GALAMSEY ACTION GROUP

Proposal on Actions to Sustain the ongoing Momentum to End Irresponsible Mining and Restructure the Artisanal and Small-Scale Mining Sector

"Yen Ara Asase Ni!"
(Our Land, Our Forests, Our Rivers, Our Gold!)
Restructuring for Environmentally Sustainable Mining!

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Preamble

The **Galamsey Action Group,** a Non-Governmental Organization (NGO) incorporated in Canada, is made up of Ghanaians located at home and abroad who are very concerned about the state of degradation of Ghana's rivers, arable land and forest reserves as a result of irresponsible mining in several communities in Ghana. Our mission is to expose the problem, sensitize the people, seek the restoration of the destroyed land and rivers, and reparation for the people and communities that have been so badly impacted. We also aim to work with and pressurize the Ghana Government to provide alternative sources of livelihood for impacted unemployed youth and seek the equitable distribution of resources for the development of resource-rich but development-deprived communities in Ghana.

We have noted with encouragement the ongoing efforts being made by the government of President Nana Addo Dankwa Akufo-Addo, through the Ministry of Lands and Natural Resources and the Ministry of Defense to stop irresponsible and illegal mining within and along rivers and in the forest reserves, a phenomenon that has turned Ghana's beautiful and lush landscape into a cesspool of death and desolation. While these "surgical actions" seem to be succeeding to some extent, we wish to offer the following proposed actions to ensure that these gains are sustained.

The galamsey problem has dented Ghana's brand and image as a rising developing country with real tourism potential and the potential to reach middle income status. Ghana now faces the risk of assuring the export market that its highly rated cocoa beans remain unaffected by the effect of rivers and farmland that are now polluted by cyanide and mercury from galamsey and irresponsible mining.

It is imperative that the Ghana Government take an unwavering and sustained position to halt galamsey mining and view the restructuring and regularization of the small-scale Mining sector as part of a broader process of training unemployed youth and developing alternative livelihoods within the context of more balanced regional development and a sustainable National Development Plan. Ghana needs to restructure the mining sector to ensure environmentally sustainable production of gold and other minerals!

On a broader level, it is equally critical for the Ghana Government **to review and assess the total cost-benefit of gold mining operations** in Ghana and to redesign and implement new legislation, policies, fee assessments - including the cost of land restoration, and royalties that would accrue the most economic benefit for the country.

Executive Summary

The primary purpose of this proposal is to focus attention on actions needed to arrest the galamsey mining situation and achieve a positive and sustainable outcome:

1. Halt all small-scale mining activities (Galamsey, community mining, artisanal mining), including all surface / alluvial mining for a period of two years to enable a full restructuring of the sector;
2. Undertake a massive public education campaign to inform the public about the dangers of illegal and irresponsible mining;
3. Reclaim the land areas that have been severely damaged by artisanal and small-scale mining through regrading, filling pits, and replanting trees and other vegetation to secure the soil and minimize soil erosion. We recommend surcharging any concessionaires on whose concession such reclamation work has to be done by the State;
4. Develop and train youth for alternative livelihoods as a long-term strategy for redirecting and diversifying economic activity in rural communities from artisanal and small-scale mining;
5. Prosecute all miners arrested for illegal and irresponsible mining and deport all illegal immigrants involved in illegal mining **after** they have served their sentence.
6. Test water for heavy metals, cyanide and mercury, and test soils for mercury and other harmful pollutants;
7. Restore the polluted rivers and other water bodies and remove cyanide, mercury and other heavy metals from the water and river beds;
8. Provide much needed clean water in affected communities through the use of boreholes, rainwater harvesting, and solar and wind powered water purification systems;

9. Enforce the ban on the use of mercury for extraction of gold and comply with the terms of the Minamata Convention on Mercury[1] adopted in 2017 and ratified by Ghana;
10. Ban the discharge of effluent from mining activities into rivers and fresh water bodies;
11. Require continuous EPA testing of water from rivers, streams, lakes, lagoons and other water bodies and soil from mining areas to ensure compliance with the ban on use of mercury and other dangerous chemicals;
12. Require continuous EPA testing of water from the Atlantic Ocean and lagoons where water from polluted rivers enter the Atlantic Ocean to ensure compliance with the ban on use of mercury and other dangerous chemicals;
13. Restructure and regularize the Small-scale Mining Sector. This includes a complete cost-benefit analysis of the sector to determine its REAL impact on Ghana's long term sustainability.
14. Identify, demarcate and designate the mining areas that are best suited for small-scale mining and publish such designated mining areas on an interactive digital map to facilitate ongoing surveillance and monitoring of small-scale mining activities;
15. Ban individual artisanal miners and require the formation of mining cooperatives for artisanal mining. The Artisanal Mining Cooperatives need to be licensed by both the Ghana Minerals Commission and relevant municipalities and districts. Such artisanal mining cooperatives **should take place only in areas designated by the Ghana Minerals Commission for artisanal and small-scale mining, and no trespassing should be tolerated**;
16. Engage the Artisanal Gold Council[2] and other experts to provide training of trainers on sustainable, environmentally safe and chemical free mining and extraction of gold and other minerals;
17. Train and certify all artisanal miners and all small-scale miners on appropriate sustainable, environmentally safe and chemical free mining and extraction of gold and other minerals;
18. Enhance human capital and infrastructure development in resource rich but development deprived areas through establishment of development funds for funding

[1] Minamata Convention on Mercury: http://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf

[2] Artisanal Gold Council: https://www.artisanalgold.org/

development projects in such areas. (A good example is the Newmont Ahafo Development Foundation).[3]

19. Focus on achieving the UN Sustainable Development Goals, and reposition Ghana to be a tourism destination and a source of supply of inputs for the growing Wellness industry.

In this paper, we will discuss the background to the galamsey problem; recent developments; impact of galamsey on rivers and water supply; impact of the use of cyanide and mercury on the environment and health; impact of galamsey on forests and farms, land and community development; social justice, equity and gender issues; and the proposed solutions to the galamsey problem.

Background

In 2020, Ghana was the sixth (6th) largest gold producer in the World with 138.7 tonnes and the largest gold producer in Africa.[4] According to the Ghana Chamber of Mines, in 2019, mining and quarrying contributed approximately 10% of Ghana's total revenues and gold accounted for approximately 93% of gross mineral revenue.Total production of gold in 2019 was 4.577 million ounces of which 2.989 million ounces (65.3%) was attributed to the large-scale mining sector, and 1.588 million ounces (34.7%) was attributed to the small-scale sector. The main methods of mining in Ghana are underground and open pit mining, and alluvial mining is popular in the small-scale sector.[5] Small-scale mining licenses are reserved for only Ghanaians![6]

Artisanal mining has been practiced in Ghana for centuries. Gold was mined in Ghana long before the Europeans arrived in the Gold Coast and brought mechanized large scale mining techniques. Since the small-scale Mining Act, 1989, also referred to as P.N.D.C.L 218 was enacted in 1989 to regulate the artisanal and small-scale mining sector, the sector has evolved from artisanal mining to artisanal and small-scale mining (ASM aka "Galamsey") to mechanized small-scale mining that involves the use of cyanide and mercury for extraction of gold. Currently,

[3] Newmont Ahafo Development Foundation (NADEF): https://nadef.org/
[4] "World Gold Council - Gold Mine Production": https://www.gold.org/goldhub/data/historical-mine-production
[5] "Ghana Chamber of Mines - 2019 Mining Industry Statistics and Data": http://ghanachamberofmines.org/wp-content/uploads/2020/07/2019-Mining-Industry-Statistics-and-Data-for-Ghana.pdf
[6] Acquiring A Mining License - Types of Mineral Rights: http://www.mincom.gov.gh/acquiring-mining-license

artisanal mining and small-scale mechanized mining are undertaken by both licensed and unlicensed Ghanaian miners often with the assistance of foreigners and business people. Artisanal miners are still mostly poor people seeking a means of livelihood. See Appendix I for a list of the Municipalities and Districts that reported illegal mining activities in 2019.[7]

The artisanal and small-scale mining sector has evolved beyond the boundaries of the governing law, and it now involves the use of excavators and large equipment and dangerous chemicals for the extraction of gold. Cocoa and other farms are destroyed in the process of digging pits to extract ore. The pits are often left unfilled and they fill up with water. The small-scale miners use rivers and streams directly in the process of extracting gold. The chemicals and mud from the extraction process pollute rivers and other sources of clean water of the affected communities. There is also an increased level of illegality and criminality associated with small-scale mining in Ghana. Illegal foreign immigrants have infiltrated the small-scale mining sector, and they take gold out of Ghana without declaring the gold to the Mineral Commission, Ghana's Customs Excise and Preventive Service (CEPS) or paying taxes to Ghana Revenue Authority (GRA). See the paper "Rethinking Artisanal and small-scale Mining in Ghana: Challenges and Solutions"[8] for a more detailed discussion of the evolution of the small-scale mining sector and the regulatory and other challenges.

