Global Opportunities for Long Term Development (GOLD) in the Artisanal Small-Scale Gold Mining (ASGM): Integrated Sound Management of Mercury in Kenya’s ASGM
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PRELIMINARY INFORMATION

About this Training Manual

The Ministry of Environment and Forestry (ME&F) with the support of the Global Environment Facility (GEF) and United Nations Development Programme (UNDP) is implementing the Integrated Sound Management of Mercury in Kenya’s Artisanal and Small-Scale Gold Mining as part of the Global Opportunity for Long Term Development (GOLD) in the Artisanal Small Scale Gold Mining (ASGM). The project mission is to make small-scale gold mining safer, cleaner, and more profitable. In order to achieve the project objective, the Ministry engaged a consultant to carry out a Training Needs Assessment (TNA) and develop training tools.

This training manual forms part of the Training tools developed and comprises of existing and newly developed training materials with a module on Gender in ASGM.

Providing training to miners in the Artisanal and Small-Scale Gold Mining sector can:

- Increase awareness of best mining practices that will reduce levels of accidents and incidents that have previously resulted in loss of lives, equipment and production time.
- Increase awareness of existing legislation that protects miners’ and mine workers’ rights.
- Improve ore extraction and metal recoveries through adoption of efficient mining and mineral processing methods.
- Create a clearer understanding of the minerals market and how miners can protect themselves against losses.
- Support the acquisition of mining skills that increase employability in the advanced formal mining sector.

The curriculum has been designed as an introductory level course on basic knowledge, skills and attitudes that will enable artisanal and small-scale miners to run more sustainable, responsible, and profitable enterprises with focus on key safety and health concerns. Key knowledge outcomes include:

- Knowledge on the ASGM sector
- Basic Knowledge on mining and geology
- Knowledge on Occupation Health and Safety
- Knowledge on the legal and institutional framework in the ASGM sector
- Knowledge of environmental concerns in ASGM
- Financial literacy and;
- Social and Gender issues in ASGM
Note to instructors or trainers.

It is important for instructors or trainers to understand the audience by taking into consideration the region or county which the learners are drawn from, their literacy levels, and their ability to access supporting teaching resources. To prepare for the course, trainers are encouraged to:

i. Work through all the tasks in this manual themselves or with others so that you are ready to help the learners if they have problems.

ii. Adapt examples to be culturally relevant.

iii. If translation is required, adapt the training agenda and course material to allow for the extra time and communication required

iv. Prepare additional teaching notes if needed.

Course delivery

It is important to note that:

i. Many learners will not be accustomed to sitting in classrooms for long periods of time. Although this module has been presented as a structured classroom session to be delivered over a period of two consecutive days, in many cases it may be more practical and beneficial to deliver the course in smaller periods of time spaced out to allow for better knowledge retention. For example, a good delivery structure may be four separate classroom sessions of four hours each delivered over a two-week period.

ii. Many learners will be unable to take time off work to attend classroom learning sessions. In these instances, shorter classroom sessions are extremely beneficial, as they can be delivered after work hours or potentially during mid-day work breaks. The training should be adaptable and willing to accommodate the students' schedules.

iii. The space for the training should be free from noise and distraction. Wall space to hang up notes and demonstration exercises is important.

iv. Effective course delivery is dependent on comprehension and retention by the learners but also on the ability of the trainer to address their interests. The course is designed to allow the trainer to get to know learners and if they show an interest in learning more about a specific topic the trainer should be prepared to change the course material “on the fly,” including changing examples and demonstrations, to better suit their needs.
## Targeted learners

This manual targets all stakeholders in the ASGM sector. The training plan highlights the modules that are key for each stakeholder. The table below shows the targeted stakeholders for each unit.

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<td>Ministry of Environment and Forestry, Mining Group Leaders, Local NGOs, County Government Representatives, NEMA accredited trainers,</td>
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<td>Module</td>
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<tr>
<td>Unit 4: Mercury Use and the Minamata Convention</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers, Electricians, Builders, ASGM Mining Groups (Cooperatives and Associations)</td>
<td>Ministry of Environment and Forestry, International and Local NGOs, Health Workers, County Government Representatives, TOTs</td>
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<td>2. MINING AND GEOLOGY</td>
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<td>Unit 5: Basic Geology in Gold Mining</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers, Electricians, Builders, ASGM Mining Groups (Cooperatives and Associations)</td>
<td>Ministry of Mining, County Government Representatives, TOTs, NEMA accredited trainers</td>
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<tr>
<td>Unit 6: Shaft Construction and Management</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors</td>
<td>Ministry of Mining, NEMA accredited trainers, County Government Representatives, TOTs</td>
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<tr>
<td>Unit 7: ASGM Mining Process</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, ASGM Mining Groups (Cooperatives and Associations)</td>
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<td>3.</td>
<td>ASGM AND THE ENVIRONMENT &amp; OCCUPATIONAL HEALTH AND SAFETY</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers, Electricians, Builders,</td>
<td>Ministry of Environment and Forestry, Local NGOs, Health Workers, County Government Representatives, NEMA accredited trainers, International and Local NGOs, TOTs</td>
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<td>Unit 8: Occupational Health and Safety</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers, Electricians, Builders,</td>
<td>Ministry of Environment and Forestry, Ministry of Mining, NEMA accredited trainers, Health workers, International and Local NGOs, County Government Representatives, TOTs</td>
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<td>Unit 9: Disaster Risk Management and Emergency Preparedness</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers, Electricians, Builders,</td>
<td>Ministry of Environment and Forestry, Local NGOs, Health Workers, County Government Representatives, NEMA accredited trainers, International and Local NGOs, County Government Representatives, TOTs</td>
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<td>Unit 10: ASGM and the Environment</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers</td>
<td>Ministry of Environment and Forestry, Local NGOs, Health Workers, County Government Representatives, NEMA accredited trainers, International and Local NGOs, County Government Representatives, TOTs</td>
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<td>4.</td>
<td>LEGAL AND INSTITUTIONAL FRAMEWORK IN ASGM</td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers</td>
<td>Ministry of Mining, County Government Representatives, NEMA accredited trainers, TOTs</td>
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<td>owners/ Traders, Manufacturers, suppliers</td>
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<td><strong>Unit 12: Mining and Minerals Policy 2016</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers</td>
<td>Ministry of Mining, County Government Representatives, NEMA accredited trainers, TOTs</td>
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<td><strong>Unit 14: Institutional Framework of miners</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, suppliers</td>
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<td>ASGM Mining Groups (Cooperatives and Associations)</td>
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<td><strong>Unit 16: Leadership, Negotiation Skills, and Team Management</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, ASGM Mining Groups (Cooperatives and Associations)</td>
<td>County Government Representatives, NEMA accredited trainers, Ministry of Industry, Trade and Enterprises State department of Cooperatives, County Artisanal Mining Committee</td>
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<tr>
<td><strong>Unit 17: Securing Funding, Financing, and Investors</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, ASGM Mining Groups (Cooperatives and Associations)</td>
<td>Financial Institutions, Ministry of Industry, Trade and Enterprises, State department of Cooperatives, NEMA accredited trainers, International and Local NGOs,</td>
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<tr>
<td><strong>Unit 18: Budgeting and Record Keeping</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, ASGM Mining Groups (Cooperatives and Associations)</td>
<td>Financial Institutions, Ministry of Industry, Trade and Enterprises, State department of Cooperatives, NEMA accredited trainers, International and Local NGOs,</td>
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<tr>
<td><strong>6. GENDER IN ASGM</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice</td>
<td>Ministry of Environment and Forestry, County Artisanal Mining Committee, International and Local NGOs,</td>
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<td>Module</td>
<td>Units</td>
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<td>workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, ASGM Mining Groups (Cooperatives and Associations)</td>
<td>Ministry of Environment and Forestry, County Artisanal Mining Committee, International and Local NGOs,</td>
</tr>
<tr>
<td><strong>Unit 21: Involvement of Children in ASGM</strong></td>
<td>Landowners, Shaft owners/ investors, Prospectors, Foreman/Site Supervisors, Blasters, Extractors, Processors, Winch operators, machine operators, Washers/ sluice workers, Mercury processors/ handlers, Transporters, Gold shop owners/ Traders, Manufacturers, ASGM Mining Groups (Cooperatives and Associations)</td>
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**Course Materials**

The training material required for this module include Pens; Notebooks; Markers for the trainer(s); Flipchart; Printed copies of student materials; Personal teaching notes; and Course attendance sheets.
Module Objectives

By the end of this module, the participants should be able to:

- Give a clear definition ASGM and the characteristics of communities involved in the sector
- Outline the advantages, origin of formalization initiative and the process
- Have knowledge on the history of ASGM and developments in the sector
- Identify the key stakeholders and roles played in the ASGM sector
- Have awareness on the origin of the Minamata Convention in relation to mercury use.
UNIT 1: OVERVIEW OF ASGM

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have a clear understanding of the ASM sector
- Understand the characteristics of Artisanal and small-scale mining

Introduction

Artisanal and Small-Scale Gold Mining (ASGM) can broadly be defined as gold mining activities that are carried out at community level on a small scale. ASGM is often distinguished from large and medium scale gold mining by its low levels of mechanization and high levels of labor input. Globally, more than one hundred million people in more than eighty countries rely on this industry directly or indirectly for their livelihood, and improving the sector has the potential to radically transform their lives.

