financially.

Keywords: Mining, Illegal Mining (Galamsey), Minerals,Communities

1. Historical Background Introduction

Mining is an important economic activity which has the potential of contributing to the development of areas endowed with the resources. Materials recovered by mining include bauxite, coal, diamonds, iron, precious metals, lead, limestone, nickel, phosphate, rock salt, tin, uranium, and molybdenum. Mining in a wider sense can also include extraction of petroleum, natural gas, and even water (Wikipedia, 2006).

Mining activities form an integral part in the economic development of any country endowed with mineral resources. This is due to the revenue generated from it, the employment opportunities it creates for the citizens, the foreign exchange. Communities where these minerals are found benefit from the investment opportunities, employment, royalties paid to them and other supplementary benefits. However, communities with mining suffer from pollution, land degradation, deforestation, high cost of living, poverty and lack of basic needs. Whereas attribute this to the activities of legitimate companies, others point fingers to illegal miner (galamsey operators). Though the legitimate companies put measures to tackle these effects, its effectiveness has been set back. On the other hand, the illegal miners do not have any measure even to protect themselves, let alone the communities.

Ghana, the 10th leading producer of gold in the world has a long history of mining before the colonial masters. Tracing back to the pre-colonial era, people used to mine for minerals specifically gold along the coastal areas and this even led to the naming of Ghana then Gold Coast. This sort of mining was done in small scales commonly refer to as artisanal mining. Government in economies endowed with natural resource set institutions and enact laws to regulate the activity of people in the sector. They provide legal document for individuals or corporate bodies who want to get into the sector. In Ghana, the Minerals and Mining Law was enacted under PNDC Law 153 in 1986 to register and regulate the activities of mining companies.

Gold is a very precious mineral that everyone who finds it sees it as a blessing. Revenue generated from gold will increase disposable income (household’s income), tax revenue, GDP per capital, create more employment, open the doors for more investment, and help finance agricultural and economic activities like trading. All of these show signs of blessing. But the manner in which gold is mined can have significant effects on the communities.

We often hear on news the death of illegal miners caused by a collapse cave or them being buried alive in collapse pits. Lands of these communities are deteriorating day-in day-out. One cannot underrate the dangers of chemicals used in mining in these communities as they pollute air and water such as change water colour, taste and give off bad smell, and make lands infertile to support plant growth. The pollution is not only dangerous to human life but the other living organisms which support human existence, thus, in turn destroying the ecosystem. It is also one of the factors contributing to the deforestation of the country’s forest reserves. Aside the stated above, there is prevalent high cost of living (very low living standards), poverty, lack of basic needs such as portable water, are among the threat pose to illegal mining communities.

Statistics show that “Gold represents Ghana’s major export commodity, providing approximately 50% of GDP” (Ministry of Lands and Natural Resources (MLNR), 2003).Gold was traded with the Moors and the Phoenicians on the trans-Saharan trade routes before the advent of the Portuguese and other European incursions, which began in 1471. This form of mining is described as artisanal. Artisanal mining and processing methods were employed to work both hard rock/lode and alluvial gold deposits. Lode gold was mined by excavating pits to levels where “a dark coloured stone which is interspersed with gold” was reached. The gold was then recovered “by grinding the stone to powder”, and then “washing it”. Alluvial gold was mined by collecting gravel from the beds of streams and washing sediments clean of sand and earth.

As a result, artisanal or small-scale mining continued in Ghana even after the introduction of modern exploration and mining methods to the country by the Frenchman Piere Bonnat and others circa in 1870.With the introduction of modern governance in which the government of the state is the custodian of the land, the government therefore, in 1986 enacted the PNDC Law 153 to register and regulate the activities of mining companies. Under the PNDC Law 153 heavy capital and technical ability were required, thus going into large-scale modern operation. It also did not consider artisanal mining or small-scale mining. Before 1989, artisanal mining or small-scale mining were consider as illegal mining (galamsey) even including the marketing of gold from it.

