



THE REPUBLIC OF LIBERIA

The Ministry of Mines and Energy

Handbook for Artisanal and Small-Scale Miners:

Working safely and protecting
people and the environment



FOREWORD



The artisanal and small-scale mining (ASM) sector of Liberia is very important for the Government and people of Liberia. It provides jobs for more than 100,000 people ... mostly in rural communities that are doing gold and diamond mining. Over the years, this sector has not been working properly, which has caused some bad news about damage to the environment, mining accidents and other issues affecting the communities. The Ministry of Mines & Energy, working with other partners, wants to improve the ASM sector by organizing it better so that it helps the country and its people. We want to fix the regulations for the sector and train miners. We also want to make sure that special areas can be set aside for artisanal mining and make sure that artisanal miners are properly licensed. By doing all of this, we will improve government control over the sector and make sure that the wellbeing of artisanal miners, the environment and the human rights of women and children as well as men are secured. We are counting on the support of all our partners in government, civil society and the international community to make this happen.

We want to thank the United Nations Development Programme and the Swedish Environmental Protection Agency for their financial help through the Environmental Governance Programme for supporting us to develop this ASM handbook, raise awareness, train our miners, and improve monitoring.

We are convinced that this handbook is timely and good for all the people in the ASM

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Minister, Ministry of Mines and Energy

ACKNOWLEDGMENTS

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CONTENTS

FOREWORD	-	-	-	-	-	-	-	-	-	1
ACKNOWLEDGMENTS	-	-	-	-	-	-	-	-	-	2
PURPOSE OF THIS HANDBOOK	-	-	-	-	-	-	-	-	-	4
MINERS RIGHTS AND OBLIGATIONS	-	-	-	-	-	-	-	-	-	5
<i>The Legal framework</i>	-	-	-	-	-	-	-	-	-	5
<i>Role of Government</i>	-	-	-	-	-	-	-	-	-	5
<i>How to get ASM licenses</i>	-	-	-	-	-	-	-	-	-	6-7
<i>Taxes and Royalty</i>	-	-	-	-	-	-	-	-	-	8
<i>Selling minerals</i>	-	-	-	-	-	-	-	-	-	8
WHY YOU MUST PROTECT THE ENVIRONMENT	-	-	-	-	-	-	-	-	-	8
<i>Water</i>	-	-	-	-	-	-	-	-	-	9
<i>Land & forests</i>	-	-	-	-	-	-	-	-	-	9
<i>Mercury</i>	-	-	-	-	-	-	-	-	-	11
WHY YOU MUST LOOK AFTER YOURSELF & OTHERS	-	-	-	-	-	-	-	-	-	12
<i>Safety</i>	-	-	-	-	-	-	-	-	-	12
<i>Health effects</i>	-	-	-	-	-	-	-	-	-	12
<i>Mercury</i>	-	-	-	-	-	-	-	-	-	12
<i>Socio-economic and cultural issues</i>	-	-	-	-	-	-	-	-	-	13
<i>Gender</i>	-	-	-	-	-	-	-	-	-	14-16
<i>Children</i>	-	-	-	-	-	-	-	-	-	16
<i>Land</i>	-	-	-	-	-	-	-	-	-	17
<i>Human Rights</i>	-	-	-	-	-	-	-	-	-	17
GOOD PRACTICES IN MINING	-	-	-	-	-	-	-	-	-	17
<i>Pitting</i>	-	-	-	-	-	-	-	-	-	18
<i>Trenching</i>	-	-	-	-	-	-	-	-	-	18-19
GOOD PRACTICES IN PROCESSING	-	-	-	-	-	-	-	-	-	20
<i>Hand sieve shaker</i>	-	-	-	-	-	-	-	-	-	20
<i>Sluicing-</i>	-	-	-	-	-	-	-	-	-	20
<i>Panning</i>	-	-	-	-	-	-	-	-	-	21
GOOD PRACTICES IN RECLAMATION	-	-	-	-	-	-	-	-	-	23-24
REFERENCES	-	-	-	-	-	-	-	-	-	25

PURPOSE OF THIS HANDBOOK

This handbook explains how artisanal and small-scale mining (ASM) may be done in a legal and safe way where people and the environment are protected.

ASM involves the use of manual labor and often rather simple methods of mining and processing. Materials like shovels, sluice boxes, shaker heads, and other simple machinery machines are often used.

In Liberia, those involved in ASM usually seek gold or diamonds (Figure 1).



Figure 1: Picture showing so called “gold boys” (mine workers) digging pits, digging gravel, washing gravel, washing sluice box residue (clockwise from top left).