In Kenya, ASGM are most active in Migori and Kakamega, however Kisumu, Siaya, Pokot, Turkana, Vihiga, and Narok also have significant ASGM communities. Many ASGM activities are carried out in remote and rural areas where little or no market support is available, and where mining is the best alternative to agriculture.

The Various Definitions of ASGM

ASGM involves a complex interplay of social, economic, technological, environmental and health factors that can vary considerably across local and national contexts. This makes it difficult to establish uniform global definitions for the sector.

ASGM is defined in the Minamata Convention on Mercury as “gold mining conducted by individual miners or small enterprises with limited capital investment and production” (United Nations Environment Programme, 2014). The International Labor Organization describes artisanal and small-scale mining as “…labor intensive, with mechanization being at a low level and basic” (Jennings, 1999).

Most definitions of artisanal and small-scale mining share the following characteristics:

- an informal work sector,
- limited use of mechanical tools,
- labor-intensive work,
- low capital and productivity,
- deposit exploitation, and
- limited access to land and markets

(Henschel, Hruschka & Priester, 2003; Mining, Minerals and Sustainable Development, 2002).

These characteristics illustrate the cycle of poverty that can exist in artisanal and small-scale mining communities, particularly where inefficient mining and processing techniques yield a small quantity of product and low profit (Barry, 1996).

Due to its largely informal nature, ASGM has been associated with quite poor and environmental social practices. This sector is estimated to be the largest source of mercury pollution globally, contributing to
grievous environmental and health consequences. ASGM is currently the largest anthropogenic source of mercury emissions and releases world-wide. The Global Environment Facility (GEF) supported planetGOLD programme is working to support small-scale miners to transition to mercury-free technologies and boost their productivity, leading to significantly reduced global mercury pollution and a cleaner, more responsible gold supply chain.

Being an ASGM miner could therefore refer to a wide-ranging specialized jobs including prospectors, extractors or diggers, crushers, transporters, processing machine operators, amalgamators, burners, shaft managers and shaft or landowner. Many consider buyers and sellers, who are downstream members of the gold value chain to be part of ASGM miners or “practitioners.”

Both men and women take part in ASGM activities in nearly every country where it is practiced. Cultural beliefs play a role in the extent of involvement in many countries especially those in Africa. While men work primarily in the mines, women and children can work both in and around the mines and at home, balancing mining, and household responsibilities. We will be looking into gender roles in ASGM later in the course.

In the last 20 years, ASGM has become a growing source of employment in less-economically developed countries and developing countries, but formalization is still a big challenge and constitutes the root of a substantial number of problems and negative impacts associated with ASGM.

Like other mining activities, ASGM is cyclical, and because of some unique structural and financial characteristics it is acutely sensitive to economic variations.

However, in order to enable key opportunities for positive change and the potential transformation of the ASGM sector, it is also crucial to recognize the negative impacts that ASGM brings to these economies. Mercury contamination is perhaps the most widely known contributing factor to environmental and social problems affecting miners, surrounding communities, and ecosystems.

**Task**

Ask the participants how best they would describe ASGM given the various definitions above?

**History of ASGM in Kenya and Developments in the Sector**

In Kenya, the ASGM sector dates to the 19th century. ASGM activities occur mostly near Lake Victoria, where there remain significant underexplored or underexploited reserves of gold in high concentrations. ASGM is mostly found in the counties of Migori, Kisumu, Siaya, Vihiga, Kakamega and further up north in Pokot and Turkana.

Early discoveries were made in 1880s near Lolgorian (Nyanza-Rift Valley border). The first major gold mining was done by Rosterman Gold Mine, which mined more about 7340 kgs of gold between 1935 and 1952, at its underground mines in Kakamega.

Currently, Kenya has 2 post-independence commercial gold mining companies in Narok and Nandi Hills, and many prospecting and exploration companies spread across the country. Artisanal gold mining employs more than 80,000 people across Kakamega, Migori, Trans Mara, Narok, Turkana and many other areas.
Kenya’s ASGM sector is largely informal, unregulated and until its recent recognition by the Mining Act No. 12 of 2016, illegal. Ignorance of the law may mean that miners fail to identify and take up opportunities for formalization and development. The devolution of ASGM responsibilities and the administration of mining regulations to the Counties may necessitate concomitant increases in funding, staffing, and capacity building to enhance formalization efforts. Kenya is a gold hotspot and with the new mining laws, the government, investors and the local communities can work together to optimize the gains from the precious mineral.

The Mining Act of 1940 ignored ASGM and only gave it a provision for mineral prospecting rights. There was therefore no legal framework up until 2016 within which enforcement agencies could regulate the sector, giving room to unregistered and unlicensed ASGM operations to thrive. This is compounded by the existence of cartels, middlemen and “investors” that set gold prices and lending terms with little regard to views of local miners. Where miners are organized into groups, the joint arrangement appears difficult to sustain, since individual miners process and sell gold independently.

**Characteristics of Artisanal and Small-Scale Gold Mining Communities**

ASGM activities have varying characteristics from country to country. Some of the activities are considered illegal or informal with some intolerance from authorities. ASGM activities can also be seasonal or year-round, long term or following a boom-and-bust cycle (Buxton, 2013).

Communities may comprise local populations or may be generated through extensive in-migration. In Kenya, many miners move from site to site depending on the output. Once the output forms the ore starts declining, they may migrate to other regions with the hope of getting more output. In some instances, some miners migrate to the mines on a seasonal basis. They go to the mines, buy ore, pay processors and once they make enough money, they move back home. Once they have exhausted the funds, they go back to look for more. Other miners are based permanently in the mines with diverse economic activities they can turn to during the low seasons.

Weather patterns also affect the mining period. The rainy season causes flooding in shafts. The miners are therefore not able to access the shafts and have to either wait for the water to seep away or buy expensive pumps to drain out the water. During this period, they turn to other economic activities or temporarily migrate to other regions that have accessible shafts.

The blend of mining and household work results in an array of health problems for miners, family members and surrounding communities. Many of these health problems can be exacerbated by the absence of regulation in the ASGM sector; lack of miner education about health hazards; limited access to protective equipment and limited technical knowledge due to lack of access to technical training, low levels of education or low literacy rates (Wall, 2008). In cases where ASGM operates formally, health problems can be exacerbated by lack of miner access to technical and financial resources needed to adopt more sophisticated mining practices.
UNIT 2: STAKEHOLDER MAPPING AND ANALYSIS

Objectives of the unit:
By the end of this unit, the participants should be able to:

- Have a clear understanding of the rationale for stakeholder mapping and analysis
- Identify the key players involved in the ASGM value chain directly and indirectly
- Understand the key roles played by the identified stakeholders

Introduction
Stakeholder mapping and analysis was conducted to identify the key players in the ASGM value chain, classifying them according to the level of their involvement and participation, their interests, needs and influence in the ASGM sector.

This process was carried out through comprehensive literature review of relevant documents which identified the relevant institutions and organizations that needed to be engaged to get their input during the assessment. Further engagements and identification of key players was done through conducting Key Informant Interviews of identified key players. The core strategic areas of planetGOLD also guided the mapping process.

The ASGM sector has key players who are both directly and indirectly involved in the activities. Along the Gold value chain, we have different groups playing different roles from prospecting all the way to amalgamation, buying and selling. We also have several players who are indirectly involved in the mining process. These are service providers such as manufacturers, mercury sellers, machine designers and mechanics among others. These people offer support services for the miners. We also have regulatory institutions that influence policies, rules and regulations that guide the ASGM sector. Lastly, we have training institutions that train miners on safe practices.