But this did not stop the practice. The practice which is currently known as galamsey was flourishing and winnings were mainly smuggled for sale outside the country through a well-oriented black market. Despite contributing nothing economically, operations caused significant environmental damage, health, social and economic problems. Outputs in turn enriched neighbouring countries, which were found to be exporting gold despite lacking significant gold deposits. The increasing awareness of the fact that the continued marginalization of the small-scale gold mining sector was detrimental to the economy led to a study into the phenomenon, which resulted in its regularization through the enactment of the Small-Scale Gold Mining Law, PNDC Law 218, in May 1989. Concurrently, the state agency responsible for marketing diamonds—the Diamond Marketing Corporation (DMC)—had its mandate expanded and was re-named the Precious Minerals Marketing Corporation (PMMC) to provide a ready market for both gold and diamond produced by resident small-scale miners.

In addition to the regularization of small-scale gold mining and implementation of an accompanying marketing framework in 1989, procedures for diamond marketing, which had long been legalized, were streamlined.

Though the enactment of the Small-Scale Gold Mining Law, PNDC L 218, legalized the operations of Small Scale Mining (SSM) in Ghana. It is still difficult to differentiate between the activities of small-scale miners and illegal miners. The term galamsey is interchangeably used to refer to both small-scale mining and illegal mining. The phase “Gather them and sell” explains the term galamsey and what these workers do. Small scale mining defined by various groups mostly taking into consideration the level of output the methods and tools used in their operation and the group of people who engage in it and the location.

According to the World Bank Group, “Small-scale mining is largely a poverty-driven activity, typically practiced in the poorest and most remote rural areas of a country by a largely itinerant, poorly educated populace with few employment alternatives”. Small-scale mining in Ghana can also include both the exploitation of mineral deposits using fairly rudimentary implements and/or at low levels of production with minimal capital investment.While the large-scale mining particularly gold has become predominant, small-scale mining, which predates such operations, has continued to be an important economic activity, particularly within the remote and poorer areas of the country. The environmental impacts of such small operations have, however, varied, depending on methods and the scale of operation.

The Minerals and Mining Act, 2006 (Act 703) which is a continuation of the Small-Scale Gold Mining Law, PNDC L 218 enacted in 1989 given the procedures of issuing a license to a small-scale firm. It contain in Section 81 to 99 in the 1992 Constitution of the Republic of Ghana. Small-scale gold mining licenses may be granted to Ghanaians 18 years of age and older, and are subject to the following conditions:

1. A maximum allocation of 1.2 hectares of land in the case of a grant to any one person or group of persons not exceeding four in number;
2. A maximum allocation of 2.0 hectares of land in the case of a grant to any group of persons not exceeding nine in number; and
3. A maximum allocation of 10 hectares in the case of a grant to a co-operative society of 10 or more persons and registered companies.

Though actual figure on the number people into small-scale cannot be given, it is estimated that some 200,000 are involved directly in the extraction of gold and diamonds, the great majority of about 170,000 are into illegal mining (galamsey). In a technical paper published by the World Bank entitled Strategy for African Mining, it is estimated that some 30,000 people are employed within the legalized segment of the Ghanaian small-scale mining sector. Minerals Commission and Ghana Chamber of Mines, who also noted that 60 per cent of the country’s mining labour force is, in fact, employed at small-scale mines. Regional employment assessments have estimated that over 6,000 illegal and 117 registered artisanal gold mines are found in Tarkwa alone. According to the 2008 Ghana Chamber of Mines (GCM) report, illegal mining activities (galamsey) have been increasing with an estimated number between 300,000 and 500,000 artisan miners comprising one of the largest groups of illegal miners on the continent.

The Small-Scale Gold Mining Law, PNDC L 218 enacted in 1989 with its continuation in the Minerals and Mining Act, 2006 (Act 703) which yielded no results, as according to the 2008 Ghana Chamber of Mines (GCM) report, illegal mining activities (Galamsey) have been increasing with an estimated number between 300,000 and 500,000 artisan miners comprising one of the largest groups of illegal miners on the continent. People now do not even operate on “hit and run” operation but in daylight.