This handbook is mainly for those who work with ASM directly. But it is useful for anyone who wants to understand ASM. Such persons could include chiefs, mayors, schoolteachers, and those living in areas where there is ASM.

If you have questions that are not answered in this handbook, you may please contact your nearest MME county office/Mining Agents.

MINERS RIGHTS AND OBLIGATIONS

The Legal framework

The Liberian constitution provides that all minerals belong to the Republic, and that they should be used for the benefit of all citizens. ASM miners have rights, but because of this constitutional provision, they also have important responsibilities. Knowing what the law says will help you to know what is right and what is wrong. In the eyes of a judge, to not know or understand a law excuses no one.

The main laws people involved in ASM need to understand and be aware of are:

- o **The Minerals and Mining Law of 2000**
- o **The Environment Protection and Management Law of 2003**

Role of Government

Government is elected to take care of the country and everything that belongs to the people, including minerals. The two main Government offices that supervise and control ASM are:

- o **Ministry of Mines and Energy (MME)**
- o **Environmental Protection Agency (EPA)**

The main role of MME in ASM is to issue mineral and mining licenses and to ensure that ASM is carried out according to the Minerals and Mining Law. That work includes, issuing licenses and monitoring mining activities.

The main role of the EPA in ASM is to ensure that mining is conducted based on the Environment Protection and Management Law. That work includes assessing environmental impact assessments, investigating reports of environmental pollution and taking action to correct (remediate or rehabilitate) damages to the environment, and also punishing those who cause harm to the environment.

In addition, the Forestry Development Authority (FDA) is also an important agency for ASM. The FDA looks after forests and protected areas, and they work to prevent people from mining in such areas

How to get ASM Licenses

To carry on ASM activities, you must get a mining license. A mining license is a legal document that gives a qualified individual or a company the right to mine specific minerals (e.g. gold or diamonds) in an exact identified location, and using specified methods.

There are two type of licenses that are relevant for ASM, as follows.

o **Class B Mining License (small scale mining license)**

Class B Mining License holder can use machines to carry out mining. He/she may further sell his/her mineral inside or outside Liberia if in the possession of dealer license. To obtain a Class B Mining License, it is required that mineral prospecting has been performed, and that a mineral reserve has been identified.

o **Class C Mining License (artisanal mining license)**

A Class C Mining License is a license to work on a 25-acres claim on an alluvium/placer deposit, and it may only be awarded to Liberian nationals over the age of 18. One applicant/miner(s) can have up to four of such mining licenses. Class C miners are overall encouraged to form and work in Cooperatives.

The text boxes below explain the steps needed to apply for these two types of mining licenses.

Application for a Class B Mining License (small scale mining)

- The applicant must obtain CLEARANCE from the Bureau of Mines at the County MME Office
- The Bureau of Mines will grant a survey permit for the proposed mining site.
- The applicant must go to the Mining Agent to get an OFFICIAL CLEARANCE
 - for this two passport size photos are required.
- Then, the applicant must go to the nearest MME office to obtain application form (or download at <http://mme.gov.lr>). For the application to be successful, the following needs to be included and/or in place:
 - Two passport size photos, and copies of voter registration card or your citizen ID card.
 - A copy of the business registration/certificate and the Article of Incorporation must show that a Liberian owns at least a 15% share.
 - Applications for work/resident Permit(s) for foreign partner/worker(s) are needed.
 - A Technical Work Plan and EPA Permit/copy of EIA approved by EPA before commencing operations.
 - Proof of existence of a bank balance of minimum USD 50,000.00 in a Liberian bank as working capital.
 - A physical office location for inspection and to serve for communication.

- The application should be submitted to the MME – you will receive a receipt.
- The application will be checked to make sure that: (1) nobody is working at the same place you are asking for; and (2) the place you are asking for is not on land where mining is not allowed.
- When it is clear that everything is in order, you will get a note from the Bureau of Mines and Mineral and its Cadastre Unit prompting you to pay the License Fee of US \$10,000.00 to the Liberia Revenue Authority (LRA) /Central Bank.
- The receipt of payment of the fee must be submitted to the MME
- After the necessary signatures from public officials are obtained, the license is issued, printed and a message is sent to the applicant who can pick up the license.
- Once a license is issued, mining under the license must start within six months.
- The boundaries of the mining claim must be marked in accordance with the Mining law.