On July 25th, 2019, the Ghana Government launched the Community Mining Programme (CMP) . The CMP was aimed at formalizing mining in selected communities in Ghana, and at least one community mine was expected to be set up in each of the mining districts in the country. The community mines were expected to provide employment for more than 4,500 miners that the Government trained at the University of Mines and Technology (UMaT) located at Tarkwa.[9]

[7] Appendix I: Municipalities and Districts that Reported Illegal Mining and Other Threats in 2019
[8] "Rethinking Artisanal and small-scale Mining in Ghana: Challenges and Solutions": William Tetteh Botchway, John Asafo-Akowuah and Nii Tei Botchway, May 2021
[9] "President Akufo-Addo Launches Community Mining Programme": https://presidency.gov.gh/index.php/briefing-room/news-style-2/1266-president-akufo-addo-launches-community-mining-programme

The Ghana Minerals Commission blocked out several zones in each of the mining districts for the CMP, and some traditional authorities were supposed to provide land for the CMP. Some of the large-scale mining companies were also expected to demarcate areas for the CMP.

The Ghana Government also established the "Inter-Ministerial Committee on Illegal Mining" (IMCIM). The IMCIM Mapping Team was tasked with mapping out concessions for the various CMP and uploading the concession areas onto the IMCIM GalamStop software.

Unfortunately, "Operation Vanguard" - a Military and Police Joint Task Force (JTF) that the Ghana Government set up in 2017 to combat the operation of galamsey in Ghana was not successful in combating the galamsey menace!

In 2019, the Ministry of Finance obtained funding totaling $47.80 million (comprising a $30 million World Bank loan and $17.80 from two trust funds - Climate Investment Funds and Global Environmental Facility) for the "Artisanal and Small-Scale Mining Formalization" project to "create enabling conditions for the orderly, safe, sustainable, and environmentally sound development of artisanal and small-scale mining for the benefit of Ghanaian nationals and Ghana".[10]

In 2019, the Ministry of Lands and Natural Resources also obtained a World Bank loan of $19.39 million for the Forest Investment Programme[11] to enhance natural forests and agroforest landscapes. The project was undertaken to improve forest and tree management practices by cocoa farmers, Conservation Resource Management Area (CREMA) communities, and forest reserve managers to reduce forest loss and degradation and demonstrate rehabilitation of mined-out sites in selected areas in Ghana's forests. The CREMA is managed by a Community Resource Management Committee (CRMC) approved by the District Assembly, and authorized to apprehend illegal miners, chainsaw operators and illegal hunters. The project included capacity building and alternative livelihoods.[12]

[10] "Ghana: Artisanal and Small-Scale Mining Formalization (P168002) - World Bank": https://documents1.worldbank.org/curated/en/588251567092763252/pdf/Concept-Project-Information-Document-PID-Ghana-Artisanal-and-Small-Scale-Mining-Formalization-P168002.pdf

[11] "Additional Financing for Ghana Forest Investment Program (FIP) - Enhancing Natural Forest and Agroforest Landscapes Project": https://projects.worldbank.org/en/projects-operations/project-detail/P163745?lang=en

[12] "Community Resource Management Areas (CREMA)": https://www.wapca.org/crema

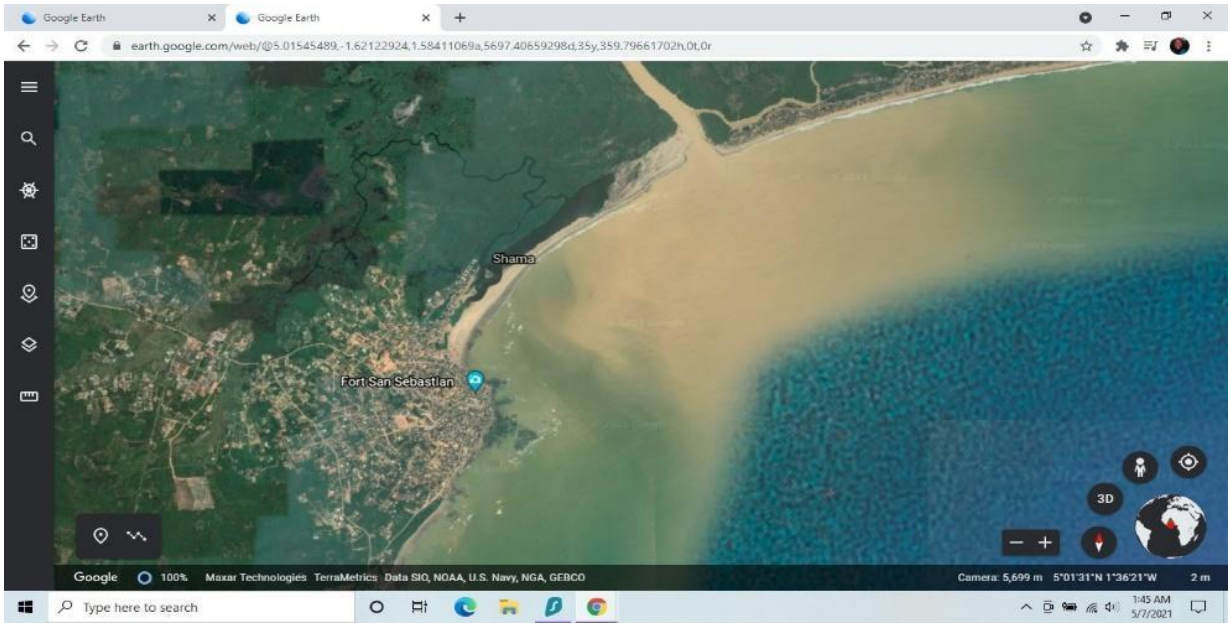
Despite these efforts by the Ghana Government and support provided by the World Bank and other funding sources, the degradation of forests, forest reserves, rivers, land and resulting land erosion continued unabated. The Ghana Government needs to take drastic and sustained actions to properly manage land use, forests and forest reserves, and the small-scale mining sector to prevent illegal mining and benefit current and future generations of Ghanaians.

Severe degradation of land at galamsey mining sites!

Severely polluted rivers due to illegal mining activities!

Severely polluted rivers due to illegal mining activities!

(Source: Edem Srem; Google Earth Images)



Polluted Pra River entering the Atlantic Ocean at Sharma in the Western Region!

(Source: Google Earth)

Recent Developments

The Ghana Government is now undertaking Operation Halt II - a joint all ranks military task force that is targeting all illegal mining activities, whether licensed or unlicensed, and equipment that pose threats to Ghana's water bodies. The exercise has led to the destruction of excavators and mining equipment that are found within established red zone areas.

Effect of Galamsey on Rivers, Water Production and Supply of Clean Water

The Ghana Water Company Limited (GWCL) has disclosed that it has been compelled to ration water to residents of certain communities where the river had become brownish and muddy. At the Daboase intake point, the turbidity of the water, which was around 54NTU in 2007, has increased to more than 3,000NTU currently. The situation had been caused by an increase in volumes of sludge in the water taken for processing, resulting in a significant increase in the use of alum to attain the right quality of water for human consumption. GWCL officials indicated that the Pra, Ankobra and other smaller river bodies in the regions had all been affected by the activities of illegal miners.[13] The polluted water poses a threat to the water treatment plants and increases the cost of water production.[14] GWCL had previously reported that illegal mining activities have had a devastating effect on its production capacity. Most of GWCL's major treatment plants across Ghana have been shut down. Most regions have been affected -- Upper East, Upper West, Northern, Brong Ahafo, Ashanti Region, Greater Accra, Volta, and with the Eastern Region, Western Region, Western North and Central Region suffering the worst! Almost every major treatment plant in Ghana has been affected. Most of the treatment plants operate at about 60 percent of the capacity and some are producing below 40% of capacity. In addition, it is not cost effective to treat water given the challenges. Some water treatment plants in neighbouring Ivory Coast have also been shut down because the activities of illegal miners in Ghana are affecting their water bodies. The Bia River enters Ivory Coast and the Tano River enters the Bia Lagoon and it is polluting the Bia Lagoon so the Ivorians are unable to treat water

[13] "Galamsey threatens water supply in Western region - GWCL", April 21, 2021, by Shirley Asiedu-Addo & Dotsey Koblah Aklorbortu: https://www.graphic.com.gh/news/general-news/ghana-news-galamsey-threatens-water-supply-in-western-central-regions-gwcl.html

[14] "Galamsey threatening water supply – Ghana Water Company Limited warns", April 21, 2021, by Kojo Emmanuel: https://www.pulse.com.gh/news/local/galamsey-threatening-water-supply-ghana-water-company-limited-warns/gg7s87f

in some of their treatment plants.[15] This can potentially have a negative effect on international relations with Ivory Coast!