The galamsey operators themselves are prone to various problems and dangers such as pit collapse and landslides. On Wednesday, November 11, 2009 an estimated 30 illegal miners (Galamseyers) lost their lives as a result of a landslide at Dopaose in the Wassa Amenfi East District of the Western Region – 14 out of the 18 retrieved corpses were women. Recent news items in a section of the Ghanaian media report that “there has been incessant and blatant depletion of more than 80% of forest reserves in these mining communities, and the heavy pollution of the Birim, Ankobra, and Pra Rivers which have been the main source of drinking water for the inhabitants over the years” (Ghana Business News (GBN), March 13, 2010).

A recent study conducted by the UN Industrial Organisation found that the majority of villagers sampled, including non-miners, carried unsafe levels of mercury in their bodies. The concentration found in fish was three times higher than levels deemed safe by the U.S. Environmental Protection Agency (EPA). Reports also state that, “in a week at least one person dies” as a direct result of the various pollution-related activities by illegal miners (CLP, Galamsey: Will Work for Gold, January 18, 2010).

Last year, a similar catastrophe hit the people of Dunkwa On-Offin in the Central Region where several people were buried in galamsey pit when it caved on them near the Offin River. It was reported that over 100 perished in that singular tragedy. Reports said that about 136 galamsey operators were working in the pit when the incident occurred Sunday June 27, 2010. Those who were lucky escaped the Sunday disaster. About 13 bodies were recovered by the rescue operation that was hampered by gushing water from the Offin River. In recent times, it has been a tragedy upon tragedy as another calamity was recorded at Attaso, near Kotokuom in the Ashanti Region, with at least 12 galamsey operators trapped in a collapsed pit. Nine bodies were retrieved from the pit (posted on Daily Guide website on November 26, 2011).

The sector if remain uncheck will cost the nation more than half of the revenue generated from it in terms of treating water, planting trees, treating diseases, etc. In term of the human resources and loss of some plant and animal species can never be recovered.

The general objective of this paper is to assess the impact and effects of illegal mining (galamsey) activities on the lives of people living in mining communities and towards the socio-economic development in Ghana.

2. Hypothesis

The hypothesis to be tested for in this paper based on the following:

Hypothesis one (1):

H_0: Illegal mining (galamsey) activities have no significant socio-economic impact on the livelihoods of community members.

H_1: Illegal mining (galamsey) activities have significant socio-economic impact on the livelihoods of community members.

Hypothesis two (2):

H_0: Illegal mining (galamsey) activities have no significant socio-economic effect on the livelihoods of community members.

H_1: Illegal mining (galamsey) activities have significant socio-economic effect on the livelihoods of community members.

3. Study Area and Location

Study Area: The location of Ghana in the globe as explain by geologists is a place where most minerals (for instants gold) can be found. Geologists today place these gold deposits into one of two general categories. The first of these is Birimian Gold. The Birimian supracrustal rocks of West Africa, which extend from Ghana westwards to Senegal and Mauritania, and northwards into Burkina Faso, are richly endowed with Proterozoic greenstone-type gold lode deposits. Deposits are variable and structurally complex, featuring gold that occurs in both quartz-filled shear zones and in altered rocks adjacent to shear zones. The metamorphosed volcanic belts in which they are found average between 15km and 40km in width, and cover approximately one-sixth of Ghana's surface area. The bulk of Ghanaian gold is derived from Birimian rocks. The second category is Tarkwaian Gold. Auriferous quartz-pebble conglomerates deposits occur within the Tarkwaian supercrustal rocks of Ghana. The matrix is fine-grained quartz and black sands (mainly hematite, and to a lesser extent, ilmenite, magnetite and rutile), and over 90 per cent of the pebbles are vein-quartz, and the balance, quartzite and phyllite.