Application for a Class C Mining License (artisanal mining)

- Go to the nearest MME office to obtain application form (or download at <http://mme.gov.lr>).
- You must attach two passport size photos, voter registration card or your citizen ID card to your application.
- Submit application to the MME – you will receive a receipt.
- Your application is checked to make sure that: (1) nobody is working to the same place you are asking for; (2) the place you are asking for is not on land where mining is not allowed; (3) that there is an EIA permit if the mining operations are included in a mining cooperative; and (4) that an adequate work plan exists
- When it is clear that everything is in order, you will get a note from the Bureau of Mines and the Mineral Cadastre Unit promoting you to pay the License Fee to the Liberia Revenue Authority (LRA) /Central Bank.
- The receipt of payment of the fee must be submitted to the MME
- After the necessary signatures from public officials are obtained, the license is issued, printed and a message is sent to the applicant who can now pick up the license.
- Once a mining license is issued, mining under the license must start within six months.
- Mining activities can only take place in accordance with the work plan accepted by the Bureau of Mines.
- The boundaries of the mining claim need to be marked in accordance with the Mining law.

Taxes and Royalty

All minerals belong to the Liberian state. Therefore, miners must pay a tax - called royalty - to the state for minerals that are sold. The rate is 3% of the revenue earned from the sale of the minerals.

Selling Minerals

To sell or buy minerals (gold, diamonds etc.) requires a license. Those who hold Class C and Class B Mining Licenses may sell gold, diamond or other valuable minerals to brokers who have a broker's License. Brokers in turn can sell to dealers who have a Dealer's License.

Anyone who is carrying gold, diamonds, and other useful minerals and who does not have a license may be arrested. If the court finds that person guilty, he/she may be sentenced to a fine or to imprisonment.

Why You Must Protect The Environment

ASM activities can cause serious environmental problems, if done badly. Some of the environmental problems are a direct result of mining, others are caused indirectly. The most common and important environmental problems are presented below.



Figure 2: Potential contamination of soils, surface and ground water by chemicals from mining processes in Noway, Grand Bassa, Liberia

Water

Water availability and quality is a big problem in Liberia, and all the major river basins are badly polluted, often from ASM activities. Mining activities can pollute rivers, stream, and creeks and spoil drinking water and kill fish.



Figure 3: River diversion by Artisanal and Small-Scale miners, Central Liberia

Land & forests

Land that may be used for other purposes may be impacted or even destroyed by ASM. ASM activities across Liberia also lead to the clearing of forest and also to excessive hunting of wild animals for bush meat. Damage to the environment also occurs when miners cut down trees for cooking, building houses, or when they clear an area to dig for gold or diamond and leave the holes uncovered- with no backfilling at some sites. Forests are crucial for maintaining healthy ecosystems, supporting biodiversity, capturing greenhouse gases, regulating local and worldwide climates etc. Therefore, you must not be careful to not cut forests around mining areas. Furthermore, the vegetation in these forests can help keep harmful chemicals and other pollutants from entering the rivers/ water and the overall environment.



Figure 4: Deforestation/forest degradation in Southeast Liberia

At some mining sites, some information is or has been provided about how to take care of the environment. The MME agents assigned to various mining districts across Liberia for example inform miners that they are must backfill through the “dig hole, cover hole” practice. This practice is ongoing in some mining places. However, in some places, no backfilling takes place. (see Figure 5, showing that this ‘dig hole, cover hole’ rule is often not followed). In the chapter on good practices for reclamation, more information is given on the need to perform backfilling.



Figure 5: Abandoned mining pits – only a few meters away from the Sapo National Park.

Mercury

Mercury is a toxic metal which is known to cause harm – both to the environment and people (see below section on health). The use of mercury is therefore banned in most countries, including in Liberia. But, despite this, it is often used in ASM – as the mixing of mercury with gold bearing sediments allow gold to be retrieved.

The problem with mercury for the environment is that first, it is toxic, and second that it builds up in the food chain, which in turn means that especially top predators – most importantly predatory fish (fish that eat other fish) - are at risk. And people by the river who eat fish can in this way be poisoned.

Therefore, the dumping of mining waste into rivers must be avoided. Otherwise, there is a risk of mercury being carried far away, including the risk for people of being poisoned by the fish.

The EPA requires miners to take action to protect the environment. This includes elaborating plans to guide, reduce and correct impacts caused by environmental pollution on land, water and air. The EPA discourage the use of mercury for mining purposes due to its effect on human health and the environment.

Figure 6 shows how mercury from ASM can enter air, water, soil, and the food chain.