Effect of the Use of Cyanide and Mercury in Galamsey Mining on the Environment and Health

In 2017, Ghana's Ministry of Environment, Science and Innovation (MESTI) held a workshop and announced that Ghana would ban the importation of mercury by 2020.[16] The Ghana Government needs to take immediate action to stop the importation and use of mercury in the mining sector. The UN member countries, including Ghana, adopted the Minamata Convention on Mercury[17] due to the significant effects of Minamata Disease (M. d.), the serious health and environmental effects resulting from the mercury pollution, and the need to ensure proper management of mercury and the prevention of such events in the future. In 2020, China was the world's largest producer of mercury.[18] Please read Appendix II for a summary of research on the effects of galamsey mining on health, water bodies and aquatic life, soil and forests.[19]

[15] "Galamsey cuts water production to only 60%", April 4, 2017: https://citifmonline.com/2017/04/galamsey-cuts-water-production-to-only-60/#sthash.U721Q6Zb.gbpl
[16] "Ghana to ban production, import of mercury products by 2020" - April 6, 2017 in MESTI NEWS: https://mesti.gov.gh/ghana-to-ban-production-import-of-mercury-products-by-2020/
[17] "Minamata Convention on Mercury": http://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf
[18] "Global mercury production by country 2020" - Published by M. Garside, Mar 3, 2021: https://www.statista.com/statistics/1005602/global-mercury-production-by-country/
[19] Appendix II: "Galamsey and Water Quality" - Review of Literature by Dr. Francis Appoh

Use of mercury in the extraction of gold is of serious global concern because it causes Minamata Disease (M. d.) which is methylmercury (MeHg) poisoning. M. d. occurred in humans who ingested fish and shellfish contaminated by MeHg discharged in waste water from a chemical plant (Chisso Co. Ltd.). M. d. was first officially "discovered" in Minamata City, south-west region of Japan's Kyushu Island in May 1956. The marine products in Minamata Bay displayed high levels of Hg contamination (5.61 to 35.7 ppm). The Hg content in hair of patients, their family and inhabitants of the Shiranui Sea coastline were also detected at high levels of Hg (max. 705 ppm). “Minamata disease, sometimes referred to as Chisso-Minamata disease, is a neurological disease caused by severe mercury poisoning. Signs and typical symptoms include ataxia (loss of full control of bodily movements), sensory disturbances, numbness in the hands and feet and tremors, general muscle weakness, dysarthria (motor speech disorder and damage to muscles that control speech), loss of peripheral vision due to constriction of the visual field, auditory disturbances and damage to hearing. In addition, fetuses were poisoned by MeHg when their mothers ingested contaminated marine life (named congenital M. d.).[20] Patient symptoms were serious, and extensive lesions of the brain were observed. Mercury is a chemical that has the ability to persist in the environment once it is aerosolized through burning. It can enter and stay in the atmosphere, soil and water bodies. It has the ability to bioaccumulate in ecosystems. It poses significant risks and has significant negative effects on human health and the environment. It has a negative effect on internal organs and the central nervous system. The exposure to mercury of vulnerable rural populations, especially women, children, and, through them, future generations is something that should be regarded with grave concern. Mercury can devastate Ghana’s rural mining communities through contamination of water, the air, and food chain.

Another dangerous chemical that miners use is cyanide which is poisonous. Although cyanide can be found naturally in certain foods and materials like plastics, the cyanide used in mining is sodium cyanide (NaCN) solution which is used to leach gold from ore. Cyanide prevents the cells of the body from using oxygen. When this happens, the cells die. Cyanide is more harmful to the heart and brain than to other organs because the heart and brain use a lot of oxygen. Exposure to a small amount of cyanide causes dizziness, headache, nausea and vomiting,

[20] “Minamata disease: methylmercury poisoning in Japan caused by environmental pollution”: https://pubmed.ncbi.nlm.nih.gov/7734058/

rapid breathing, rapid heart rate, restlessness, and weakness. Exposure to a large amount of cyanide may cause other health effects: convulsions, loss of consciousness, low blood pressure, lung injury, slow heart rate, and respiratory failure leading to death.[21] Acute and chronic exposure to cyanide also causes eye and skin irritation, skin ulcers; permanent mental and motor impairment along with progressive mental deterioration, and enlargement of the thyroid gland and altered thyroid function.[22]

Solid cyanide reacts with water to become hydrogen cyanide. According to Earthworks, the compounds that cyanide breaks down into can be harmful and cyanide spills into groundwater can persist for long periods of time and contaminate drinking water from boreholes. Cyanide contaminated groundwater can also pollute neighboring streams.[23] Cyanide spills can persist in the environment for a long time! Apart from the pollution of soils from mercury and cyanide which can affect farm produce and cocoa farms, several of Ghana's rivers are also polluted with mercury and cyanide. These chemicals kill fish and other aquatic life. The polluted water from the rivers then enters lagoons and the Atlantic Ocean and is a threat to the lagoons and aquatic and marine life! Seafood and river fish which are significant sources of protein for Ghanaians then become toxic and negatively affect internal organs!

Effect of Galamsey on Ghana's Land and Forests

There are three types of small-scale mining: i) hard rock (lode); ii) deep alluvial mining; and iii) shallow alluvial mining or surface mining. Galamsey comprises mostly alluvial mining and it has had a devastating effect on Ghana's land and forests. NASA Analysts Barenblitt, Payton, and other colleagues worked with the Ghana Space Science and Technology Institute and Ghana Statistical Service to determine the total vegetation loss due to artisanal gold mining.[24] They analyzed Landsat data from 2005 to 2019, and classified vegetation loss in four categories: mining, urban development, water, and other (agriculture, bare soil, etc.). The team found **more than 160,000 hectares (400,000 acres) of vegetation were lost from 2005 to 2019**. About **28 percent was lost to both industrial and artisanal gold mining**, while 29 percent was lost to

[21] "Facts About Cyanide": https://emergency.cdc.gov/agent/cyanide/basics/facts.asp
[22] "Cyanide Fact Sheet": https://epi.dph.ncdhhs.gov/oee/docs/CyanideFactSheet.pdf
[23] "Cyanide use in gold mining": https://www.earthworks.org/issues/cyanide/
[24]The Large Footprint of Small-Scale Mining in Ghana: https://earthobservatory.nasa.gov/images/148434/the-large-footprint-of-small-scale-mining-in-ghana

urban development. About 17 percent was converted to water, mainly due to the formation of a lagoon. The remaining 25 percent was attributed to the "other" category of land losses.

The team further classified mining as large-scale industrial or small-scale artisanal by looking at elevation data and the texture of the landscape. According to the team, Industrial mines have larger elevation changes since they dig deeper into the surface and highly textured landscapes tend to indicate artisanal mining due to the small holes compared to wider, smoother industrial areas. **Artisanal mines accounted for 85.7 percent of vegetation loss,** while industrial mines accounted for 14.3 percent from 2005-2019**.** At least 700 hectares (1,700 acres) of loss occurred in protected zones.[25]

Effect of Galamsey on Community Health and Development

The communities affected by galamsey mining activities face dire consequences. Lack of clean water for drinking, cooking, bathing and washing clothes. Health problems like diarrhea, and skin diseases are some of the complaints from the residents of affected communities. Destruction of farmland and fishing deepens poverty and makes it difficult for communities to attract teachers.[26]

Social Justice, Equity and Gender Issues

Social justice, equity and gender issues need to be taken into consideration in formulating solutions to the galamsey problem. Mining communities such as Obuasi, Prestea and Dunkwa have not benefited much from the years of mining that have taken place in these communities. Going forward, the mining sector needs to be examined from an objective and critical viewpoint to ensure that there are social responsibility programs in place to balance the development needs of the mining communities with the profits generated by the mining companies. In addressing the equity issues of how Ghana ensures that mining communities benefit from their mineral resources, attention should also be paid to the interests of women and children in such

[25] "The Large Footprint of Small-Scale Mining in Ghana": https://earthobservatory.nasa.gov/images/148434/the-large-footprint-of-small-scale-mining-in-ghana

[26] "Galamsey-polluted Pra River doubles skin diseases, diarrhoea cases in Shama District" - by Ellen Dapaah, February 14, 2020 https://citinewsroom.com/2020/02/galamsey-polluted-pra-river-doubles-skin-diseases-diarrhoea-cases-in-hama-district/

communities. There should be representation of women on committees or boards that are formed for development purposes.

Proposed Solutions to the Galamsey Problem

The galamsey problem is complex since it affects several communities in the Central, Eastern, Western, Western North, Ashanti, Bono, Bono East, Ahafo, and Northern Regions. The actual number of people - Ghanaians and foreigners - engaged in small-scale mining is unknown. Recently, the Information Minister stated that there are now 200,000 people engaged in galamsey. Other sources estimate that there are nearly 3 million who rely on it for their livelihoods.[27] Others estimate the number of small-scale miners and the people who are dependent on the sector to be 1.0 million and 4.0 million, respectively.[28]

I. Immediate Actions

To firmly control the current situation, we propose a **pause period of two years** during which the following actions should take place.

Proposed Action	Proposed Action - Details	Who	Status
1. Impose a Two (2) Year Ban on Small-scale & Alluvial / Surface Mining	Halt all artisanal, small-scale mining and irresponsible licensed mining operations in all of Ghana's Regions for two (2) years to enable the review and restructuring of the artisanal and small-scale mining (ASM) sector.	1. Ministry of Lands & Natural Resources 2. Ministry of Justice 3. Minerals Commission 4. Ministry of Defence 5. Ghana Armed Forces 6. MMDAs	

[27] "Galamsey": https://en.wikipedia.org/wiki/Galamsey#:~:text=The%20Information%20Minister%20recently%20claimed,on%20it%20for%20their%20livelihoods.