In short, Ghana is covered by the Paleoprotoerozoic rocks of the Birimian Super group and the overlying clastic sedimentary Tarkwaian group. A result of a series of erosional events, however, significant portions of these rocks have been re-deposited as placer formations in a number of streams and channels. Placer Gold Deposits, which are also referred to as 'alluvial gold', are found in the majority of rivers draining Birimian rocks. Large deposits of placer gold also occur along the terraces, floodplains, channels and river beds of the Offin, Pra, Ankobra, Birim and Tano rivers, where large

Birimian and Tarkwaian gold deposits have experienced several episodes of erosion and subsequent deposition. This made Ghana to be fittingly labelled the 'Gold Coast' some time ago. Aside gold found in these regions, there are other minerals especially in Ghana, such as diamonds - which were first discovered in Ghana in 1919 (at the time, Ghana was known as "The Gold Coast") within the stream gravels of the Birim River. Additional deposits were later discovered in what is today known as the Birim Diamond Field and the Bonsa Diamond Field. Also, there are bauxite, manganese, salt and recently oil.

Location of the Case Study Area: Kenyasi is the capital of Asutifi District in the Brong Ahafo Region with coordinates, a latitude of 6.98 (6°59' 60N) and a longitude 0f -2.38 (2°23' 60W). The location is situated 121 kilometres South of approximately centre of Ghana and 288 kilometres North West of the capital Accra. The community lies within the forest dissected plateau physiographic region with average height of about 700feet above sea level. This physiographic region is underlain by precambrain rocks of Birimain (known to be the gold bearing rocks and also have a high potential for Manganese and Bauxite) and Dahomeyan formation. Currently, gold is been mined by Newmout Ghana Gold Limited and galamsey miners. There is also a widespread deposit of sand in the study area. The community is divided into two parts, Kenyasi No.1 and Kenyasi No.2. The population of Kenyasi was about 11,050 with Kenyasi No.1 having 3,599 people and Kenyasi No.2, 7,451 people in 2000 (national population and housing survey, 2000). The population growth rate is estimated at 2.8%. The projection for 2010, 2011, 2012 and 2013 are 14,916, 15,370, 15,839 and 16,321 (DPCU projections-2010) respectively.

4. Methodology

Sample Size: 100 people were randomly selected as the sample size due to time and resource constraint on the part of the researcher. The researcher combined both convenience sampling/accidental sampling and judgemental sampling methods in picking the sample size. This sample size consists of 50 galamsey operators and 50 non-galamsey operators. In order to ensure a 100% completion rate, the researcher in most cases used the interview method to administer the questionnaires; used for the primary data. Likewise secondary data were collected from the District Assembly, the health centre, statistical service and the education office as well as from websites, reports, journal and papers.

5. Data Presentation and Analysis of Results

There are no official records on the number of galamsey miners, but through the 50 miners who were interviewed at the sites, galamsey start in Kenyasi in 2004 with a population of about 1700. There are now about 5000 galamsey miners in Kenyasi an increase of 34% within 8 years. The largest and the oldest have approximately 3000 miners and approximately 1000 at the other two sites. The number of miners is increasing at a rate high of about 14%.

Estimating the future numbers of galamsey miners:

Using exponential growth model, we have

$$\frac{dQ}{dt} = kQ$$

Where, k is the constant of proportionality, Integrating this gives;

$$Q = \mathrm{Qo}e^{kt}$$

where

Q = present population

Qo = the initial/base population (that is, at t = 0, in the year 2004)

e = constant

k = constant of proportionality

t = time (in years)

$$5000 = 1700e^{k*8}$$

$$k = 0.1349$$

$$Q = Qoe^{0.1349t}$$

The projected population of galamsey miners in Kenyasi in 2017 will be:

$$Q = 1700e^{0.1349*13}$$

$$Q = 9819$$

Assuming the growth rate is per year:

$X_{n+1} = X_n + rX$

Working backward;

$X_n = (1 + r)^n X_o$

where

X_n = the target year population

X_o = base population

r = growth rate

n = time in years

The projected population for the year 2017 will be:

$X_n = (1 + 0.14)^n * 1700 = 9337$

Table 1: Projected numbers of miners

Projected population for 2013 – 2017					
Growth	Years				
	2013	2014	2015	2016	2017
Exponential growth model	5724	6551	7497	8580	9819
Growth rate per year	5528	6302	7185	8190	9337

Source: Field Survey (2012)

Table 2: Age Groups

	Population work status	
Age groups	Non-galamsey miners	Galamsey miners
0 - 10	0	0
11 - 20	5	17
21 - 30	23	26
31 - 40	12	6
41 - 50	5	1
51 - 60	4	0
60+	1	0

Source: Field Survey (2012)

From the contingency table in the Appendix 5, since $X^2 = 14.3956 > X^2_{0.05,6} = 12.59$ we reject H_0 that the population work status and age group are independent.