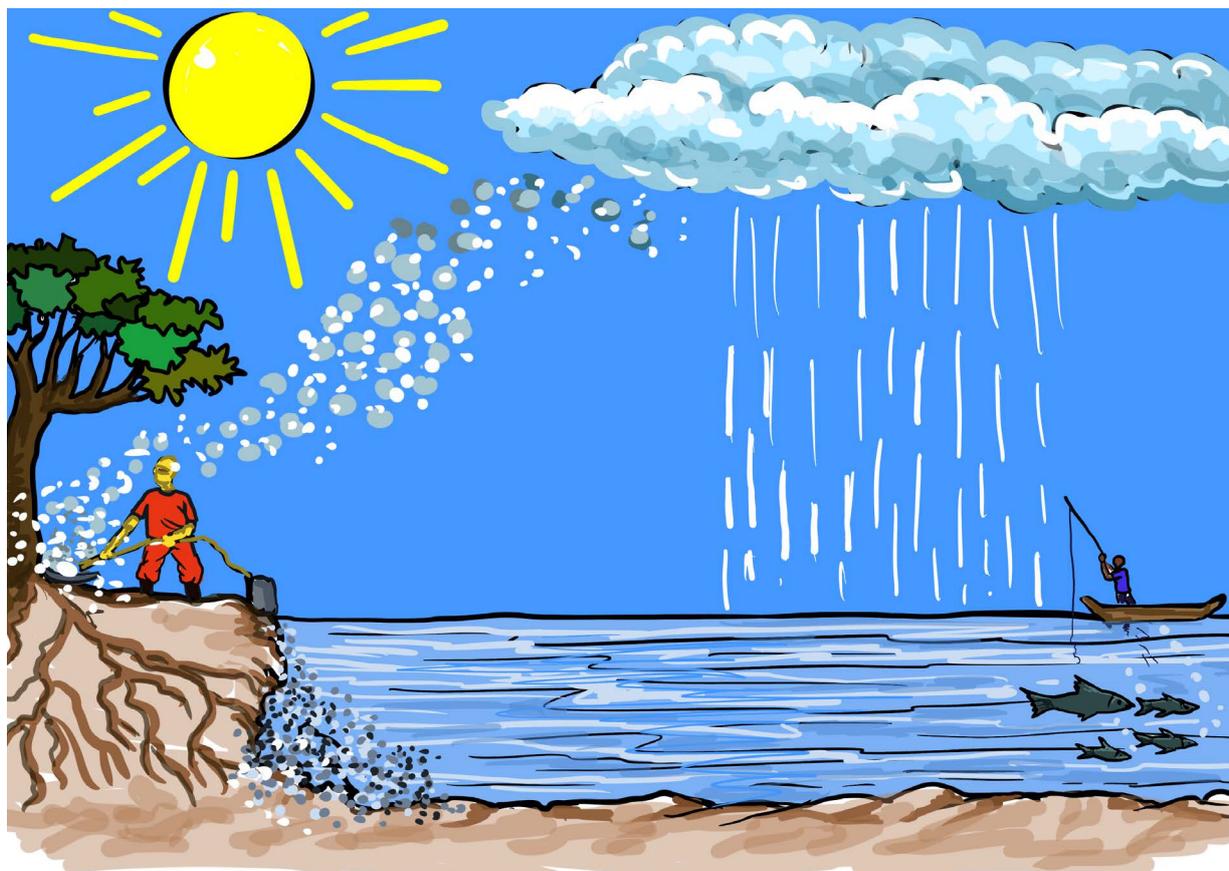


Figure 6: Illustration of how mercury flows through the food chain

In the section on good processing practices, alternatives to using Mercury are presented.

Why You Must Look After Yourself & Others

ASM activities may be dangerous for the miners themselves. They may also cause danger, nuisance and/or health risks for others. The most common and important risk for health and wellbeing are presented below.

Safety

Mining can be dangerous, especially ASM.

The list of things that can go wrong in ASM include tunnels collapsing, falling rocks, accidents with equipment, dynamite etc.

Mining often involves high-risk and difficult working conditions that can cause serious accidents. Miners must therefore be mindful to take action to improve the safety of the places where they work.

Health effects

There are several health problems associated directly or indirectly with artisanal and small-scale mining that primarily affect miners themselves. Some of these health problems that have a more indirect link to ASM include water borne diseases (thyphoid, cholera etc). Further skin diseases and physical injuries can be caused directly by the mining itself, or the associated use of chemicals.