[28] "Rethinking Artisanal and small-scale Mining in Ghana: Challenges and Solutions": William Tetteh Botchway, John Asafo-Akowuah and Nii Tei Botchway, May 2021

2. Seize Equipment Used by Illegal Miners and Irresponsible Licensed Miners	Where feasible, seize, inventory, tag, and hand over to a trusted, independent body all equipment used by illegal galamsey and irresponsible licensed miners. Such an independent body must be subjected to unannounced audits and be held fully accountable for any losses or inability to account for any equipment. All seized equipment must be tagged with tracking devices.	1. Ministry of Lands and Natural Resources 2. Minerals Commission 3. Ministry of Defence 4. Ghana Armed Forces 5. MMDAs	
3. Review all Prospecting & Mining Licenses	Halt, cancel and review all existing prospecting and mining licenses[29]. Review the operations and track record of all licensed operators (large and small), and the areas demarcated for prospecting. We recommend that licences be reissued ONLY after a complete cost-benefit analysis is done, and Ghana has proven that it has in place an effective means of monitoring and enforcing compliance and tracking mining operations, revenue generation, and export and trading of minerals. (See Appendix IV)	1. Minerals Commission 2. Lands Commission 3. MMDAs	
4. Enforce Mining Laws	Diligently enforce the law on responsible mining.	1. Minerals Commission 2. Ministry of	

[29] As of June 19, 2021, the website https://ghana.revenuedev.org/map shows 2947 applications.

	Arrest and prosecute illegal mining offenders in a quick and transparent manner in special fast track courts.	Justice 3. Regional Courts 4. Regional Coordinating Councils 5. Ghana Police	
5. Enforce Immigration laws	a. Require Ghana Immigration Service to make available to the Regions and MMDAs a list of all authorized immigrants in the country. b. Assess the residency status of all immigrants caught taking part in illegal mining or other illegal activities and deport those who do not have proper immigration documents **after they have duly served their sentence for their actions.**	1. Ministry of Interior 2. Ghana Immigration Service 3. Regional Coordinating Councils 4. Ministry of Justice 5. Regional Courts 6. MMDAs	
7. Ongoing Patrol & Surveillance of Mining Areas	Implement ongoing patrol and surveillance of **all mining areas, particularly rivers and forest reserves,** using military and police personnel, drones, boats, Google Earth, and satellite imaging.	1. Forestry Commission 2. Ghana Armed Forces 3. Ghana Police 4. Regional Coordinating Councils 5. MMDAs 6. Traditional Councils	
8. Publish Mining Concessions Online	Publish (along with the concessions captured at this link https://ghana.revenuedev.org/map), the names and key information of all concessionaires so that they can be held	1. Minerals Commission 2. Ghana Geological Survey Authority	

	accountable for any irresponsible mining activities that contribute to environmental degradation and pollution of water bodies.		
9. Public Education Campaign	Undertake a massive public education campaign to inform the public about the dangers of illegal and irresponsible mining and the impact on the land, forests, water bodies and water supply, and Ghana's finances!	1. Ministry of Lands and Natural Resources 2. Minerals Commission 3. Ministry of Information 4. NCCE 5. Govt. Media 6. MMDAs	

Discussion:

1. Halt all illegal small-scale (galamsey) mining and irresponsible licensed small-scale mining operations in all of Ghana's Regions to enable the review and restructuring of the small-scale mining sector. Additionally, cease all surface mining operations until a thorough review of licensing rules, land and water impact assessment, and effective oversight structure is adopted and compliance enforced.
2. Halt, cancel and review all existing prospecting and mining licenses. Review the operations and track record of all licensed operators (large and small), and the areas demarcated for prospecting. We recommend that licenses be reissued ONLY after a complete cost-benefit analysis is done, and Ghana has proven that it has in place an effective means of monitoring and enforcing compliance and tracking mining operations, sales, tax revenues, exports and other mining related issues.
3. Diligently enforce the law on responsible mining (arrest and prosecute offenders in a quick and transparent manner in special fast track courts).
    a. Immigration: Require Ghana Immigration Service to make available to the districts and regions a list of all immigrants in the country.
    b. Assess the residency status of all immigrants caught taking part in illegal mining or other illegal activities and deport those who do not have proper immigration documents **after they have duly served their sentence for their actions.**
4. Where feasible, seize, inventory and hand over to a trusted, independent body equipment used by illegal galamsey and irresponsible miners. Such an independent body must be subjected to unannounced audits and be held fully accountable for any losses or inability to account for any equipment. All seized equipment must be tagged with tracking devices.

5. Implement ongoing patrol and surveillance of **all mining areas, particularly rivers and forest reserves,** using military and police personnel, drones, boats, Google Earth, and satellite imaging.
    a. Publish (along with the concessions captured at this link https://ghana.revenuedev.org/map) the names and key information of all concessionaires so that they can be held accountable for any irresponsible mining activities that contribute to environmental degradation.
6. Undertake a massive public education campaign to inform the public about the dangers and health consequences of illegal and irresponsible mining, and the impact on the land, forests, water bodies, water supply, and Ghana's finances!

II. Short-Term Actions - 3 months to 18 months

These are critical actions that need to be taken over the next three to 18 months:

Proposed Action	Proposed Action - Details	Who	Status
1. Alternative Livelihoods	a. Compile a list of all residents that are engaged in illegal mining in the various communities. Galamsey Action Group has created a form for collecting information that can be leveraged. https://forms.gle/EGi7iTjBEhXTkmiX7 b. Implement alternative livelihood programs to absorb these people as they exit the illegal mining sector. [See the discussion of **Alternative Livelihoods** below.]	1. Ministry of Finance 2. Ministry of Local Government & Rural Development 3. Export Promotion Authority 4. MMDAs	
2. Provide Clean Water	a. Provide affected communities with clean drinking water through	1. Ministry of Finance 2. Ministry of Water and Sanitation,	

	boreholes and streams that have not been affected by galamsey mining. b. Encourage rainwater harvesting. c. Deploy solar and wind powered water purification systems to provide clean water. d. Implement regular testing of water by the EPA.	3. Ghana Water Company Ltd. 4. MMDAs 5. EPA	
3. Reclaim and Regrade Land	a. Reclaim degraded lands to avoid further destruction through erosion and reduce risk of death from people falling into pits. b. Regrade and level land in all areas affected by irresponsible galamsey and irresponsible licensed small-scale mining. c. Fill in pits that now have standing polluted water to prevent accidents and the development of mosquito breeding grounds. d. Plant fast growing trees, grass and other plants in the reclaimed areas to prevent soil erosion. e. Compost organic waste for use in planting grass, trees and other suitable plants in these areas. f. Artisanal and small-scale miners should pay	1. Ministry of Finance 2. Ministry of Land & Natural Resources 3. Forestry Commission 4. Minerals Commission 5. EPA 6. MMDAs 7. Ghana Armed Forces Corp of Engineers	

	a reclamation fee to the EPA. g. Take back concessions that require reclamation by the state and surcharge the owners for reclamation work done.		
4. Reclaim Polluted Rivers	a. Reclaim affected polluted rivers using techniques developed by the Ghana School of Mines (once efficacy has been established). b. Undertake ongoing surveillance of all of Ghana's water bodies in mining areas and downstream communities.	1. Ghana Water Company, Ltd. 2. Ghana School of Mines 3. EPA 4. MMDAs 5. Ghana Armed Forces Corp of Engineers	
6. Map Out Areas Best Suited for Small-scale Mining	a. Undertake geological surveys and analysis to identify and map out the areas that are best suited for small-scale mining. b. Set aside specific areas for small-scale mining where a limited number of registered cooperatives of licensed small-scale miners can mine under well established rules and regulations with enhanced supervision. c. The mining cooperatives must post a compliance bond.	1. Minerals Commission 2. Ghana Geological Survey Authority 3. MMDAs 4. Traditional Councils 5. EPA	

7. Review and Amend the Existing Statutory Framework	a. Ban the importation and use of mercury and other poisonous substances in both the large scale- and small-scale mining sectors; and comply with the Minamata Convention on Mercury. b. Ban the use of rivers and streams for washing alluvial soils and rocks during mining of Gold and other minerals. c. Expand the buffer zone along rivers and waterbodies from 100 meters to 2 kilometers. d. Adopt and encourage the use of new non mercury gold extraction technologies in both the large scale and small-scale mining sectors in Ghana. e. Establish a system that certifies whether Gold leaving Ghana has been mined in a sustainable way or not. f. Involve the Bank of Ghana in the gold ecosystem to ensure that gold mined by small-scale miners are properly reported and accounted for.	1. Minerals Commission 2. EPA 3. Ghana Ports & Harbor Authority 4. Precious Minerals Marketing Company	
8. Adopt Best Practices and Seek Guidance from the Artisanal	a. Identify and learn best practices from mining operations in other countries. There is	1. Ministry of Lands & Mineral Resources 2. Minerals	