There is enough evident to support the claim that the population work status in the area depends on the age of the person. Therefore, we can say that galamsey operation is for the youth and others jobs are for the elderly in the community. This is true because the youth are the one with much strength to work on the rocks.

Using Z-test to test for the mean age of galamsey miners:

Assuming the average of the galamsey miners is 26 years as against that of 24.08 of the 50 miners interviewed during the study. The standard deviation for 50 samples is 7.24. To test for the significance of the population mean age using the Z-test at 5% level of significance.

1) Hypothesis

H_0: $\mu \geq 26$ (galamsey miners population mean is greater than or equal to 26)

H_1: $\mu < 26$ (galamsey miners population mean is less than to 26)

2) Test statistics (Z-test)

$$Z = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

$$Z = \frac{24.08 - 26}{7.24/\sqrt{50}}$$

$$Z = -1.8752$$

where

x = sample age mean

μ = population age mean

s = sample standard deviation

n = sample size

3) Test characteristic/critical value

Reading from the Normal (Z) table, $Z_{\alpha = 0.05} = -1.645$

4) Decision

Since the test statistic (Z) is less than the critical value (Z_α), there is enough evidence to reject the null hypotheses (H_0) that the mean age of galamsey miners at Kenyasi is 26 years.

5) Conclusion

The mean age of galamsey miners at Kenyasi is therefore less than 26 years. This implies that, majority of the miners are the youth and may include a greater portion of children of school going age.

Gender ratio

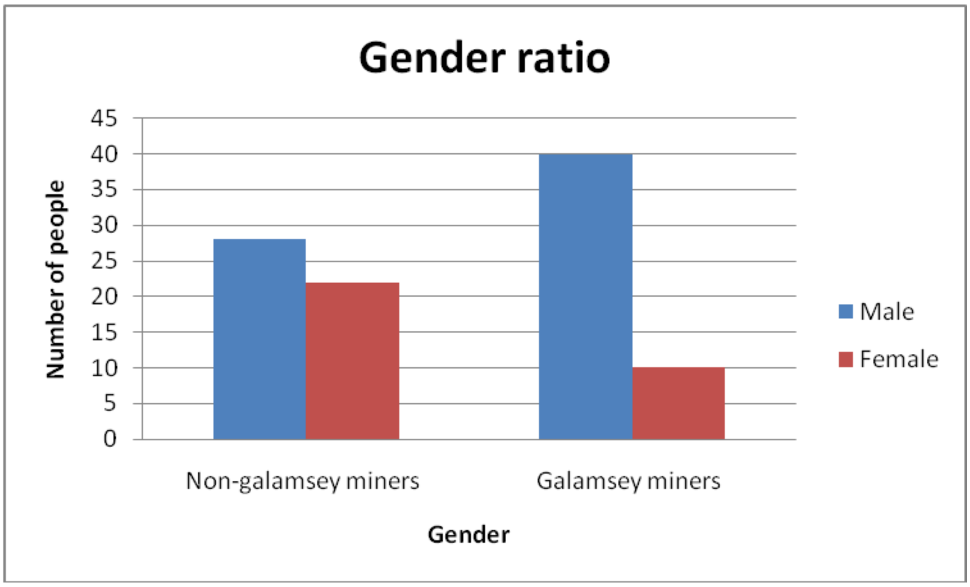

Figure 1: A bar chart showing the gender ratio of both non-galamsey and galamsey miners

From the contingency table in the Appendix 5, $X^2 = 6.6176 > X^2_{0.05,6} = 3.85$ we reject the H_0 that the population work status and age group are independent. Therefore, there is enough evident to support the claim that the population work status dependents on gender. This explains why males are the majority.