Furthermore, it has been reported that frequent overexertion and long working hours (hard work over long time), may lead to miners suffering from “irritability, sleeping disorders and appetite loss” (Hilson 2002, 8)

Another serious health risk is the lack of toilets in often over-crowded mining camps, and/or in the buildings used to house mining workers. There are often too few and often poorly built toilets in most mining camps. Without good sanitary conditions, many of the ASM workers in camps - there may be about 500 people - use the surrounding forest as toilets. The lack of access to sanitation can lead to the outbreak of a variety of harmful diseases. Cholera or diarrhea outbreaks can also occur as a result.

Mercury

As explained above, mercury is – despite being banned – often used in gold mining. Mercury is toxic and to swallow, inhale and/or have skin contact with mercury even in small amount, may cause serious health problems.

Two main groups are especially badly affected by mercury:

- Adults who regularly handle mercury, like miners and gold buyers.
- Children (exposure may be both in utero and in early life).

Exposure during ASM mining occurs in two main ways:

- During mixing mercury with gravel, which is usually done near riverbanks or water sources).

- During panning and the adding of mercury to create amalgam, and especially during the heating of the resultant amalgam to evaporate the mercury.

There are both short and long-term effects of mercury exposure. The negative health impacts are many and may include:

- The fumes from hot or melted mercury is very dangerous for the brain, nerves and kidneys, and the damage is permanent and cannot be treated.
- Acute exposure from burning amalgams, where symptoms can include painful breathing, chest pains, coughing, pneumonia, liver and kidney failure.
- Long term exposure may causes bleeding, metallic taste, tremors (fingers & toes), slurred speech, blurry vision, unsteady walking, impotence, hearing loss and dizziness.
- Psychological symptoms include insomnia, fatigue, forgetfulness, irritability, loss of sexual desire and depression.
- Pregnant mothers, unborn child & young children have the highest risk of damage to organs, tissues, and brain.
- Short term vapor exposure can cause coughing, chest pains, nausea & vomiting, shortness of breath, eye irritation and vision problems

Socio-economic and cultural issues

ASM gold and diamond work take place near many villages across Liberia. The inhabitants in these far-away villages nearly always help the miners by providing them with accommodation and by providing labor for transport of materials in areas that are not accessible by vehicles/bikes. Even though there are benefits from ASM, and especially in providing jobs and income, there are also potential negative impacts on both people and the environment.



Figure 7: Mining camp north of Sapo National Park Boundary

Artisanal mining can affect communities in different ways. Workers coming from outside can act in violation with community practices and cultures. If miners ask for more goods and services to buy that can make local prices goods and services go up or services become more difficult to access (community education, and health clinics). Mining camps can also be associated with drugs and alcohols, prostitution, gambling, and domestic violence. These factors can affect women and children. Miners must respect the local authorities, the culture of communities and avoid violating the laws that keep the communities safe and peaceful. People in the communities, and the miners must report all crimes, including rape and acts of violence to the police or the courts.

ASM miners often forget or are not aware of local government (Clan Chief, town Chief etc) in the rural villages or towns where they operate, and miners may also set up local structures of their own. However, once a mining permit has been acquired, the miner are under obligation to submit copies of their mining permit to the local administration. Miners are also required to show respect for the local authorities and norms of the communities in which they operate. Miners must abide by the laws which requires them to reclaim previously mined areas to allow for communities to use the land for other activities



Figure 8: Pollution of a stream by artisanal and small-scale miners

Gender

By gender we mean roles and behaviors of men and women that are socially created. In society, we aim to achieve gender equality – that is women and men should have equal opportunities and rights. This aim can only be achieved if we show equal respect to both men and women.

Women often perform specific tasks in the ASM sector, including crushing, washing, and sorting. They are also involved in the provision of goods (for example food and drink) and services (for example transporting dirt and water, cleaning, and doing laundry) in the mining camps. In some mining areas, women have leadership roles in cooperatives and, and there are examples of women serving as mining agents, mine chairpersons, financiers, and traders. However, women often face challenges in finding safe opportunities where they are not exploited, and some women may have a very limited awareness of their rights. Women may face a lot of discrimination due to cultural beliefs and norms.

Often, women are given lower status tasks in ASM – jobs that are physically difficult but pay less than those done by male counterparts. Further, because of differences in access to credit, women may have limited ability to purchase the necessary equipment to mine, while many of them lack awareness of their rights and the value of the minerals they mine. There is also risk of gender-based violence (GBV) in and around mine sites and lack of proper sanitation facilities and childcare options can limit women’s participation in the sector. In some mining areas, women become the victims of trafficking, forced labor, and sexual exploitation.