Gold Council and other Institutions	increasing use of technology and clean energy in mining operations that can be studied and adopted in Ghana. b. Seek guidance from the **Artisanal Gold Council (AGC)**[30] and other institutions such as universities in Ghana to develop expertise on deploying **alternative safer and sustainable methods of artisanal mining**.	Commission 3. EPA	
8. Construct a Centralized Processing Plant	Construct a centralized processing plant and an accompanying tailings storage facility (TSF), for the small-scale miners to use. The plant would serve all galamsey operators in a particular district or assembly.	1. Ministry of Finance 2. Minerals Commission 3. MMDA 4. EPA 5. Ministry of Lands & Mineral Resources	
9. Oversight by Ghana Environmental Protection Agency (EPA)	a. For each cooperative, require the EPA to review and approve each licensed small-scale mining company's process of extracting gold and other minerals. b. Increase personnel and resources of the EPA and decentralize it to be able to play its supervisory role more effectively.	1. Ministry of Finance 2. Ministry of Lands & Mineral Resources 3. Ministry of Environment, Science, Technology & Innovation 4.Parliamentary Select Committees 1. Environment, Science & Technology 2. Mines and Energy	

[30] Artisanal Gold Council; https://www.artisanalgold.org/

	c. Establish KPIs for the EPA, the Minerals Commission and other supervisory bodies within the mining value chain that equally motivates and makes them responsible for the performance of the miners under their care.		
10. Reporting from MMDAs	a. Require comprehensive reporting from MMDAs to accurately reflect the threat of environmental degradation from mining and related activities; and align these with set KPIs for the MMDAs. b. Follow-up with the MMDAs that report illegal mining activities.	1. Ministry of Local Government & Rural Development 2. Local Government Services 3. MMDAs 4. Parliamentary Select Committee on Local Government	
11. Implement SDGs	Implement UN Sustainable Development Goals (SDGs); and reposition Ghana as a tourism destination and a source of supply of natural products for the growing Wellness industry.	1. Ministry of Finance 2. Ministry of Lands & Natural Resources 3. Ghana Export Promotion Authority 4. Ministry of Agriculture 5. MMDAs	

Discussion:

1. Alternative Livelihoods:

a. Compile a list of all people that engage in illegal mining in the various communities. Galamsey Action Group has created a form for collecting information that can be leveraged. https://forms.gle/EGi7iTjBEhXTkmiX7 Such information can be used to properly plan rehabilitation and remediation efforts in the communities affected by galamsey activities.

b. Implement alternative livelihood programs to absorb these people as they exit the illegal mining sector. These programs can include:

   i. Work Brigades: absorb displaced miners immediately into supervised brigades to reclaim lands, plant trees and compost waste in areas where the land has been destroyed.

   ii. Massive infrastructure development: In many countries, building roads and bridges, schools, cottage industries, hospitals, improving sanitation, water supply, etc using local labour and capital is considered a major way to boost the local economy, especially after a major disaster. In the Ghanaian context, such investment will have the added advantage of drawing unemployed youth away from galamsey.

   iii. Vocational Skills Training: Engage youth in vocational skills training and provide initial capital for them to set up enterprises either individually or as cooperatives. Every effort must be made to have these individuals and groups work on available government projects. They should also be supported to win private contracts where possible.

   iv. Agriculture: Obtain land to create modern model farms and employ youth to work for pay as hired employees or as co-owners or owner operators. These farms can be used to cultivate food crops, animal husbandry, fish farming or cash crops or a combination of all. Non-traditional exports such as cola nuts, avocado, mango, pawpaw, shea butter, tropical flowers, medicinal herbs and spices that can be used in the growing Wellness industry should be emphasized.

   v. Agro-processing: Encourage the universities and technical colleges to develop affordable machinery that people in rural communities can use to process agricultural produce for sale.

   vi. Cottage industries: Create cottage industries around these - food processing, manure and poultry feed production, food packaging, wellness products etc to provide a ready market for the farmers. An example is the Bokro Cassava Processing factory[31] that is discussed in Appendix II.

   vii. Energy sector: Train youth and displaced miners to assemble and install solar panels and windmills for homes, schools, clinics, and community solar or

[31] Appendix II: Alternative Livelihoods, the Case of Bokro State of the Art Cassava Processing Factory

energy banks.[32]

2. Clean Drinking Water

Provision of clean water to the affected communities will help to reduce the negative effects of galamsey polluted water and related diseases on unborn fetuses, babies, children, adults and the elderly.

a. Provide affected communities with clean drinking water through boreholes and streams that have not been affected by galamsey mining;
b. Deploy solar and wind-powered water purification systems that can draw water from wells, boreholes, streams, lakes and purify water to municipal standards.
c. Community members should also be taught rainwater harvesting techniques that they can use to supplement other sources of clean water.
d. Regular testing of water by the EPA to ensure safety of water.

3. Regrade and Reclaim Land

The current state of the landscape in galamsey areas is a disaster waiting to happen. Therefore, we recommend an urgent plan to reclaim these lands to avoid further destruction through erosion, and reduce the risk of death from people falling into pits. As indicated in Item 1.b.i above, employ youth and other workers to engage in regrading and leveling land, creating compost, and planting grass and trees.

a. Regrade and level land in all areas affected by irresponsible galamsey mining.
b. Fill in pits that now have standing polluted water to prevent accidents and the development of mosquito breeding grounds.
c. Plant fast growing trees, grass and other plants in the reclaimed areas to prevent soil erosion.
d. Compost organic waste from farms, households, markets, schools, universities, hospitals, workplaces and transportation parks for use in planting grass, trees and other suitable plants in these areas.
e. Artisanal and small-scale miners should pay a reclamation fee to the EPA to cover such costs in the future.

4. Reclaim Polluted Rivers

a. We expect the severely polluted rivers to restore themselves once the destructive mining activities are halted. However, where rivers have been diverted, we recommend dredging to restore the path of these rivers.

[32] "A Guide to Community Solar: Utility, Private, and Non-profit Project Development": https://www.nrel.gov/docs/fy11osti/49930.pdf

b. Where necessary, reclaim polluted rivers using techniques developed by the Ghana School of Mines (once efficacy has been established).
c. Desilt the riverbeds where necessary to remove soil sediments that are now polluted by mercury, cyanide and heavy metals.
d. Establish a surveillance team to patrol all of Ghana's water bodies on an ongoing basis to ensure that there are no pockets of destructive mining activity.
e. Use drones and other technology to monitor water bodies; and collaborate with organizations such as NASA Earth Observatory,[33] SERVIR - West Africa[34] and the Center for Remote Sensing and Geographic Information Services (CERSGIS)[35] that provide services for illegal mining detection.[36] .

5. Map Out Areas Best Suited for Small-scale Mining

a. Require Ghana Geological Survey Authority to undertake geological surveys and analyses in order to identify and map out the areas that are best suited for small-scale mining.
b. Set aside such areas specifically for small-scale mining where a limited number of **registered and licensed mining cooperatives** and **licensed small-scale mining companies** can mine under well established rules and regulations with enhanced monitoring and supervision.
c. The **mining cooperatives** and **small-scale mining companies** must be made to post a **compliance bond** of a substantial amount **that will be given back only after all rules have been adhered to and mined land has been restored to acceptable form**.

6. Review and Amend the Existing Statutory Framework

a. Review and improve the statutory framework and regulations for small-scale mining and include regulation of small-scale mechanized mining.
b. Update the existing laws to change behaviour and move towards sustainable mining practices:
    i. Ban the importation and use of mercury and other poisonous substances in small-scale mining. Article 7 of the Minamata Convention on Mercury states that; "Each Party that has artisanal and small-scale gold mining and processing, subject to this Article within its territory shall take steps to reduce, and where feasible eliminate the use of mercury and mercury compounds in,

[33] NASA Earth Observatory: https://earthobservatory.nasa.gov/images/148434/the-large-footprint-of-small-scale-mining-in-ghana
[34] SERVIR - West Africa: https://servirglobal.net/Regions/West-Africa
[35] Center for Remote Sensing and Geographic Information Services: https://cersgis.org/
[36] Reducing illegal gold mining in the tropical forests of Ghana and Peru: A forthcoming collaboration across the Atlantic - Published: Apr 10 2020: https://servirglobal.net/Global/Articles/Article/2725/reducing-illegal-gold-mining-in-the-tropical-forests-of-ghana-and-peru-a-forthc

and the emissions and releases to the environment of mercury from, such mining and processing." [37]

ii. Ban the use of rivers and streams for washing alluvial soils and crushed rocks during mining of gold and other minerals.
iii. Expand the buffer zone along rivers and waterbodies from 100 meters to 2 kilometers.
iv. Require the tagging of excavators and other mining equipment with tracking devices to make it easier to track the movement of equipment that can be deployed in illegal mining.
iv. Adopt and encourage the use of new non mercury gold extraction technologies in both the large scale and small-scale mining sectors in Ghana.
v. Establish a system that certifies whether Gold mined in Ghana for export or the internal market has been mined in a sustainable way or not.
vi. Involve the Bank of Ghana in the gold ecosystem to ensure that gold mined by small-scale miners are properly reported and accounted for.