Migration:

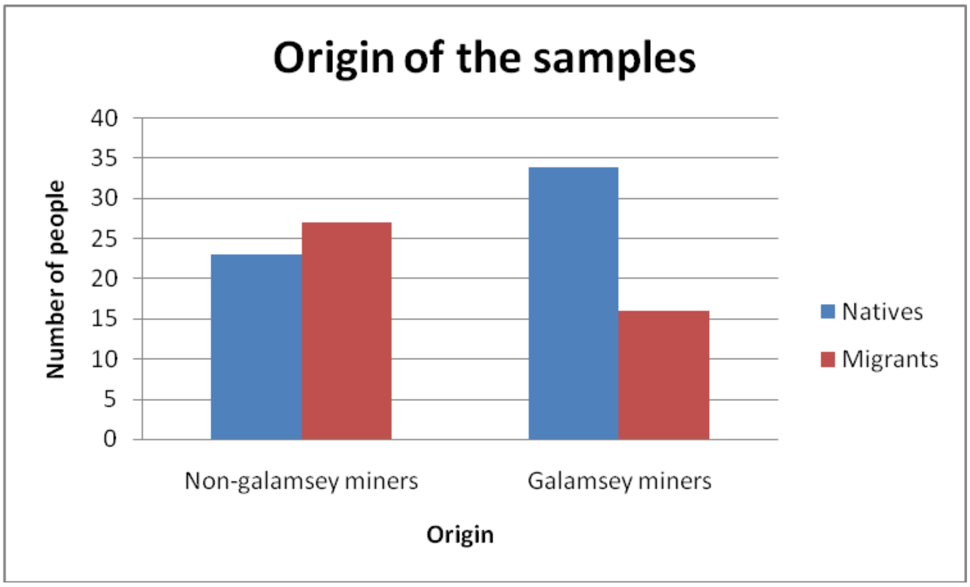

Figure 2: A bar chart proportion of native and migrants of non-galamsey people and galamsey miners

From the contingency table in the Appendix 5, since $X^2 = 5.3188 > X^2_{0.05,6} = 3.85$ reject the H_0 that the population work status and place of origin are independent. There is enough evident to support the claim that the population work status in the area depends on the place where the person comes from. This implies that migrants are mostly into galamsey operation.

Educational level:

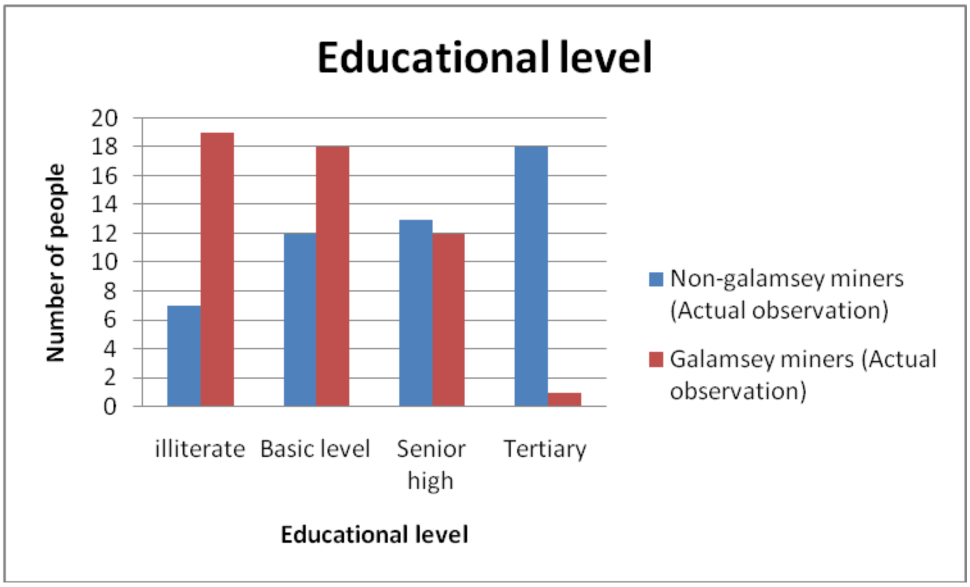

Figure 3: A bar chart showing their educational level

From the contingency table in the Appendix 5, since $X^2 = 21.989 < X^2_{0.05,3} = 7.81$ we reject H_0 that the population work status and educational level are independent. There is no enough evident to support the claim that kind of work one does in the area depends his educational level. We can conclude that, less educated ones are into galamsey operation and highly educated people are in other jobs.