Mining work can create health risks for the whole family, including women. And where men have control over radios, women can have a hard time getting information (such as on health risks or training) and cannot participate in public awareness activities. Some cultural taboos also stop women from going to mining places when menstruating. The MME wants an ASM sector where women’s rights are fully respected. The MME therefore encourage all actors involved in ASM (miners, local authorities etc) to implement and enforce the existing laws that protect women’s rights.

It is important for everyone to know that women are entitled to the same rights and freedoms as men according to Liberian law. Therefore, the ASM community should make sure to uphold the rights of women. People making decisions in the ASM sector should ensure that women have access to working tools and equipment just like men do. Women’s role in the ASM sector must be controlled by the women themselves and not by men. And, it is not acceptable to stop a woman from working because she is menstruating.



Figure 9: Woman using “calabace” to pan for gold



Figure 10: At the ASM mining sites, women often establish a small business selling products to the miners.



Figure 11: Men and women mining gold in Sinoe County, Southeast Liberia

Children

Children below 18 are not allowed to work in mining in Liberia, whether underground or on the surface. Children may not either be used for operating a machine for lifting or moving objects. The Liberian Law says that this is wrong. So, when children work in mining sites, the responsible adults can be prosecuted.

Land

Communities have the right to make decisions on how their land is used. This is why it is important for government to consult with communities when taking decisions about land, forest or mining activities.

Communities have rules regarding how land is acquired and used. It is unfair and wrong to conduct mining activities on land that belong to communities without their prior approval. Doing so may result in conflict and violence. Therefore, artisanal miners should get the approval of the communities before using their land for any purpose. Artisanal and other miners also must avoid mining inside of Protected Areas and Proposed Protected Areas.

Human Rights

The Independent National Commission on Human Rights (INCHR) is the government office that is responsible for the need to address human rights abuses and violations in Liberia – and that mandate includes working to improve the often bad working conditions in ASM. The INCHR therefore wants to improve the working conditions within ASM overall, including human rights related risks and issues.

The INCHR is working with other government authorities to make sure that ASM practices are regulated in a manner that causes less negative impacts on the environment, human health, safety and social well-being.

The INCHR encourages miners and other stakeholders to respect the laws regarding human rights. This includes a no to forced labor, no to child labor, no to the use of minerals that harm the environment and human health, and the respect for the rights of women and children. The INCHR wants miners and other ASM actors to be aware that people who are responsible for violations of human rights can be punished under the Laws of Liberia.

Good Practices In Mining

The main mining methods for mining mineral deposits in swamps, old riverbeds, river flats, low and high terraces are pitting and trenching. These mining methods are simple and involve comparatively little expenditure. After mining, the pits and trenches should be back filled, first using oversize gravels and then overburden. If gold or diamonds are found, then further examination will be done in the vicinity of the pit or trench where the gold or diamonds were found.

Pitting

Miners must tell diggers to dig 3 to 4m wide or two shovels in length, and 1 to 3m or one and a half deep pit - and also put steps to give access to pit's bottom which makes it easy to go down and climb out. The overburden is put on one side of the pit and the gravel on the other side (see figure 12). Pits are suitable in high terraces because the ground is strong and there is no need to do benching

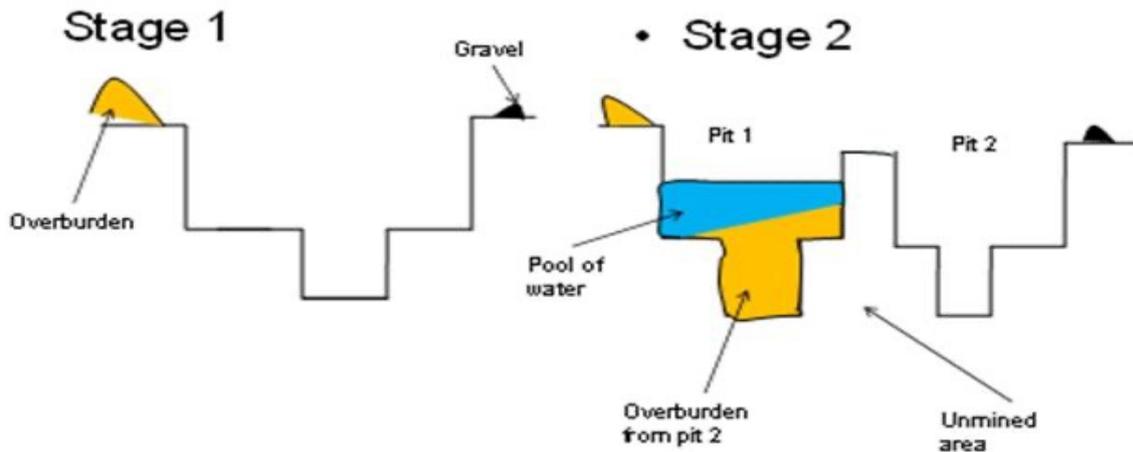


Figure 12: Drawings that illustrates how to perform the pitting method.