7. Adopt Best Practices and Seek Guidance from the Artisanal Gold Council and other Institutions

a. Identify and learn best practices from mining operations in other countries. There is increasing use of technology and clean energy in mining operations that can be studied and adopted in Ghana.
b. Seek guidance from the **Artisanal Gold Council (AGC)**[38] and other institutions such as universities in Ghana to develop expertise on deploying **alternative safer and sustainable methods of artisanal mining**. The AGC designs and trains artisanal gold miners to use mercury free and safer methods of extracting gold. The Ghana Government needs to arrange training for trainers who can teach Ghana's artisanal and small-scale miners safer and sustainable methods for extracting gold. In 2012, the AGC provided mercury reduction and mercury-free technology training to artisanal gold miners at five (5) mine locations in Ghana as a part of a Fairtrade certification program by AGC's partner - Solidaridad. During the visit to Ghana, the AGC conducted assessments of the participating mine sites and delivered highly specialized, site-specific, training on mercury-free and mercury-reduction technologies. The objectives of the training sessions were to improve work safety and transition miners away from mercury-use and improve mercury safety during the transition period. A flexible mercury-free and mercury-reduced training curriculum was designed for delivery to miners in a "train the trainer" model.

[37] Minamata Convention on Mercury: http://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf
[38] Artisanal Gold Council; https://www.artisanalgold.org/

This included selected topics such as the correct use and construction of retorts, mercury-free direct smelting techniques, 99.9% purity gold refining, and general mercury health and safety information.[39]

8. Construct a Centralized Processing Plant

Construct a centralized processing plant and an accompanying tailings storage facility (TSF), for the small-scale miners to use. The processing plant would serve all small-scale mining operators in a particular district or assembly. This will enable greater oversight of small-scale mining activities.

9. Oversight by Ghana Environmental Protection Agency (EPA)

a. Require the Ghana Environmental Protection Agency (EPA) to review and approve each licensed mining cooperative and small-scale mining company's process of extracting gold and other minerals.
b. Increase funding for personnel and resources of the EPA, and decentralize the EPA to enable it to play its supervisory role more effectively.
c. Establish key performance indicators (KPIs) for the EPA, the Minerals Commission and other supervisory bodies within the mining value chain that equally motivates and makes them responsible for the performance of the miners under their care.

10. Reporting by MMDAs

Require comprehensive reporting from MMDAs to accurately reflect the threat of environmental degradation from mining and other activities, and align these with set KPIs for the MMDAs. There should be follow-up with MMDAs that report illegal mining activities to enable quick remedial action.

11. Social Responsibility

Require all artisanal and small-scale miners to undertake social responsibility and environmental sensitivity training prior to licensing. This will sensitize the small-scale miners to the needs of the communities that they operate in.

[39] Using Retorts to Reduce Mercury Use, Emissions, and Exposures in Artisanal and small-scale Gold Mining - A PRACTICAL GUIDE: http://www.artisanalgold.org/wordpress/wp-content/uploads/2017/01/Retort_guide_Oct2014_lowQ_version1.0_Eng.pdf

III. Intermediate-Term Actions - 18 months to 3 years

1. Training in Use of Alternative Safer and Sustainable Methods of Ore Extraction

Train all small-scale miners in use of alternative safer and sustainable methods of ore extraction in small-scale mining.

2. License and Regulate small-scale Miners in Safer and Sustainable Mining Methods

a. License and regulate small-scale miners and require the deployment of safer and sustainable methods of artisanal and small-scale mining.
b. Only licensed **Mining Cooperatives** made up of trained, licensed small-scale miners, and licensed small-scale mining companies should be allowed to undertake mining in earmarked small-scale mining areas.

3. Training in Alternative Sectors

Train youth in alternative sectors such as agriculture, small-scale agro-processing, crafts, carpentry, construction, welding and fabrication, and tourism. There are several excellent YouTube instruction videos and online courses that youth should be guided to use to learn new skills and obtain certifications. Funding should be sought to facilitate such training. Ghanaian professionals in Ghana and abroad should be asked to consider sponsoring youth for training courses, and also provide mentorship and skills transfer.

4. Develop Local Mining Expertise

a. Encourage the setting up of corporations with funding from local private investors, crowdfunding, public fund managers like SSNIT and other private fund managers to go into mining in order to build up local mining expertise that can compete with large foreign owned companies.
b. Subject domestic mining companies to the same standards as foreign large-scale mining companies and provide meaningful employment to youth in mining.

5. Enhance Human Capital and Infrastructure Development in Resource Rich Areas and Establish Development Funds

The visible and huge disparity in development and lack of opportunities in these resource rich areas is a big reason why many youth resort to galamsey. Ghana's rural residents work incredibly hard! However, poverty persists and household incomes are very low. Unfortunately, there has not been a significant improvement in

agro-processing and economic development in Ghana's rural areas. The processing of cocoa, palm oil, palm kernel oil, coconut oil, groundnut oil, shea butter and sisal has not changed much since the 1920s Guggisberg era, when Mr. Winfried Tete-Ansa published "Africa At Work"[40] in an effort to entice African-Americans to partner with Africans for economic development. This should give us pause for serious thought about the need to stimulate rural development.

Ghana's impoverished youth, out of hopelessness, despair and extreme deprivation, resort to galamsey to generate income for themselves and their families at considerable risk to their health and safety. To achieve long term positive results and a turnaround in the economic development of Ghana's mining and rural communities, there should be visible evidence of benefits accruing to these communities from the resources taken from them. To achieve this, we expect the Ghana Government to:

a. Review and adopt a more equitable distribution of mineral royalties and other tax revenues (we propose a minimum of 25% of revenue earned in these areas) to be used for clean water and sanitation, bridges, education, healthcare and road infrastructure in the areas where these resources are extracted.
b. Establish Development Funds similar to the Newmont Ahafo Development Foundation (NADeF)[41] model to achieve sustainable and equitable economic development. The NADeF is a sustainable community development foundation established by Newmont Mining in collaboration with the Ahafo communities. In 2014, the European Union judged NADeF as the best social impact project in Africa. NADeF undertakes human resource development through education and scholarship programs, economic empowerment, provision of Infrastructure such as schools, ICT centres and libraries, provision of social amenities such as clean water and toilets, protection of natural resources, and support for cultural heritage. Community infrastructure and other projects undertaken by NADeF can be viewed at its website.[42]
    i. The Board of the Development Funds should include traditional authorities, community members, and women -- to ensure gender equality.
    ii. Embark on enhanced human capital development in these areas - i.e. skills training and capital for graduates to set themselves up in order to be able to supply the mining and other companies and the local market.
    iii. Require mining and other companies in these areas to allocate a certain quota of jobs for indigenes of the communities that they operate.

[40] "Africa At Work" by Winfried Tete-Ansa: https://babel.hathitrust.org/cgi/pt?id=uc1.$b667569&view=1up&seq=1
[41] Newmont Ahafo Development Foundation (NADeF): https://nadef.org/
[42] NADeF Infrastructure Projects: https://nadef.org/our-projects-infrastructural/

iv. Require mining and other companies to support local communities where their operations are situated by sourcing some of their purchases from the local community - i.e. local content. E.g. farm produce.

6. Social Responsibility

a. Require all artisanal and small-scale miners to undertake social responsibility and environmental sensitivity training prior to licensing. This will sensitize the artisanal and small-scale miners to the needs of the communities that they operate in.
b. Encourage artisanal and small-scale miners to undertake projects such as boreholes and toilets to help the communities that they operate in.
c. Require licensed mining companies to prepare and submit annual social responsibility reports to indicate their compliance with environmental and other social responsibility standards.

IV. Long-Term Actions - After 3 years

Streamline the above so that there is a strong and thriving alternative to galamsey, as well as clear and easily accessible guidelines on the operation of limited small-scale mining in Ghana covering licensure, sustainable mining and accounting for Ghana’s gold and associated revenue.

Appendix I

Municipalities & Districts' Report of Illegal Mining & Other Threats - 2019			
Region	**Municipality or District**	**Illegal mining**	**Other Threat**
Asante Region	Ahafo-Ano South West	Illegal mining	
Asante Region	Atwima Nwabiagya Municipal	Illegal mining	
Asante Region	Asante Akim South	Illegal mining	
Asante Region	Atwima Nwabiagya North	Illegal mining	Threat to Water Bodies
Asante Region	Amansie Central	Illegal mining	
Asante Region	Juaben	Illegal mining	
Asante Region	Sekyere East	Illegal mining	Illegal sand winning
Asante Region	Asante Akim Central	Illegal mining	
Asante Region	Adansi South	Illegal mining	
Asante Region	Amansie West	Illegal mining	
Asante Region	Atwima Kwanwoma	Illegal mining	
Asante Region	Obuasi East	Illegal mining	
Central Region	Upper Denkyira West DA	Illegal mining	
Central Region	Twifo AttiMorkwa DA	Illegal mining	
Central Region	Upper Denkyira East MA	Illegal mining	
Central Region	Effutu MA		Illegal sand winning
Central Region	Twifo Hemang Lower Denkyira DA	Illegal mining	
Eastern Region	Kwahu West	Illegal mining	
Eastern Region	NsawamAdoagyiri		Illegal sand winning
Eastern Region	Ayensuano I		Illegal sand winning
Eastern Region	Abuakwa South	Illegal mining	
Eastern Region	Atiwa West	Illegal mining	
Eastern Region	Atiwa East	Illegal mining	
Eastern Region	Fanteakwa South	Illegal mining	
Greater Accra Region	Ga South Municipal Assembly		Illegal sand winning
Greater Accra Region	Shai Osudoku District Assembly	Illegal mining	
Greater Accra Region	KponeKatamanso Municipal Assembly		Illegal sand & gravel winning
Northern Region	Kumbungu		Illegal sand winning