Direct Stakeholders in ASGM
The Direct Stakeholders in ASGM are the miners themselves. Being an ASGM miner could therefore refer to a wide-ranging specialized jobs including prospectors, extractors or diggers, crushers, transporters, processing machine operators, amalgamators, burners, shaft managers and shaft or landowners among others. Many consider buyers and sellers, who are downstream members of the gold value chain to be part of ASGM miners or “practitioners.” Miner groups, CBOs and cooperatives also form part of direct stakeholders.
The table below provides an analysis of the direct stakeholders identifying their key roles/ functions in the ASGM value chain:

**Table 1: Direct Stakeholders in ASGM**

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Key Role/ Function</th>
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</table>
| 1.  | Landowners                          | • Contact person at the mining site  
• Release land for mining activities  
• Signs land lease agreement/ negotiations with shaft investors  
• Offer site safety and security |
| 2.  | Shaft Owners/Investors              | • Owns the ore  
• Manage the workers  
• Inspects the shaft periodically  
• Ensure that the shaft is drilled and constructed in a standard acceptable way  
• Ensures that the shaft is spacious, stable, comfortable, and well  
• Should be able to conduct basic first aid in case of an emergency |
| 3.  | Prospectors                         | • Explore on gold rich ore  
• Search for new gold deposit  
• Advice on technical approaches |
| 4.  | Foreman/Site Supervisors            | • Inspects the condition of work and equipment  
• Advises what should be done at any given time, whether to go to the shaft, who goes to do what  
• Assigns people duties and has an inventory of management / file; worker control at site; shaft inspection; shaft drilling / extraction management. |
| 5.  | Blasters                            | • Get license; acquire and keep explosives; move to the shaft and use explosives. |
| 6.  | Extractors                          | • Drill the gold-rich ore: manual or mechanized  
• Sell/release the ore to processors |
| 7.  | Processors (Air, Parata)            | • Reduces the size of the ore for increased surface area of contact  
• Sun dries the ore |
| 8.  | Winch/Pulley operators             | • Manages the winch which is a powered cable to hoist and move gold-rich ore loads from the shaft to the ground.  
• Monitors the winch gauges connects and disconnects winch cables to loads being moved or lifted  
• Moves winch around sites as needed. |
| 9.  | Machine Operators/ Crushers         | • Lift, load and unload manually crushed ore to and from crusher / mills  
• Operate the milling machines; help washers / to remove the crushed ore powder from the mill |
| 10. | Washers/Sluice Workers              | • Washes the crushed ore with water to isolate gold on the sluice material |
| 11. | Amalgamators/Mercury Handlers/Processors | • Wash the ore dust or mercury laden tailings  
• Mix gold with mercury for amalgamation |
| 12. | Transporters (Boda, Vehicular)      | • Lift, load and unload the raw ore; move with the ore on the road and at borders. |
| 13. | Gold Shop Owners/ Traders           | • Procure processed gold from processors  
• Handle the mercury amalgam; burn the amalgam  
• Procure, stock, and Sell inputs and equipment e.g., crushers, pumps, compressors; mercury. |
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<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Key Role/ Function</th>
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</table>
| 14. | ASGM Mining Groups (Cooperatives and Associations); (MICODEPRO, OSIRI Matanda Sacco, ASMNET Kakamega) | • Mobilizing people into actions.  
• Acts as pillars and forum through which the communities rally people together to address a common issue.  
• Gives the community members chance to prioritize their needs and be able to understand how best to address them both personally and through external intervention.  
• Acts as a platform where communities are able to learn and exchange ideas.  
• Acts as a conduit though which the Government, national and international donors are able to realize sustainable development goals through community driven initiatives.  
• Acts as capacity development forums where the members are able to have peer to peer learning, experiment leadership skills learnt through managing different activities and programs that are run on a day-to-day basis.  
• Offers employment, economic empowerment of the youths and the community by people pulling their resources together to fund their collective or individual business ventures there by creating employment. In marginalized community CBOs have been known to increase bargaining power of farmers to get good and fair prices of their items they are selling among many other benefits.  
• Coordinate community issues and development  
• Officials register and keep all records about a site |

**Indirect Stakeholders in ASGM**

Below are some of the Indirect Stakeholders and the roles they play in the ASGM Value Chain:

**Manufacturers and Suppliers**

In carrying out ASGM activities, miners use a range of equipment. Some of these equipment include; rock drills, hammers, ball mills, mercury, compressors, winches, generators, sluices and explosives (used by blasters) These equipment are manufactured or assembled externally and bought by the miners for use in their activities. These manufacturers therefore play a big role in supporting ASGM activities.

Simple tools used in the mining process such as basins, pans, blankets among others have to be sourced from somewhere. PPEs also need to be sourced for safe mining practices.

In setting up the sites, the miners to build sheds, construct shafts, design and install winches among other installations within the mining sites. Most miners outsource such services. It was observed that some of the mining sites have air compressors for ventilation within the shafts. Some of the shafts are also connected to electricity to light up the ways within the shafts. This indicates the need for electricians.

When machines such as generators and ball mills wear out or fail, the miners require mechanics to repair them.
The table below summarizes the manufacturers and suppliers and the roles each plays in the ASGM sector.

**Table 2: Manufacturers and Supplier Roles in ASGM**

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Key Role/ Function</th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>Manufacturers</td>
<td>• Assemble equipment such as ball mills, winches, compressors among others.</td>
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<td>• Manufacture PPEs such as helmets, dust masks, safety gloves, safety boots, etc.</td>
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<td>16</td>
<td>Suppliers</td>
<td>• Suppliers of Mercury</td>
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<tr>
<td></td>
<td></td>
<td>• Suppliers of basins, jerricans, blankets, sacks e.tc.</td>
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<td></td>
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<td>• Suppliers of fuel for generators and compressors</td>
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<td></td>
<td></td>
<td>• Suppliers of PPEs such as helmets, dust masks, safety gloves, safety boots, etc.</td>
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<td>• Suppliers of building and construction materials for sheds, sluices, etc.</td>
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<td>17</td>
<td>Electricians</td>
<td>• Repair, install and design electrical power systems within the mines.</td>
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<td></td>
<td>• Set up electric power functions to provide light in shafts.</td>
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<td></td>
<td></td>
<td>• Keep generators, lighting and electrical systems in working order.</td>
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<td>18</td>
<td>Mechanics</td>
<td>• Inspect machines such as Ball Mills, generators, compressors, etc. and run diagnostic tests to discover any functionality issues.</td>
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<td></td>
<td></td>
<td>• Conducting repairs on machines within the site.</td>
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<td>19</td>
<td>Builders</td>
<td>• Construct and maintenance sheds.</td>
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<tr>
<td></td>
<td></td>
<td>• Building and maintenance of sluices.</td>
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<td></td>
<td></td>
<td>• Assist in Shaft Construction.</td>
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<tr>
<td></td>
<td></td>
<td>• Assist in installation of winches, generators and other equipment.</td>
</tr>
</tbody>
</table>

**The National Government and County Governments**

The National Government through various ministries and parastatals influence ASGM activities through various regulatory and institutional frameworks. The County Governments also play a similar role through various directorates and departments. The table below shows the stakeholders at the national and county level and the roles they play.