Trenching

Trenching refers to making a long cut in the ground – with the purpose to collect gravel which is washed to remove valuable minerals. A trench is generally deeper than it is wide, and it is also narrower compared to its length. Trenching is better than pitting for mining gold and diamond deposits that are present in swamps, low terraces, river flats etc. This method can help miners get plenty of gravel for washing. This method also allows mined out areas to be carefully back filled by materials coming from nearby trenches and ensures that there is not much back filling work to do after mining has finished. Steps should be built to allow miners to get in the hole and climb up easily.

Trench Lay out

- Brushing and clearing.
- Use a measuring tape (estimate distance by pacing) to measure a cut 60m long x 10m wide.
- Trenches of 10m-20m x 6m-8m are measured.

Trench Excavation

- Dig 18m long x 6m wide in center of 20m long x 8m wide hole.
- Dig trench down to 2m and bench.
- Expected total maximum depth: 3m-4m.
- The overburden is placed on virgin ground.

Transport of gravel

- Gravel is removed from 1st trench of 1st cut to bench towards 2nd cut.
- Gravel is moved from the bench to the washing point or stockpile.
- Equipment used include wheelbarrows, head pans, bucket and sacks.
- Removal of overburden and gravel continues to the end of the 1st cut.
- Mining, overburden disposal and gravel transport continues until all the following cuts have been mined

Trenching method

- Benches: usually with 4m-5m wide, 6m long & 5m deep and 1.5m high.
- Overburden is continuously - step-by-step - placed back into the adjacent mined out pit.
- Gravel is collected.
- The pits are usually dewatered: 3inch x 43 inch (300gpm) and 4inch (500gpm) pumps are commonly used.
- Holding walls are sometimes built between mined out areas and newly dug areas - to stop mudslides

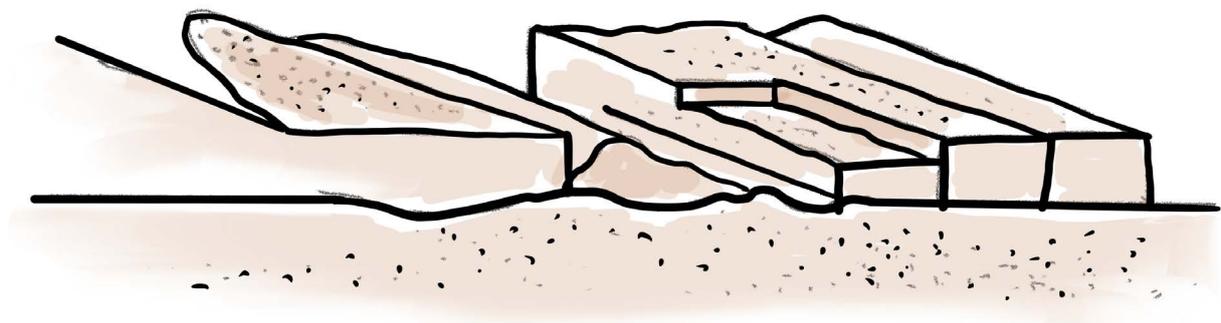


Figure 13: Drawings that illustrate how to perform trench mining

Good Practices In Processing

The mineral processing practices presented below have limited impacts on the environment. The potential for water pollution is significantly reduced as these methods do not use harmful chemicals such as mercury; sodium cyanide and/or nitric acid to extract gold. The washing tools selected, and their exact use depend on whether the miner is looking for gold or diamonds.

Hand sieve shaker

This washing tool (figure 14) is perfect for diamond mining. After removing the big-big rocks, the sieve is pushed back and forth, material laid flat, and the lighter materials are washed away, and diamonds and other heavy minerals gather together at the sieve's center. The miner then picks the mineral (for example diamonds) from the tailings.



Figure 14: ASM operator jiggling for Diamond, Tahn, Western Liberia

Sluicing

The sluice board is a gravity concentration tool used by many ASM workers in Liberia. It is used to wash for gold and other heavy minerals. It is swift and helps miners to wash more gravel per day compared to panning.