Municipalities & Districts' Report of Illegal Mining & Other Threats - 2019			
Region	**Municipality or District**	**Illegal mining**	**Other Threat**
Upper West Region	Wa East	Illegal mining	
Western Region	Tarkwa Nsuaem	Illegal mining	
Western Region	Ellembelle	Illegal mining	
Western Region	Prestea Huni Valley	Illegal mining	
Western Region	Wassa East	Illegal mining	
Western Region	Mpohor	Illegal mining	
Western Region	Nzema East	Illegal mining	
Source: 2019 Annual Report - Local Government Service		https://lgs.gov.gh/index.php/annual-report/	

Appendix II

Galamsey Mining and Water Quality

Review of Relevant Literature
by Dr. Francis Appoh

Issues with galamsey or informal mining as a whole are less straightforward. While many national and local stakeholders acknowledge its importance for direct employment, wealth creation and invigorating downstream industries and activities, informal mining is widely associated with — and singled out for — environmental destruction, the pollution of water bodies, lack of reclamation, associated negative health impacts, detrimental social vices, and for drawing school-age children away from formal education. Freshwater resources are continually decreasing in quality and quantity. Illegal mining has taken a toll on the limited water resources, destroying a lot of fresh water bodies in Ghana. In view of this, surface water quality considerations are becoming increasingly important due to mining activities, urban and industrial pollution problems and agricultural development. Reliable data on water quality is of importance for proper management and thereby the protection and development of surface water resources for the future.

Mantey et al; 2020
Analyzed concentrations of mercury across the nine (9) types of galamsey being practiced - illegal artisanal small-scale gold mining operations (galamsey) in Ghana. The extent to which nine (9) types of galamsey influences mercury levels within surface drainages, soils, slurry/sludge and solid wastes in three hotspot assemblies of the Western Region of Ghana were assessed. Indeed, differences exist in mercury levels due to galamsey types under different environmental media. The extent or degree to which the nine types of galamsey influences pollution levels within surface drainages, soils, slurry and solid wastes. The authors recommend that:

1. Considering the levels of mercury recorded by the nine galamsey types across the four environmental media, the Ghana Government should consider the ban of the Mill House, Anwona, Washing Board, Washing Plant, Dredging and Chamfi galamsey types.
2. The galamsey operations categorized as “processing only and simultaneous mining/processing types” involve the use of mercury in substantial quantities. The underground galamsey, which involves mining type, makes no use of mercury and has very limited impacts on the environment. Therefore, a decision should be made to construct and centralize a processing plant and an accompanying tailings storage facility (TSF), for the galamsey operators to use. Thus, the plant being in the shape of the Mill House operation, would serve all galamsey operators in a particular district or assembly.
3. Clean ups should be observed in affected galamsey areas for public health protection and general environmental protection.

Mantey et al; Heliyon. 2020 Jun; 6(6): e04312

Barenblitt et al 2021. Many of these artisanal mines are not only harmful to human health due to the use of Mercury (Hg) in the amalgamation process, but also leave a significant footprint on

terrestrial ecosystems, degrading and destroying forested ecosystems in the region. In this study, the Landsat image archive available through Google Earth Engine was used to quantify the total footprint of vegetation loss due to artisanal gold mines in Ghana from 2005 to 2019 and understand how conversion of forested regions to mining has changed over a decadal period from 2007 to 2017. A combination of machine learning and change detection algorithms were used to calculate different land cover conversions and the timing of conversion annually. Within the study area of southwestern Ghana, our results indicate that approximately 47,000 ha (±2218 ha) of vegetation were converted to mining at an average rate of ~2600 ha yr−1. The results indicate that a high percentage (~50%) of this mining occurred between 2014 and 2017. Around 700 ha of this mining occurred within protected areas as mapped by the World Database of Protected Areas. In addition to deforestation, increased artisanal mining activity in recent years has the potential to affect human health, access to drinking water resources and food security.

Barenblitt et al Science of The Total Environment Volume 781, 10 August 2021, 146644
Banunle A et al 2018 determined pH, Conductivity, Total Dissolved Solids, Turbidity and Dissolved Oxygen and the concentrations of Arsenic, Lead, Copper, Cadmium and Mercury in the Tano River along the Catchment of the Ahafo Mine in the Brong-Ahafo Region of Ghana. The results from the analysis showed that the physicochemical properties of the river investigated were all within the recommended range of acceptable water quality except for DO which was slightly lower than recommended threshold. The concentrations of heavy metals were also relatively low and all fall within tolerable thresholds of the EPA and WHO except for the concentrations of lead which were slightly higher than the recommended threshold at both the upstream and downstream.
Banunle et al., J Environ Anal Toxicol 2018, 8:3.

Samefo and Ofoe, In 2017 evaluating water quality Index (WQI), nine parameters in water quality, which were harmful to human health were considered. They were pH, dissolved oxygen, total suspended solids, total dissolved solids, total hardness, total alkalinity, chlorides, sulphates and nitrates. On the basis of the computed WQI (55.054), River Bonsa fell within the poor drinking water category. Hence the water needs to be treated before it can be drunk directly. Intensive education on water-related diseases is also needed to inform the inhabitants living along the river bank, who use the water from the river directly without any chemical treatment. Victus Bobonkey Samlafo and Emmanuel Ofosu Ofoe Chemical Science International Journal 20(4): 1-8, 2017

Asare-Donkor and Adimado 2016 working on the Tano and Ankobra rivers have showed that water, sediment and fish Total-Hg concentrations were 0.145–1.078 μg/L, 23.39–73.31, and 0.03–0.443 μg/g dw, respectively in Ankobra basin, while in Tano basin levels of 0.214–0.250 μg/L, 14.43–21.51, 0.068–0.413 μg/g were found for water, sediment and fish, respectively. The T-Hg concentration in water from both basins were within the World Health Organization threshold limits for drinking water except at River Asuo Kofi. Concentration of Total-Hg in the sediment exceeded the Environmental Protection Agency ecotoxicological threshold in some

sampling stations, suggesting potential adverse ecological effects. Total-Hg levels in fish from both basins were lower than the WHO value (<0.500 µg/g (wet wt). The target hazard quotient values suggest that humans should minimize meals/week of the analyzed species to avoid deleterious effects during lifetime. The results suggested that mining activities significantly contribute to the considerable environmental Hg contamination in both Ankobra and Tano River basins. Therefore, Hg levels should be carefully monitored and controlled to reduce its inputs and mitigate potential health consequences of Hg accumulation in the environment.
Asare-Donkor and Adimado *Environ Syst Res (2016) 5:5*

Isaac Kojo Arah 2015. Observed that there was inadequate monitoring of players in the Ghanaian mining industry for compliance which resulted in the destruction of many natural resources that support the mining communities. Adequately resourcing regulatory bodies to properly monitor these players is crucial if the mining industry must continue to contribute positively towards the socio-economic development of the country without having the negative impacts on the environment. He adduced the following are some recommendations for the Ghana Government to follow in ensuring a sustainable mining industry:

1. To put in place a more stringent and stricter water quality monitoring and assessment through its regulatory bodies.
2. Waste disposal from production sites of mines should be properly investigated by the regulatory agencies (EPA, Ghana Water Commission) to ascertain the true levels of contaminants discharged into the environment.
3. Progressive rehabilitation, as opposed to post-mining rehabilitation, should be used in preventing generation of sediment, which eventually pollutes river bodies.
4. Regulatory bodies must be adequately resourced to function effectively and efficiently in ensuring compliance by mining companies.
5. Stricter sanctions must be applied to those who do not comply with the mining regulations to serve as a deterrent for other potential offenders.

Isaac Kojo Arah; Asian Journal of Humanities and Social Sciences (AJHSS) Volume 3, (1), 2015.

Darko et al 2013; The most comprehensive water quality monitoring and assessment of the Southwestern and the Coastal Rivers Systems of Ghana from 2005 to 2008 published in 2013 sponsored by Danish Government. Ten water quality parameters were used to determine the water quality index (WQI): Dissolved Oxygen (DO % Saturation), Biochemical Oxygen Demand (BOD), Ammonium Nitrogen (NH_4-N), Faecal Coliform (FC), pH, Nitrate as Nitrogen (NO_3-N), Phosphate as Phosphorus (PO_4-P), Total Suspended Solids (TSS), Conductivity and Temperature. Evaluation of the waters with the WQI indicated that most Ghanaian waters were in Class II, the fairly good water quality state, but with variations in this range within the seasons and stations, and from one water body to the other. The levels of the trace metals investigated in the waters, Fe, Mn, Zn, Pb, Cr, Ni, Cu, As, Cd, and Hg, were found to be generally low, and do not yet pose health risks in the dissolved form. However, Fe and Mn levels were moderately high, exceeding their respective TWQR values stipulated for Ghanaian freshwaters. Results of the risk assessment, however, revealed a hazard quotient greater than 1 in some locations,

indicating that the risk of adverse health effects associated with exposure to zinc, manganese and iron is high in those locations. Efforts should therefore be made to prevent metal pollutants, mainly from mining activities, from entering our water bodies to keep them suitable for their intended uses.
Humphrey F. Darko, Osmund Ansa-Asare, Adwoa Paintsil; Journal of Environmental Protection, Vol.4 No.11, November 2013

Appendix III

Example of an Alternative Livelihood Project for Galamsey Miners: The role of Bokaro Cassava Processing Factory

Presented by Felix Mensah

Introduction

The Nzema East Municipal Assembly envisioned six years ago, the need to set up a state of the art cassava processing factory to serve producers of akyɛkɛ and gari in Bokaro and its surrounding villages. The unhygienic and cumbersome circumstances under which akyɛkɛ and gari was processed led to the need for improved technology.