**Table 3: National and County Government Roles in ASGM**

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Key Role/ Function</th>
</tr>
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<tbody>
<tr>
<td>20</td>
<td>Ministry of Environment &amp; Forestry (MoEF)</td>
<td>• National Authority responsible for coordinating the work of all lead agencies</td>
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<td>• Environmental policies and legislation</td>
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<td></td>
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<td>• Environmental regulations</td>
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<td></td>
<td></td>
<td>• Hosts the GEF, Stockholm, Minamata, Basel and Rotterdam Conventions</td>
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<td>• Focal point in the Implementation of the SAICM national program</td>
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<tr>
<td></td>
<td></td>
<td>• Create awareness and advocacy on mercury use/exposure impacts.</td>
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<td>• Form an inter-ministerial committee to coordinate activities after ratification.</td>
</tr>
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<td></td>
<td>• Form an inter-ministerial team to roll out the ongoing UNEP/WHO phasedown approach programme with priority</td>
</tr>
<tr>
<td>No.</td>
<td>Stakeholder</td>
<td>Key Role/ Function</td>
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<tr>
<td></td>
<td></td>
<td>given to the establishment of a database of key stakeholders in artisanal mining.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop a National Action Plan for ASGM.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Support artisanal miners to adapt environmentally sound mining practices.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strengthen policy and regulatory frameworks for mercury supply, sources, and trade.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assess manufacturing processes in Kenya in which mercury or mercury compounds are used.</td>
</tr>
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<td></td>
<td></td>
<td>• Assess artisanal and small-scale gold mining sites that require remedial action.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Promote research monitoring of mercury emissions and releases in Kenya.</td>
</tr>
<tr>
<td>21.</td>
<td>Ministry of Mining</td>
<td>• The governing body of the extractives/mining sector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Responsible for development and review of public policies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Review mining regulations and the management of the mining sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Development of the national extractives/mining sector plans; monitoring compliance with the sector’s objectives, policies, and goals; Administers mineral resources.</td>
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<tr>
<td></td>
<td></td>
<td>• Review/revisit existing regulations to support phase out and prohibition of mercury use at ASGM.</td>
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<td></td>
<td></td>
<td>• Promote safe ASGM technology.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permit issuance for mining.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ASGM coordination and formalization at the county level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conflict resolution on ASGM issues</td>
</tr>
<tr>
<td>22.</td>
<td>Ministry of Industry, Trade and Enterprises State department of Cooperatives</td>
<td>• Formulation, adoption and implementation of policy and legal framework for the development and growth of all co-operatives in keeping with the overall national development policies and priorities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Registration and liquidation of co-operative enterprises</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Establishment of uniform standards of the operations of co-operative enterprises, recognition of county co-operative enterprises, cross-county co-operatives enterprises</td>
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<tr>
<td></td>
<td></td>
<td>• Develop and maintain inter-governmental relations framework on co-operative enterprises</td>
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<td></td>
<td></td>
<td>• Carry out inquiries, inspections, and investigations into the affairs of co-operatives</td>
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<td></td>
<td>• Provide oversight to apex, federations, secondary, and cross-county co-operative enterprises</td>
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<td></td>
<td></td>
<td>• Regulate co-operative audit services including social and value for money audits</td>
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<td></td>
<td></td>
<td>• Promote good governance and ethics on co-operative enterprises</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Formulate co-operative education, training, standards and regulations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carry out capacity building to the county Governments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Promote public private partnership and joint ventures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Promote and facilitate regional and international co-operative relations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Establish and maintain a data and information center for co-operatives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Promote research and development in Co-operatives</td>
</tr>
<tr>
<td>No.</td>
<td>Stakeholder</td>
<td>Key Role/ Function</td>
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</tr>
</tbody>
</table>
| 23. | Ministry of Health | • Review and enforce registration requirements from time to time  
• Promote harmonization and/or linkages between the movement, the National Government and County Governments through periodic forums |
| 24. | NEMA | • Awareness creation on occupational health hazards associated with ASGM  
• Training of safety and safe mining  
• Advisory on safe health practices  
• Health protection  
• Disease and health surveillance  
• Disease and injury prevention  
• Population health assessment  
• Health promotion  
• Emergency preparedness and response |
| 25. | County Governments of Migori, Kakamega, Narok and Vihiga | • County Executive Committees oversight of development sectors.  
• County Mining Committee licensing of ASGM individuals and groups.  
• Identification of environmental and health risk factors at impacted area.  
• Cross sector and program coordination through the county integrated development plans.  
• Capacity increase for health staff and laboratories. |
| 26. | County Artisanal Mining Committee | • Offers training support  
• Represent the interest of miners  
• Give technical, administrative  
• Support  
• Give financial support  
• Implements policies |

**Training Institutions and ToTs**

Training Institutions include academic institutions such as Universities, Colleges, Technical and Vocational Educational Training Centers who play a key role in imparting technical expertise on mining processes for those interested in taking the various courses. Majority of the miners do not have access to these training institutions due to high poverty levels which denies them the opportunity to enroll for courses. Local and International NGOs come in to fill these gaps by providing the miners with basic skills on safe mining practices. Apart from training, these NGOs also offer support in terms of finance and capacity building for ASGM Communities.

Limited access to formal education leaves apprenticeship as the major source of learning form most of the miners. This gives rise to Trainers of Trainers (ToTs) where skilled miners are engaged in coaching.
new trainers who are less experienced with a particular activity along the ASGM value chain. ToTs, therefore, play a key role in the ASGM community in terms of skills development.

The table below summarizes the roles of academic institutions, training institutions and ToTs in ASGM:

*Table 4: Roles of Training institutions and ToTs in ASGM*

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Key Role/ Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.</td>
<td>Universities e.g., JKUAT</td>
<td>• Training on mining technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Localization of mining technology/equipment</td>
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<tr>
<td>28.</td>
<td>Trainers of Trainers (ToTs)</td>
<td>• Are needed to keep the mining population aware of the science, the mining</td>
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<tr>
<td></td>
<td></td>
<td>technologies, the art, the mercury safety, environmental concerns, and the</td>
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<tr>
<td></td>
<td></td>
<td>socioeconomics of mining.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• They need to understand the various mining and processing technologies,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>especially the mercury and cyanide free processing technologies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• They need to know the handling techniques for the hazardous substances on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>site, and the laws governing their elimination e.g., the Minamata convention.</td>
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<tr>
<td></td>
<td></td>
<td>Lastly, COSHH - control of substances hazardous to health is needed to be</td>
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<tr>
<td></td>
<td></td>
<td>known to majority of the mining population.</td>
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<tr>
<td></td>
<td></td>
<td>For each site, it should be clear who forms the above team, with their full</td>
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<td></td>
<td></td>
<td>contacts; the reporting channel, i.e., how any communication reaches any of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the above team members; report keeping for the site; organizational system /</td>
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<tr>
<td></td>
<td></td>
<td>hierarchy / structure / profile or organogram of the site, among others.</td>
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<tr>
<td></td>
<td></td>
<td>Currently, there is health and safety policy for the Sacco. The groups which</td>
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<td></td>
<td>form the basic units of the cooperative are inspected by authorized competent</td>
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<tr>
<td></td>
<td></td>
<td>authorities. However, a few cases have been reported where the officers are</td>
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<td></td>
<td></td>
<td>bribed, thereby compromising the ability and quality of the site to meet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>standards. As per the Sacco H$$ policy, each site needs to have a functional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>first aid box, with an operator / trained first aider. In addition, each site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is supposed to have a disaster rescue and management team.</td>
</tr>
<tr>
<td>29.</td>
<td>Local and International NGOs e.g., NCCK, CEJAD, Impact Facility, Fair</td>
<td>• Sensitization on safe mining</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade, Solidaridad, CIRDI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Advice on occupational health hazards associated with mining</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sensitization of forming active groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Financial support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Support with requisite equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strengthening of institutional capacity building of the ASGM groups and the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>regulatory and policy framework pertaining to SMC.</td>
</tr>
</tbody>
</table>
Other Key Indirect Stakeholders

Financial Institutions, the Media and the General Public also form part of the key indirect stakeholders in ASGM. The table below summarizes the roles they play:

*Table 5: Other Key Indirect Stakeholders in ASGM*

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Key Role/ Function</th>
</tr>
</thead>
</table>
| 30. | Financial Institutions/Banks | • Provide financial products that serve the community/public non ASGM livelihood needs.  
• Provide loans for business                                           
• Provide advice on prudent financial management                        |
| 31. | Media                        | • Awareness creation and sensitization                                                
• Collect, verify, and analyze news about ASGM.                             
• Promote capacity building from a point of knowledge                      
• Publish/broadcast news stories about ASGM and other related stakeholders. |
| 32. | General Public               | • Protecting the environment through participating in rehabilitation plans            |

**Task**

- Ask the participants whether they have interacted with any of the above-mentioned stakeholders. How was the experience?
- Are they all playing their roles in the ASGM sector as expected?
- Is there room for improvement? Ask for some suggestions if any.
UNIT 3: FORMALIZATION OF ASGM

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Understand the definition and process of formalization
- Have knowledge on the mandate of the Artisanal Mining Committee
- Identify the potential benefits of formalization

Introduction

ASGM is an economic and mining sector with specific technical, economic, and social characteristics. This concept is the starting point for building a national approach to formalization and legalization of the activity.

The processes of ASGM legalization and formalization are indeed challenging but they need to be faced because the other alternatives (ignoring, forbidding, waiting for it to disappear, repression) are not effective options, as history has repeatedly shown that they have proved to compound existing problems.

Formalization, as a process that brings ASGM into the formal economy, can only be achieved if programs and public policy deal with the different dimensions of ASM activities simultaneously and in an integrated way.

What is formalization?

Formalization simply means to give something or an organization or entity a legal or formal status.

ASGM is a unique business in that it is mostly informal but still employs millions around the world and in a big way influences the world’s economy. In Kenya, towns like Migori, Kakamega and Ikolomani have grown as a result of Artisanal mining. ASGM produces approximately 20%-25% of the world’s gold annually, and often operates without formalization or business licenses from the governments of the areas in which they operate.

Formalization of a business, therefore, requires that a business becomes compliant with relevant local and national laws and regulations. This may involve registering the business and obtaining a business license, obtaining relevant environmental and operational permits, keeping business records and accommodating the monitoring of business activities by the state.

The Origin of the Formalization Initiative

International policy mechanisms, such as the Minamata Convention on Mercury, promote formalization as an essential step towards mitigating the sector’s various negative impacts and to unlock its full development potential. Following this, many countries have embarked on a quest for the formalization of the artisanal and small-scale mining (ASM) sector. Many governments, Kenya included, are currently overhauling policy frameworks in an attempt to gradually formalize Artisanal and small-scale segments of the sector.
Formalization is a process that seeks to integrate the ASGM sector into the formal economy, society and regulatory system. Formalization is a process ensuring:

i. ASM actors (e.g., miners and traders) possess the necessary licenses and permits.
ii. ASM actors are organized in legitimate entities that represent their needs.
iii. Policies are implemented, monitored and enforced.
iv. ASM actors have access to technical, administrative and financial support that empowers them to comply with requirements prescribed by national regulations.