The sluice board is a long shallow box with a roughened bottom, as shown in Figure 15. The sluice board can be made of hardwood, split bamboo and iron or aluminum sheets. The base may be roughened with strips of wood or synthetic mats (carpets). A sluice box works well when the miner uses an old diesel drum and puts the water in the box at a constant rate. Miners should try to use different types of carpets and riffles. The water's

speed can be controlled by setting the slope angle slightly higher than at the speed when the sand covers and blocks the rug. Miners should make sure to keep the sand out of the carpet spaces so that they can get hold of the gold.

The concentrate on the mat is washed into a big tub, and the cycle is then usually repeated.



Figure 15: Sluicing at Artisanal Mining Site at Larjor, Western Liberia.

Panning

Panning works well for cleaning as sands and gravel are swirled with water in a shallow conical dish or pan, as shown in Figure 16. The heavy materials collect at the bottom of the pan, and the lighter remain on top and can be emptied with water from time to time. Panning is most successful when small heavy grains are taken away from big grains. Miners throughout the world use many types of gold pans.



Figure 16: Gold panning at Artisanal mining site, Masawo, North-Western Liberia



Figure 17: Plastic pan with ruffles in the side

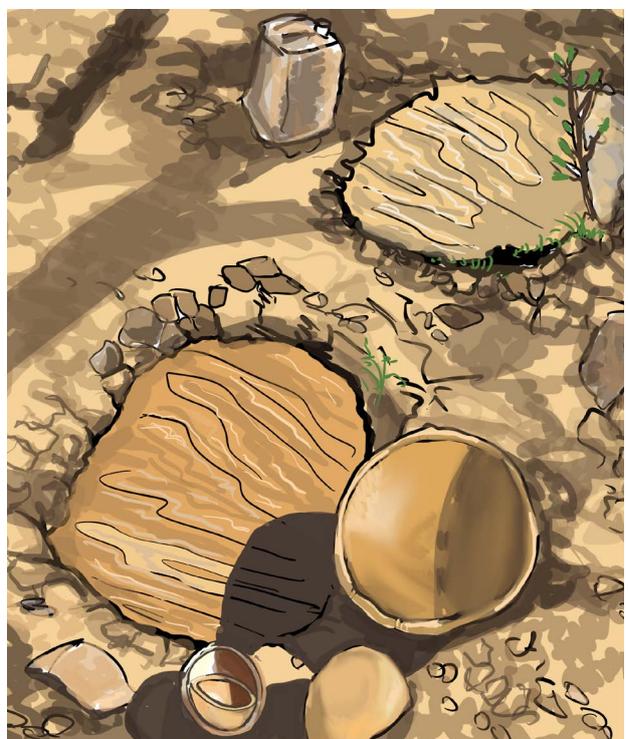


Figure 18: Steep-walled plastic kitchen bowl/Hand-carved wooden bowl and gourds

Good Practices In Reclamation

Reclamation means covering/backfilling the holes and voids left after digging for gold, diamonds, etc- and the planting of vegetation (for example trees) in the areas near or on the places where mining activities have taken place. It is the practice of “repairing bad things caused by mining activities on the environment”.

To protect both human beings and stop impacts on the natural environment (such as soil, water, air, forest, and wildlife resources) in and near mined areas and make it possible for the soils to again be used for agriculture, the “dig a hole, cover hole” should be part of every miner’s work. This practice can stop or at least reduce some bad things that can happen to the environment.

There are so many benefits that the mining community and the miners themselves can get from doing backfilling after mining. Especially if it has been made sure that mercury or other harmful chemicals were not used during the mining process, and that this has been verified that the soil and water is healthy to use - some of these benefits include:

- They can plant cash crops on the backfilled land - to increase their income.
- The backfilled land can be used for fishponds, raising animals such cows, goat, sheep etc.
- Nearby creeks or rivers will have cleaner water and more fish.
- Backfilled land can stop an increase in malaria, which will result in less medical cost (mosquito larva can grow fast in stagnant water left in mining pits that are not covered).
- In some cases, backfilled land could also be used as a community entertainment place.

There are four main steps to restore a mined-out site. They include:

- 1) Cover or backfill the dug pit with the overburden material taken from near the pit,
- 2) Level the materials in the hole with shovels till they fit into the surrounding land/landscape;
- 3) Put topsoil to cover the levelled overburden material; and
- 4) Then, plant or re-vegetate the area covered with the topsoil with the same vegetation / trees that were present on the land before mining.

After these steps above are taken, the environment can be rebuilt, either actively or passively. Both the EPA and the Ministry of Mines inspectors have an important role in monitoring to make sure that old mine sites are restored.



Figure 19: Reclamation of the mining site, Tahn, Western Liberia.

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