Impact of Galamsey on the Community:

Galamsey is having impact on economic activities, health, social life, employment, Pair wise ranking of the impacts of galamsey.

Pair wise ranking of the impact of galamsey operation was done by the respondents. Impact on economic activities, impact on health, impact on social life and impact on employment creation are represented by 1, 2, 3 and 4 respectively.

Table 3: Pair wise ranking of the impacts of galamsey

	1	2	3	4	Ranking
1	X	1	1	1	1st
2		X	2	4	3rd
3			X	4	4th
4				X	2nd

Pair wise ranking of the effect of galamsey:

Using the Pair wise ranking, the effects of galamsey were rank by the community members as in the table below. Economic effect, health effect and effect on social life are represented by 1, 2 and 3; 4, 5, and 6 represents that of environmental effect, effect on agriculture and effect on education.

Table 4: Pair wise ranking of the effects of galamsey operation

	1	2	3	4	5	6	Ranking
1	X	2	1	4	5	1	4th
2		X	2	4	2	2	2nd
3			X	4	5	3	5th
4				X	4	4	1st
5					X	5	3rd
6						X	6th

Pair wise ranking on the role of institutions in dealing with galamsey:

Pair wise ranking was used to access the role various institutions in dealing with galamsey, the community people expect more from government and least from individual members. Using 1 for government, 2 for NGOs, 3 for community heads and individuals and legalised mining companies represented by 4 and 5 respectively show the ranking of the institutions.

Table 5: Pair wise ranking of the various institutions

	1	2	3	4	5	Ranking
1	x	1	1	1	1	1st
2		X	3	2	2	3rd
3			x	3	3	2nd
4				x	4	4th
5					X	5th

Table 6: Descriptive Statistics

	Mean	Std. Deviation	N
Gold	234.60	214.815	20
Miners	52.50	33.962	20
Depth	106.64	66.180	20

Reasons why people are into illegal mining:

These can be summarised as follows: Poverty, High unemployment rate or lack of job, Very poor business performance and huge start-up capital, Loss of farmlands.

6. Regression Analysis

The output of gold is measured in “loads” (the sample stone containing the gold). These “loads” are sold to those who will process it to get the final gold. The output of 20 different pits, the number people involve in digging and the depths of the pits (in feet) for the month of April are in

Appendix 3. Using regression analysis to regress the gold (in "loads") against the number of miners per pit and the depth of the pit using SPSS, gives the result below.

The mean of the gold is 234.60 loads with a standard deviation of 214.815. The number of miners per pit and the depth of a pit have means 53 people and 106.64ft.

Table 7: Correlations

		Gold	Miners	Depth
Pearson Correlation	Gold	1.000	0.470	0.474
	Miners	0.470	1.000	0.986
	Depth	0.474	0.986	1.000
Sig. (1-tailed)	Gold	.	0.018	0.017
	Miners	0.018	.	0.000
	Depth	0.017	0.000	.
N	Gold	20	20	20
	Miners	20	20	20
	Depth	20	20	20

From the table above, the Pearson's rank correlation showed that there is a positive correlation between the gold and the number of miners per pit, and output and the depth of the pit. There is also a semi-weak correlation between the gold and the independent variables, because the significance values from the Pearson's rank correlation are all less than the significant level of 0.05.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.474	0.225	0.134	199.927	2.392

a. Predictors: (Constant), Depth , Miners

b. Dependent Variable: Gold

The multiple correlation coefficient (R): The value from the model summary table above is (R) = 0.474 indicating a semi-strong relationship between the observed and the model-predicted values.