From the above broad definition, it is clear that formalization is a multi-dimensional and multi component process, ranging from allocating land, regularizing miners’ organizations (Chamas), to facilitating access to finance and enforcing regulations. This is as illustrated below:

*Figure 1: An illustration of the Formalization Process*

Formalization is therefore a multi-faceted, long-term process that may take decades to fully accomplish. However, by designing a realistic, participatory, comprehensive and customized pragmatic approach, substantial progress can be made in selected areas. The global ASGM formalization booklet says: Formalization in the sector shall require the following: recognition of the ASGM; licensing procedures; inspection procedures; clear steps towards gradual phasing out of mercury, introduction of mercury free technologies, development of clear Standard operating procedures (SOPs) to secure workplace safety; clear health and safety policy; the PPEs policy; welfare issues including access to clean drinking water; and access to credit. In Kenya, the establishment of the Artisanal mining committee (AMC) has been a first bold step towards implementing the 2016 mining act.

**The Artisanal Mining Committee (AMC)**

Up to 2016, ASGM was illegal and often had their equipment and merchandise confiscated by the authorities. The 2012/13 Mining Act listed it as an illegal activity. This has since changed as ASGM is now recognized by the Mining Act 2016. This has gone further with the formation, appointment and inauguration of the artisanal mining committee (AMC) whose chair is an appointee of the County Governor.

This purpose of this committee is to help the Government in issuing and renewal of artisanal miners’ permits.
In addition, the committee is expected to have a record of all miners, their full particulars and records. This extends to groups, CBOs, Saccos and cooperatives. The AMC is already placed in Southern Nyanza and Western in Counties where ASGM is practiced.

**Characteristics of ASGM Formalization**

Some of the characteristics of ASGM Formalization process include:

**Continuity**

There is need for continuous policy support and engagements that will allow gradual and incremental process of improvement.

**Stability**

Policies and frameworks in place should be improved overtime and their long-term objectives preserved to ensure that the economic viability of the mining operation is maintained, along with environmental and social sustainability.

**Multiple dimensions**

Associated plans and programs should be multidimensional. There is need for coordination and integration among different institutions that work with ASGM.

**Multiple stakeholders**

Several stakeholders, including governments, the ASGM sector and civil society groups, are all important players. Successful formalization takes into consideration these different interests and creates space for participation of all stakeholders.

The process of ASGM Formalization entails use of different public policy approaches and instruments, generation of and access to information, and development of an ASGM vision.
Advantages of ASGM Formalization

Formalization of ASGM is a process that will require a lot of time commitment, costs and restrictions to the operation. Tax liabilities especially for miners will produce the formalization, with the state monitoring the activities taking place in the sector. This may pose the question: is it worth it? Many will tend to think that staying informal without the state keeping an eye on their processes is more advantageous for them. However, some of the potential benefits of formalization include:

- Reduced risk of government shut down at the mining sites. This is a common problem at mining locations where governments will intervene to shut down ASGM operations for several weeks, months or even indefinitely. Even if operations resume upon government departure, downtime represents a significant lost income stream for workers and owners.
- Increased access to reputable gold buyers and suppliers of equipment which can increase profits and reduce operating costs.
- Indirect benefits such as improved environmental and social conditions in the workplace which will have positive impacts on the health of workers and the community as a whole.
- In some cases, the state will offer supports such as geological services, business development services or financial services to formalized businesses.
- Increased access to reputable lenders and financers if the owner desires to grow the business with more efficient equipment.
- Secure title to the land being mined.
- Miners will be able to deposit the money they make from gold ore and product sales with banks. The licenses and permits will give the cash they earn legal backing.
Formalization of the ASGM Sector coupled with eliminating mercury usage will help the Government of Kenya to work towards the achievement of the SDGs as shown in the figure below.

<table>
<thead>
<tr>
<th>SDG</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 No Poverty</td>
<td>By increasing income generation for miners. Alternative methods of Gold Recovery will recover more gold for the miners and this translates to more income.</td>
</tr>
<tr>
<td>2 Zero Hunger</td>
<td>By improving the ability of miners to access and acquire adequate food as a result of increased Income.</td>
</tr>
<tr>
<td>3 Good Health and Wellbeing</td>
<td>By reducing the harmful effects of mercury from ASGM activities on local, regional and global populations</td>
</tr>
<tr>
<td>5 Gender Equality</td>
<td>By mainstreaming gender and ensuring women rights.</td>
</tr>
<tr>
<td>6 Clean Water and Sanitation</td>
<td>By protecting water resources from Mercury contamination</td>
</tr>
<tr>
<td>8 Decent Work and Economic Growth</td>
<td>By improving the working conditions in the mines through safer technologies and practices</td>
</tr>
<tr>
<td>9 Industry, Innovation and Infrastructure</td>
<td>By investing in appropriate sustainable technology</td>
</tr>
<tr>
<td>12 Responsible Consumption and Production</td>
<td>By phasing down gold produced using harmful substances under illegitimate conditions.</td>
</tr>
<tr>
<td>14 Life Below Water</td>
<td>By safeguarding aquatic life from mercury.</td>
</tr>
<tr>
<td>15 Life on Land</td>
<td>By reducing environmental degradation from ASGM related activities.</td>
</tr>
<tr>
<td>16 Peace, Justice and Strong Institutions</td>
<td>By strengthening the capacity of institutions to manage mercury and promote peace by guarding against transboundary pollution from ASGM</td>
</tr>
</tbody>
</table>

*Figure 2: Achievement of SDGs through Formalization*
**Task: (Small group activity)**

In small groups, ask participants to consider the formalization initiative. Let them discuss what they have learnt and answer the following questions:

- What do they understand by formalization?
- What benefits do they believe formalization will bring? Is there any other benefit apart from the ones mentioned above?
UNIT 4: MERCURY USE AND THE MINAMATA CONVENTION

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Identify the different types of mercury
- Understand the levels of exposure to mercury and their effects
- Identify the symptoms of elemental mercury intoxication/mercury poisoning
- Understand the rationale of the Minamata Convention on Mercury

Introduction

In the last 20 years, knowledge about the use of mercury in the ASGM sector, its impacts, and ways to drastically reduce such impacts on people and the environment has increased substantially through national and international projects. Mercury is a powerful neurotoxin that is harmful to people, plants, and animals, but especially to young children and developing fetuses. People exposed to mercury may experience both acute (immediate) and chronic (long term) health effects.

Mercury in the ASGM industry is used to amalgamate gold from crushed ore, after which point the amalgam is burned and only gold and trace metals remain. This mercury-based process is currently favored by many ASGM miners over other methods of gold extraction because mercury is affordable relative to the price of gold, accessible, simple to use and can be processed anywhere, and allows miners to produce gold quickly, often on the same day the gold is extracted.

Reducing the use of mercury is essential in attracting investors to ASGM projects due to national and international regulations controlling mercury usage.

Mercury Use

Characteristics of Mercury

As mentioned earlier, mercury is used in ASGM to extract gold from the ore through amalgamation. In ASGM communities, it is sold in plastic bags or small bottles. Below are some of the characteristics of mercury:

- It is silver colored and is a very heavy liquid.
- It releases toxic vapors
- Its vapors are invisible and odorless
- It also releases buts of vapors when it is left in open air without being heated. It will produce vapors at normal room temperature.

Figure 3: Mercury in a test-tube
Miners who work with mercury and those who sell the liquid end up breathing in these toxic vapors. Touching mercury with bare hands also exposes the skin. Mercury vapors stick to objects, walls and clothes that are close by. These vapors are also carried by the wind towards people and houses. When mercury sticks to something, it contaminates it. This may last a long time, from days to months and even years. Contaminated spaces means that people who are in close proximity to these objects will end up breathing in these vapors

**Types of Mercury**

There are 3 types of mercury: elemental mercury, methylmercury and inorganic mercury compounds. In gold mining, elemental mercury is used directly in the ore processing, which often leads to miners being in contact with it. In addition, in certain cases and under certain specific aquatic conditions, elemental mercury can also be transformed into methylmercury.

**Elemental Mercury (Hg)**

This is a heavy silver liquid metal. When heated, it turns into invisible vapors. Even at room temperature, as mentioned earlier, it releases toxic vapors.

**Direct exposure** is mainly due to the presence of this elemental mercury. The exposure is often severe and acute. It is a high dosage that can be absorbed up to 80% by the lungs. It causes damages mainly to the kidneys and lungs, but also to the nervous system.

When the amalgam is mixed and heated in open air it releases a lot of noxious vapors. The person who burns the amalgam and those in close proximity will breath in a large amount of mercury vapors.