Interventions

Within two months after the idea came up for consideration, the Bokro state of the art cassava processing factory was designed and contract awarded. Unfortunately the contractor unduly delayed implementation and could not meet the timelines. The 1D1F agenda of the government came into being and the on-going Bokaro project was captured as one of the interventions from Nzema East that fits into the agenda. Despite all the delays and excuses, the project was finally completed and handed over in April 2021 and is now ready for a test run.

Stakeholder Engagements

A couple of stakeholder engagements and meetings held to discuss the management of the factory revealed some gaps on the entire cassava processing value chain that need attention. The existing raw material base cannot meet the capacity demand of the factory.

Arrangements are underway to interface with the school feeding program. Akyɛkɛ is in high demand by all three Nzema districts and other neighboring districts. Linking the project to the school feeding program will require consistency, reliability and capacity.

To ensure consistency and reliability of supply especially to schools, the project must ensure there is enough raw material base to feed the factory. Therefore, a search for arable farmlands for a large cassava farm is currently ongoing. At least 10-acre farmland located anywhere within the three Nzema districts for the project will be appreciated.

Alternative Livelihood

Activities along the value chain beginning from cassava farms through to the final product, supply to schools, local and international markets through packaging among others will create job opportunities that can engage some galamsey miners and other idle hands. Women involved in the akyɛkɛ and gari processing role have already been identified. However, gaps still exist for growing cassava, harvesting, conveyance from farms to the factory, drying of cassava peels for animal feed, packaging of gari for local and foreign markets among a host of other activities including management of the facility.

In addition, there is still room for retrofitting or additional components to the factory for processing of industrial starch which is a byproduct of gari and akyɛkɛ processing.

This war against galamsey cannot be won without ensuring sustainability. One of the ways to ensure sustainability is to provide alternative livelihood interventions. These job alternatives can be supported by CSOs, NGOs and all Ghanaians living worldwide. Galamsey is a very risky but lucrative and quick money making venture. The young men and women who put their lives on the galamsey lines are fearless. Their fearlessness emanates from experiences and treatment our social and economic set up has given them. Living and growing up in Ghana from poor families and poor communities is hellish. The difference between the 'haves and the have nots' is often very wide and glaring. Social support systems are either nonexistent or exist in weak forms. These galamsey miners would rather die than to return to such low lives and communities with no jobs and means of livelihood to support their families.

Therefore, the call by GAG and other CSOs to institute alternative livelihoods is a laudable one. Indeed, these alternatives should have been preconceived and designed alongside the campaign but for the urgent need to act with alacrity to salvage our polluted water bodies. It is worth noting however, that offering alternatives to the miners may not be easy. Such interventions ought to be carefully crafted and designed with capacity building components to enhance productivity in order to create income levels that can compensate for loss of incomes earned from galamsey.

External and Parts of Interior View of Bokro Cassava Processing Factory

External View of Bokro Cassava Processing factory six months before handing over

Interior pars of Bokro Cassava processing factory showing some of the component parts under installation

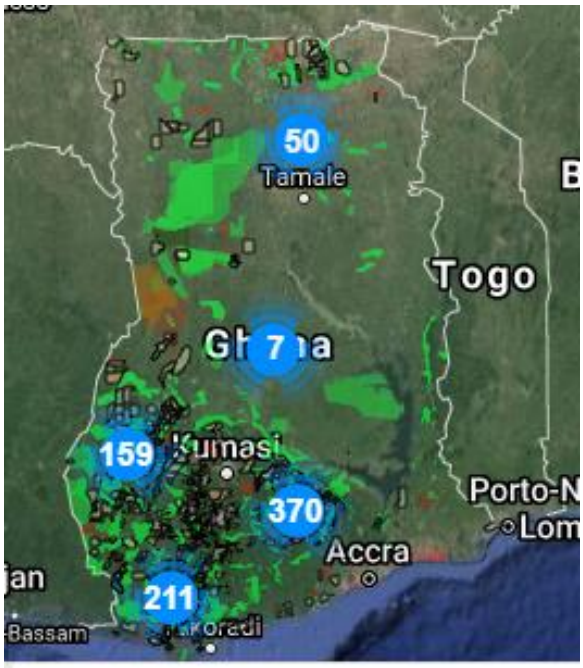
Appendix IV

Summary of Mining Licence Applications and LIcenses by type and status, June 2021
Source: https://ghana.revenuedev.org/map

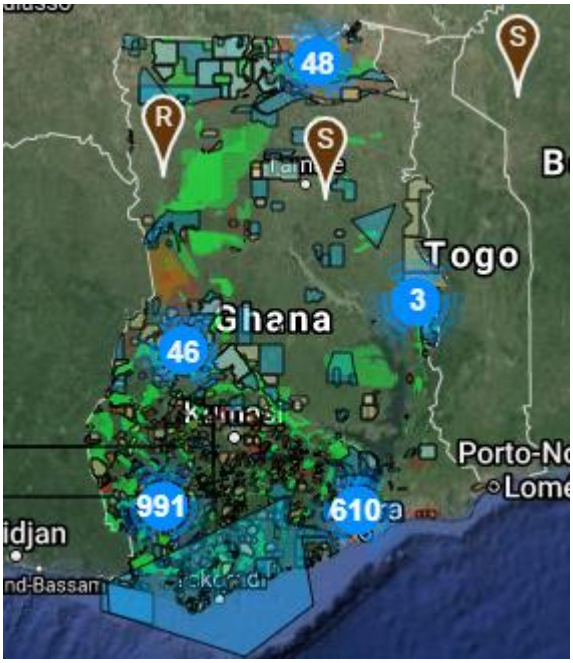
Applications by type and Status - June 2021					
Count of Application Code	Column Labels				
Row Labels	Approval	License Pending	Registration	Validation	Grand Total
Gold Export (Buying & Export)	1	3	24		28
Gold Export (Processing of Tailings)			4		4
Gold Export (Refinery)			1		1
Mining Lease	5	2	4		11
Prospecting Licence	69	401	105	28	603
Prospecting Licence (Foreign)			1		1
Reconnaissance Licence	121	21	12		154
Restricted Mining Lease (Sand & Gravel)	64	2	20	1	87
Restricted Mining Lease (Sand/ Gravel)	50		9	1	60
Restricted Mining Lease < 25 Acres(National)	4		12		16
Restricted Mining Lease <25 acres (International)	8		10	1	19
Restricted Mining Lease <25 acres (National)	102		16	3	121
Restricted Mining Lease >25			1		1
Restricted Mining Lease >25 acres (International)	1		7		8
Restricted Mining Lease >25 acres (National)	106	13	39	26	184
Restricted Prospecting Licence(National)	137	5	8		150
Restricted Prospecting License	6				6
Restricted Reconnaissance License	5		1		6
Restricted Small Scale Mining License			25	1	26
RML Annual Mineral Right fee <25 acres (National)			2		2
Small Scale Mining Licence (Non- industrial Minerals)	45	1,125	119	2	1,291
Small Scale Mining License	44		10	34	88
Small Scale Mining License (Salt)	1			1	2
Support Service (Class A)	3		57		60
Support Service (Class B)			13		13
Support Service (Class C)			5		5
Grand Total	**772**	**1,572**	**505**	**98**	**2,947**

All Licenses by Type and Status - June 2021						
Count of License Code	Column Labels					
Row Labels	Active License	Canceled	Expired	License Pending	Suspended	Grand Total
Export License for Holders of Mineral Rights	9		3			12
Gold Export (Buying & Export)	74		28			102
License to Deal in Minerals		1	11			12
Mining Lease	118	2	30		8	158
--Mining Lease (<2014)	8	1	4			13
Prospecting Licence	281	6	297		4	588
Prospecting License		1	51		1	53
Reconnaissance Licence	6		115			121
Restricted Mining Lease (Sand & Gravel)			3			3
Restricted Mining Lease <25 acres (International)	8		7			15
Restricted Mining Lease <25 acres (National)		1	31		1	33
Restricted Mining Lease >25 acres (National)	4					4
Restricted Prospecting Licence(National)	25		8			33
Restricted Prospecting License	1		3			4
Small Scale Mining Licence (Non- industrial Minerals)	767		714	2		1,483
Small Scale Mining License	1		30			31
Support Service (Class A)	147		20			167
Support Service (Class B)	6		3			9
Support Service (Class C)	1		1			2
Grand Total	**1,456**	**12**	**1,359**	**2**	**14**	**2,843**

Pictorial view of Active Licenses -Ghana



Pictorial view of Active application



Source: https://ghana.revenuedev.org/map as at June 19, 2021

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