The coefficient of determination (R^2): From the model summary table above, the coefficient of determination (R^2) is 0.225. That would imply that 22.5% of the total variation around the mean of gold is explained by the variables included in the model. The R^2 is very low, meaning the model is not good. Hence, the regression has not done a good work in modelling gold, number of miners and the depth of the pit.

Table 9: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	197263.115	2	98631.557	2.468	0.115
	Residual	679501.685	17	39970.687		
	Total	876764.800	19			

a. Predictors: (Constant), Depth , Miners

b. Dependent Variable: Gold

From the ANOVA table, there is a large difference between the regression sums of squares (the variation accounted for by your model) – RSS = 197,263.115 and residual sums of squares (the variation that is not accounted for by your model) – ESS = 679,501.685. This indicates that small of the variation in the numbers of miners and the depths of the pits are explained by the model. Also, the significant F statistic from the ANOVA table above is greater than 0.05, indicating that the variation explained by the model may be due to chance. This may implies that, the output of galamsey miners is due to chance or other factors that were not included in the model.

Table 10: Coefficients Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	71.510	87.225		0.820	0.424
	Miners	0.670	8.198	0.106	0.082	0.936
	Depth	1.199	4.207	0.370	0.285	0.779

a. Dependent Variable: Gold

Gold = $\beta_0 + \beta_1$(number of miners) + β_2(pit's depth) +μ_i

From the coefficient table, the model now becomes;

Gold = 71.510 + 0.670(number of miners) + 1.199(pit's depth)

β_0 = 71.510 is the intercept (a constant), but for the model to increase, number of miners and the pit's depth should increase. That is, for a pit owner to increase his loads there should be increase in the number of miners and the pit's depth. For the model to decrease the reverse is true.

Test of significance of the parameters:

Gold = $\beta_0 + \beta_1$(number of miners) + β_2(pit's depth) +μ_i

Gold = 71.510 + 0.670(number of miners) + 1.199(pit's depth)

Hypothesis:

H_0:β_0 = 0 (parameter is not significant)

H_1:$\beta_0 \neq$ 0(parameter is significant)

H_0:β_1 = 0 (parameter is not significant)

H_1:$\beta_1 \neq$ 0(parameter is significant)

H_0:β_2 = 0 (parameter is not significant)

H_1:$\beta_2 \neq$ 0(parameter is significant)

Using the significance values of the coefficients from the coefficient table above, all the coefficients are not significant in the model. This is because, all their significant values (β_0 = 0.324, β_1 = 0.907 and β_2 = 0.832) are all greater than 0.05. This means number of miners and pit's depth do not contribute much in the model for loads.

7. Conclusion

Galamsey operation in actual fact impact people live in the community. It have a direct impact on trading activities, increases the disposal income not only the miners but a large portion of the community especially those into trading of goods and rending of services. It creates an avenue for people to get some form of employment and earn huge sums of money. It also has an impact in their social life.

In as much as it has an impact in the lives of both the galamsey workers and some members of the community, its negative effects outweigh its impact. These effects include; land degradation, deforestation, water pollution, air pollution and noise pollution. Other effects are decrease in the output of farm product, high rate of teenage pregnancy and prostitution, school drop-out and absenteeism. A lot of lives are also lost, some get severe injuries and other health related problems.

Galamsey really affect the community than it benefits it. The effects are significantly high than the impacts.

Recommendations

The government should formulate a policy that includes the following:

- Encouraging and assisting the Galamsey people to come together and acquire

legal permits, or the government forming a state owner mining company which takes over the mining site of galamsey miners or a joint stock mining company comprising the government and some interested sponsors. In addition to either of the above; the government should persecuting anyone who fails to comply with this directive.

- Also, educating them on the effects of their operation and assure them that there

are safe methods of mining, discouraging especially the youth and providing financial support for the youth to further their education.

- Government should create and promote jobs and/or business opportunities

alternative to galamsey so that they can easily quit galamsey. In addition to this, providing capital and encouraging them to save so that they can invest in these opportunities.

- Parents should also take up a proactive role in educating and advising their Children about galamsey.
- Mining Companies should pay higher percentage as royalties and provide business opportunities in place of farming and also engaging in practice that can still make lands good and less risky for farming.

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