**Indirect Exposure** is due to the presence of elemental mercury vapor (Hg) contaminating surrounding surfaces. This exposure is often chronic and consists of small to medium doses that can be absorbed up to 80% by the lungs. It causes significant neurological disorders.

When the amalgam is heated and releases mercury vapors, the vapors are deposited on cloths, walls and surrounding surfaces, contaminating these objects. Anyone in contact with these objects will also inhale noxious fumes, even a long time after the amalgam has been burned. These vapors can also be carried by the wind towards the village and residences and in turn, contaminate these also.

**Methylmercury (MeHg)**

This is an inorganic compound that can accumulate in the food chain, particularly in fish and seafood sourced from contaminated water bodies.

Under specific aquatic conditions, elemental mercury released in air, water or soil can potentially be transformed into methylmercury (MeHg). This can occur close to ASGM sites or further away. Methylmercury accumulates in the food chain (biomagnification). The large piscivorous fishes contain more MeHg than smaller piscivorous fishes. Human exposure is due to the consumption of fish contaminated by MeHg. Exposure is often chronic and sometimes severe. It usually consists of small to medium doses that are absorbed almost in totality by the bowels (up to 95%)
Inorganic Mercury

Exists in different forms such as salts. They are often found in manufactured products such as batteries.

Figure 4: Exposure to Elemental Mercury and Methylmercury (Source: Artisanal Gold Council Training Materials)
**Effects of Mercury**

When miners or people in general, breathe in mercury vapors, mercury enters the lungs and spreads throughout the body. Putting a piece of cloth does not change anything. Only a special mask can protect the miners.

Mercury can make a person seriously ill. It can take a long time before the effects start showing. In some cases, symptoms of poisoning can happen really fast.

Some of the effects of mercury exposure include:

- Uncoordinated walking
- Impaired balance and coordination
- Metallic taste
- Headaches
- Fatigue
- Mood swings
- Shaking or body tremors
- Difficulty breathing and coughing
- Color changes in the mouth
- Loss of Kidney Function
- Loss of Memory

Mercury effects are often permanent. Medication can help, but only if the affected person takes medication regularly and stays away from mercury. In some cases, the effects may disappear or fade away without taking any medication as long as the person stays away from mercury. It is therefore very important for the miners to protect themselves before the disease begins.

**Effects of Mercury in Children**

Mercury is very dangerous for children and fetuses. The effects on the brain are also very severe for children than adults. This is because their brains have not finished developing. These effects can also be permanent unless the child takes medication and stays away from mercury. Children and pregnant women should not work with mercury or be near a person who works with mercury.
Figure 5: Frequent symptoms of Chronic Elemental Mercury Intoxication (Source: Artisanal Gold Council Training Materials)
**Chronic Poisoning: Mercury poisoning clinical manifestations**

The manifestations of elemental mercury toxicity vary depending on the dose and chronicity of the exposure. Inhalation of high concentrations of mercury vapor, as may occur in an industrial setting, may result in cough, chills, fever, and shortness of breath. Nausea, vomiting, and weakness may result.

This syndrome may progress to a severe acute lung injury and respiratory as well as renal failure. Chronic exposure to lower concentrations of mercury vapor produces a classic triad of tremor, gingivostomatitis, and neuropsychiatric disturbances. The mercurial tremor may be both static and intentional. Sudden episodic bursts of tremor, also called tetanus mercurialis, have been experienced by victims.

Neuropsychiatric manifestations of mercury poisoning, also known as erethism, include fatigue, insomnia, memory dysfunction, social withdrawal, shyness, and depression.

Inorganic mercury poisoning can occur after dermal or mucosal absorption of mercury-containing cosmetics and teething powders as well as after accidental or intentional ingestion of mercuric chloride antiseptics. After acute ingestion, a hemorrhagic gastroenteritis is typically followed by renal failure from acute tubular necrosis.

Chronic exposure is associated with erethism, renal dysfunction, and neurologic manifestations such as sensorimotor neuropathy, constriction of visual fields, tremor, and delirium. Acrodynia, or pink disease, has been described after elemental or inorganic mercury exposure, most notably in children after exposure to mercurial teething powder and diaper ointment. This syndrome is manifested as an erythematous, hyperkeratotic, often desquamating rash on the palms, soles, and face in conjunction with a papular rash. Acrodynia is also associated with an idiosyncratic hypersensitivity to mercury ions and mercury poisoning, which itself can increase circulating catecholamines and mimic pheochromocytoma (Chapter 215). Common findings include tremor, diaphoresis, tachycardia, and hypertension.

Human toxicity from organic mercury was first recognized when the dumping of mercury-containing waste into Minamata Bay in Japan led to a large-scale poisoning of the population, whose primary dietary staple was fish from the bay. In what is now called Minamata disease, patients presented with paresthesia, ataxia, dysarthria, tremor, and constriction of visual fields or “tunnel vision.” These symptoms can be progressive and sometimes fatal.

Children born to these exposed mothers (congenital Minamata disease) suffer mental retardation, limb deformities, chorea, seizures, and microcephaly. However, prenatal exposure to elevated maternal organic mercury levels in the Republic of Seychelles, which is a high-fish-eating population, has no adverse effect on childhood neurodevelopmental outcomes. In a large Korean study, higher mercury levels were associated with depression in women but not men, and even then, only in women with low fish consumption. Furthermore, although seafood consumption is correlated with higher brain levels of mercury in adults, these higher levels are associated with less Alzheimer disease neuropathology.
The Minamata Convention on Mercury

The Minamata Convention is an intergovernmental agreement to reduce anthropogenic emissions of mercury worldwide in order to protect human health and the overall environment from the damaging effects of mercury. It is named after the Japanese city of Minamata, which experienced a severe, decades-long incidence of mercury poisoning after industrial wastewater from a chemical factory was discharged into Minamata Bay. The wastewater contained methylmercury, which bioaccumulated in fish and shellfish in the bay. Local people who consumed seafood from Minamata Bay became very sick, and many died or were left severely disabled.

The Minamata Convention: 

The Convention was agreed at the fifth session of the Intergovernmental Negotiating Committee on mercury in Geneva, Switzerland at 7 a.m. on the morning of Saturday, 19 January 2013 and adopted later that year on 10 October 2013 at a Diplomatic Conference (Conference of Plenipotentiaries), held in Kumamoto, Japan. The Minamata Convention entered into force on 16 August 2017, on the 90th day after the date of deposit of the 50th instrument of ratification, acceptance, approval or accession.

The convention includes measures which limit the supply and trade of mercury worldwide, as well as controls regarding the use of mercury in industry and manufacturing and has specific goals and measures which pertain to ASGM. Article 7 of the Minamata Convention applies to artisanal and small-scale gold mining (ASGM), in which mercury is used to extract gold.

A total of 137 parties or countries from Africa, Asia-Pacific, Eastern Europe, Latin America, the Caribbean, Western Europe, and other regions have been working together to control the supply and trade of mercury, reduce the use, emissions, and release of mercury, raise public awareness, and build necessary institutional capacity since 2017.
Why is Global Response Needed?

Mercury pollution is a global problem that requires global action. It moves with air and water, transcends political borders, and can be transported thousands of miles in the atmosphere.

The Minamata Convention on Mercury is an opportunity for the global community to address this mounting problem before it gets worse. Over the next decades, implementation of this international agreement will help reduce mercury pollution from the specific human activities responsible for the most significant mercury releases to the environment.

The Minamata Convention requires that party nations:

- Reduce and where feasible eliminate the use and release of mercury from artisanal and small-scale gold mining (ASGM).
- Control mercury air emissions from coal-fired power plants, coal-fired industrial boilers, certain non-ferrous metals production operations, waste incineration and cement production.
- Phase-out or take measures to reduce mercury use in certain products such as batteries, switches, lights, cosmetics, pesticides and measuring devices, and create initiatives to reduce the use of mercury in dental amalgam.
- Phase out or reduce the use of mercury in manufacturing processes such as chlor-alkali production, vinyl chloride monomer production, and acetaldehyde production.
- In addition, the Convention addresses the supply and trade of mercury; safer storage and disposal, and strategies to address contaminated sites.
- The Convention includes provisions for technical assistance, information exchange, public awareness, and research and monitoring. It also requires Parties to report on measures taken to implement certain provisions. The Convention will be periodically evaluated to assess its effectiveness at meeting its objective of protecting human health and the environment from mercury pollution.
Module Objectives

By the end of this module, the participants should be able to:

▪ Have a basic understanding of geology in gold mining
▪ Have an understanding on how to carry out various ASGM activities from extraction to trading
▪ Understand the categories of shafts, the standard shaft construction and management.
▪ Understand the mercury free technologies for gold recovery
UNIT 5: BASIC GEOLOGY IN GOLD MINING

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Identify the common rocks that are associated with Gold
- Have knowledge on the basic gold prospecting and exploration techniques
- Understand the role of a Geologist in Mining

Geology of Gold Deposits in Kenya

Gold is one of the rare metals having an average grade of 3-6 parts per million (ppm) of low-grade deposits. Sediment or ore thought to contain gold is placed in a wide, curved pan along with water. In Nyanza, gold deposits are dominantly found in Nyanzian System rocks of Archean in age, approximately 2.8 billion years old. Ore deposits are majorly found in quartz veins. There have been poor exposure of quartz vein. In Migori and Lolgorian, the gold deposits are found along the Archean Nyanza granite-greenstone belt which lies in the Archean Tanzanian Craton.

The host rock includes; Andesite, meta basalt, shale and banded ironstone. Gold mineralization is found in all volcanic facies found in Migori and Lolgorian. In Western Kenya, the Neoarchean greenstone belt of the Lake Victoria Goldfield are composed of a sequence of Nyanzian metavolcanic overlain by younger Kavirondian sequence. In most cases, gold deposits in Kenya are associated with greenstone-quartz veins. Quartz in this case acts like a gangue. Veins also known as reefs are made of white quartz.

Gold occurs in placer/alluvial/eluvial deposits or enclosed in sulphides and silicate veins.
Common Rock types associated with Gold in Kenya

The rocks reported to contain gold are described below:

Andesite rock; Also known as "host rock". It is dark grey in color and fine to medium grained

**Figure 7: Andesite rock**

Basaltic rock; fine grained extrusive rock.

**Figure 8: Basaltic rock**

Granite rock; medium to coarse grained extrusive igneous rock

**Figure 9: Granite Rock**
Diorite rock; coarse grained rock composed of mainly silicate minerals such as hornblende and pyroxene. It is light grey in color.

Figure 10: Diorite rock

Shale; dark grey rock fine to medium grained.

Figure 11: Shale Rock

Gold Prospecting

What is Gold Prospecting?

This is the assessment of several geological factors in a systematic sampling frame prior to carrying out any major mining operations to establish the viability of the project. It deals with establishment of the gold deposits.

Common gold prospecting and exploration Technique used;

Literature Review

Gathering of information in a desktop study of the broader geological surveys of the area. In Kenya, the ministry of mining and Petroleum have got various geological data and geological maps showing distribution of various minerals deposits in Kenya. This will guide on the potential areas/sites to carry out the subsequent field study.

Reconnaissance Survey;

Also called the site pre-visit. This is the actual physical visit of the identified sites to carry out geological mapping, identifying the site extent/ size.

Aerial Reconnaissance and Prospecting

Entails the use of satellite images and Aerial geophysical methods. Helps to identify the prevailing site anomalies for gold deposits. This technique covers a wide area of land within a short period of time. It is expensive hence not commonly used prospecting method.
**Geochemical Survey**

A grid/pattern is established to enable a systematic sampling of the soil and rock materials. Geochemical analysis of the collected soil/rock samples will be used for quantification of the gold and other associated minerals such as silver. Results from the laboratory material testing will enable validation of the field interpretations and allow quantification of volume and establishment of the spatial extent of the rocks. Laboratory analysis will be carried out on field collected samples and will include petrography and rock mechanics. The analysis will focus on further identification of the quality of the ore deposit.

**Geophysical Survey;**

Various Geophysical techniques are used during the prospecting stage for gold mineral. It is used to identify anomalies on the site since different minerals have got different properties. The technique can also determine depth and extent of the orebody. Exploration geophysics uses surface methods to measure the physical properties of the subsurface. This will comprise of vertical electrical sounding and tomography to give indication of structures within the body of the rock and to measure the physical properties of rocks, and in particular, to detect the measurable physical differences between rocks both vertically and laterally. The survey will also include collection of information on any geologic structures such as Joints, faults and unconformities likely to affect mining of the gold ore deposits. The analysis is used during quantification of the volume hence an estimation of economic value of the rock material together with groundwater potential. This will enable the investors establish the returns on investment in the proposed project. The most commonly used equipment includes; Magnetometer, Terameter, Seismometer, GPS etc.

**Borehole Drilling**

Borehole drilling provides information with high degree of accuracy. Diamond core drilling is used to obtain core samples for logging and laboratory analysis. This technique is most suitable for ore deposits situated deeper underground, which is deeper than 10.0m.

**Gold detector**

There are some plants and their growth pattern which can be used as gold detectors. These plants utilize some minerals and elements for growth and such minerals can are called trace minerals for gold. They are also associate minerals.

This technique is less accurate since other metallic minerals associated with gold such as silver and copper can be detected.

**Role of a Geologist**

When carrying out exploration, it is important to identify the correct method to use at any stage, because each has a cost implication. It is therefore necessary to develop an exploration programme with the help of a geologist, which will help contain the exploration costs. For instance, after reconnaissance, a geomagnetic survey may follow, allowing areas without mineralization to be eliminated and ensuring a focus on the mineralized areas for follow-up pitting and trenching. Locations for borehole drilling can then be easily identified as guided by the mineralized zones’ geoparameters indicated during sampling of the pits and trenches.
Task: (Small group activity)

In small groups, ask participants to considering their prospecting, exploration, and mining experience and answer the following questions:

- Which rock types described above have you come across?
- Which rock types described in this module have you overlooked in the past? Why?
UNIT 6: SHAFT CONSTRUCTION AND MANAGEMENT

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have knowledge on the categories of shafts and the appropriate standards for their construction
- Understand the safety measures for shaft construction
- Have knowledge on the poisonous gases in the shafts and the effects on their health when exposed
- Understand the basic shaft management skills and support underground mines

Shaft Construction

A shaft is a facility installed for materials handling of the ore and associated wastes and the means of transport for the miners and materials. A shaft should be drilled to service the mine for a long time and should therefore be properly planned. The cost of developing a shaft is high, and therefore one cannot afford to lose it and start another one.

Categories of Shafts

There are four shaft categories;

1. Vertical Shaft with Hoisting – for deep horizontal (<30°), vertical or steeply inclined (>70°) deposits
2. Inclined Shaft with hoisting – moderately inclined deposits (30°-70°)
3. Slope or decline with haulage (Conveyor/trucks) - Shallow horizontal deposits
4. Drift/Audit with haulage (Conveyor, truck, rail) - Shallow outcropping horizontal deposits

Standards for Shaft Construction

The dangers that are experienced in the shaft include the collapse of the shaft or fall of ground in the shaft. To avoid these dangers, the following standards need to be followed:

- The shaft must be placed under a shade to prevent rainwater from entering directly into the shaft.
- The shaft must be properly positioned on competent high ground. Before developing the shaft, look for the best position in the claim. This must be closest to the reef or orebody, and the ground must be competent enough.
- The shaft needs to be of a good size (about 1.2 meters on the sides). Square or rectangular shafts are recommended. Circular shafts are more competent, but there may be challenges requiring additional support that is costly for small-scale miners. The challenges arise from the need for massive reinforced concrete structures for circular shafts which might go beyond the affordability of most small-scale miners. With rectangular shafts, additional support is simply by means of timber
- The shaft may be collared using concrete if the ground at the top is loose.
- Each shaft must be equipped with at least a windlass where there is no hoist installed.
- About fifteen meters should be allowed between vertical excavations. This leaves a good pillar between the vertical excavations.
- A shaft pillar of about five meters should be left between the shaft and stopes.
- The shaft must be supported using timber.
Task

Ask the participants whether the shafts they use or have constructed meet the above safety standards. If not, what do they need to do to ensure the standards are met?

The Need for Ventilation in Shafts

Ventilation requirement met by installing ventilation tube in the shaft connected to a fan on surface. The shaft should be compartmented and bulkheaded to divide the airflow.

A mine must be supplied with fresh air for supply of oxygen to the miners and machinery within the shafts. Proper ventilation also helps expel foul or contaminated air from the shafts. It will also create conditions necessary for the miners to work, in terms of temperature and humidity.

If there is poor ventilation, hazards created include accumulation of poisonous gases, poor working environment in terms of temperature, humidity and dust particles and oxygen deficiency for the miners.

The table below shows some of the poisonous gases that may pose a danger to miners:

Table 6: Some of the poisonous gases and their effects to miners

<table>
<thead>
<tr>
<th>No</th>
<th>Gas</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carbon monoxide</td>
<td>Most dangerous gas with no smell and no taste. Kills within minutes and does not support combustion.</td>
</tr>
<tr>
<td>2.</td>
<td>Carbon dioxide</td>
<td>Kills by asphyxiation. It is generated from blasting, decomposing timber and diesel machines.</td>
</tr>
<tr>
<td>3.</td>
<td>Nitrous fumes</td>
<td>Kills by causing blisters in the lungs and one drowns in their own fluid. It has a pungent smell of ammonia.</td>
</tr>
<tr>
<td>4.</td>
<td>Hydrogen Sulphides</td>
<td>Has a smell of rotten eggs and is usually found in stagnant pools.</td>
</tr>
</tbody>
</table>

According to the regulations, a mine must have at least two shafts or openings. The second shaft should act as an escape route and can also act as a ventilation shaft. The second shaft provides a good alternative for natural ventilation.

Ventilation risk controls include, but are not limited to, natural and mechanical ventilation. Natural mine ventilation is a natural air current which happens without human assistance. This is possible when one opening of the mine is located higher than the other. Differences in temperature and air density between the inside and outside air results in natural ventilation. The airflow direction, however, changes with the seasons. Mechanical ventilation should be used when natural ventilation fails. This refers to the application of fans where electricity is available and may be used together with natural ventilation. Air can be directed into the working areas using auxiliary fans, doors, regulators or brattice.
Flooding in Shafts

Flooding in shafts is both a threat to miners working underground and a hindrance to their operations. Excess water in mines can interfere with operations and create safety hazards.

Submersible pumping systems have traditionally been the mainstay when it comes to draining underground mines. Pneumatic pumps are also in use. A proper water reticulation system can be designed to avoid danger and reduce cost. This will involve the use of pumps and pipes and construction of underground dams.
**Fall of Ground (FOG)**

The major disaster in ASGM in Kenya are due to FOG. These accidents occur in

- Shafts
- Drifts, drives, traveling ways and manways.

The main reasons for FOG include poorly planned excavations and poorly supported excavations. The standards for shaft construction need to be followed at all times when digging and construction is ongoing.

To prevent FOG, look at the stope width or the size of an excavation. If the width is too big, the ground is likely not to be able to support the weight. Secondly, consider the time of support. Large areas of ground should not be left unsupported for a long time. During cleaning, temporary support should be in place, with permanent support installed soon after cleaning. Third, ensure that the right type of support is used based on the ground conditions, materials available, and the training given to personnel.

**Shaft Management**

Every shaft should have a supervisor, shaft construction technicians, and a shaft technical assessor. Edwin Extractors should know how and where to track gold (closely and keenly guided by the supervisor for shaft safety during working hours).

The supervisor plans the work and assigns people duties on a daily basis, ensures the shaft workers use the PPEs appropriately, and ensures only those with appropriate PPEs are assigned duties. He or she decides where to stop and block, where and when to stop to reinforce / construct before continuing to extract, among other basic safety and coordination issues inside the shaft.

Every new miner must be assessed first before being allowed in—expertise and team spirit included. Often people know one another across the mines as they are the same people who rotate from mine to mine. Any new person must be introduced by a member at the site. This is to ensure efficiency, safety, teamwork, among other ideals required in the sector.

The site manager controls who go into / access the site, ensure all have the requisite PPEs as they come in; and ensures he has a proper documentation of all on site, and who have gone inside the shaft as a health and safety measure.

The duration and number of shifts should be fair to all miners. Apart from being dictated by the number of miners available, factors such as fatigue and health should be considered when assigning shifts. The conditions in the shaft may not be ideal for long shifts even though ventilation is provided. The miners will need rest and fresh air periodically. If miners are many, the work should be divided into eight shifts of three hours each. Supervisors should ensure the shifts are followed keenly through strict timing lest some quarters suffer.
Task
Ask participants to take a look at Shaft A and Shaft B shown in the figure below. Which shaft meets the standards as laid out in this unit?

Which type of shaft is better and safer for the miners? Vertical shafts as shown above or diagonal shafts as shown below? And Why?

Can you identify the weaknesses in Shaft D?

Figure 14: Shaft A

Figure 15: Shaft B

Figure 16: Shaft C

Figure 17: Shaft D
UNIT 7: ASGM MINING PROCESS

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Understand the ASGM mining processes in detail e.g., ore extraction methods, crushing, the principle of sluicing and gold transportation
- Identify the appropriate equipment required during the various mining processes
- Select the appropriate processing techniques and recover gold efficiently

Ore Extraction

This is the actual work of extracting the ore bearing deposits and begins from the surface advancing underground through development of openings that are ranked in three categories by order of importance:

1. Primary-main openings (e.g., shaft and slopes)
2. Secondary-lever or zone openings (e.g., drift, entry)
3. Tertiary-lateral or penal openings e.g. (Ramp, crosscuts)

During ore extraction, shaft and mining can be done at the same time provided that the exercise is done on an ore deposit.

There are two methods used for ore extraction; Surface mining and underground mining. The method of mining depends on the nature and geology of the ore deposit.

Surface mining

This method of mining is done when the ore deposit is near the earth surface. It involves open pit mining, placer/alluvial mining done on soft soil and along the riverbeds and mining on eluvial deposits i.e., gravels.

Underground Mining

This method is more advanced and expensive to carry out compared to surface mining. It is used when the ore deposit is located deeper underground. In artisanal and small-scale mining, shafts are constructed during ore extraction. Underground mining can go as deep as 100-300m. Both gangue and precious metals are extracted together and transported to the surface for the subsequent step of gold processing.
**Gold Processing**

This is a process which involves separation of the valuable gold from the gangue/Unwanted materials by physical methods.

Gold occurs in two forms namely;

**Free gold;** this is where an ore body is crushed by use of hammers reducing the ore material to small sized which can be processed further by grinding using the ball mills. The grinding of the ore body makes it into powdery form, which can be further processed by use of mercury. Most artisanal and small-scale miners uses this form of gold processing.

**Finely disseminated gold;** This form of gold occurrence requires cyanide chemical for processing.

Gold recovery depends on the extent of gold distribution, nature and mineralogy of gold containing copper and silver ore.
Ore drying and Manual Crushing

Ore drying is meant to get rid of water. Most shaft ore come from wet / moist environment, rendering the product water laden. Drying is done immediately the ore is removed from the shaft to prepare it for manual size reduction.

It will take up to 2-6 hours to completely dry the ore at maximum sunshine capacity after which it can be manually crushed. The drying largely involves lifting of load and bending / squaring to spread or removed the material.

At the manual crushing, a mattock, hammer, and such types of heavy material is used. Manual crushers risk crushing their fingers, and dust inhalation. Some particles may also slip and injure their eyes. Material splashing can be reduced by putting the ore in a gunny bag while crushing. It is advisable that the miners wear safety goggles, gloves and helmets while crushing.

Milling of the dried crushed ore

After manual crushing, the product is placed in a ball mill for refined grinding where very fine powder is the result. This is mechanical reduction in size to the floor stage. This stage is wrongly referred to as crushing on the ground, and an equipment called a ball mill is used.
At this stage, the key issues are dust hazard and noise hazard. Sound level is in the range of 78-85 decibels, higher than the 65-75 recommended for most occupational settings. The milling process is both noisy and dusty, with sound levels ranging from 75-90 decibels.

The ground ore powder is removed for sluicing. The key occupational health challenges here are dust hazard exposure and noise, in the range of 80 decibels, from the crusher. The people exposed to these hazards are the crusher / machine operator and the team removing the powder from under the crusher. As the removal continues, another round of milling / grinding is under preparation, with the crusher being loaded with fresh materials. Across the board, there should be precaution taken for safety from the hazards. This stage should mandatorily require earmuffs, dustcoat, and a face mask.

Figure 21: Ground ore powder ready for sluicing
Sluicing

Figure 22: Sluicing in progress at Teng Teng Village in Lolgorien

The principle:
Sluices use water to wash ore or alluvium down a series of angled platforms. As water washes sediment down a sluice, gold particles sink and are captured by material covering the bottom of the sluice. In the Western Kenya, blankets and sisal gunny bags are used, even though carpets can also do. Sluices are usually inclined at 5-15° angle.

As moving water travels down a sluice, it generates greater force and keeps gold particles from sinking easily. For this reason, most gold is captured at the beginning of the sluice. The capturing devices on the bottom of sluices are then removed and washed in a bucket to remove the captured dense material. The tailings which are disposed of into pans are either recycled or sold to the leaching companies.

The process:
The ground powder from a crusher is placed bit by bit to the perforated washing trays, at the rate of one basin or less. Water is then drawn from the basins and poured onto the tray, releasing the muddy mixture onto the slanting washing trays / sluices. These flow downwards by gravity.

On the sluices (washing trays made of wooden planks with a piece of wide blanket or gunny bag sent), the thick soil suspension washing flows by gravity, while allowing fine but heavier gold particles to remain
trapped in the cloth material on the basin. Usually sluice lining is either blanket or gunny bags for trapping the gold.

Sluicing poses a number of hazards to miners. Lifting heavy troughs for sluicing may expose miners to muscle-skeletal and upper limb disorders. At both environmental and economic levels, a sluice can be inefficient in gold recovery, resulting in effluents that are very rich in gold.

**Controlling losses of Gold through various Sluice designs**

For now, there is a uniform sluice design in Western Kenya. However, sluice design can lead to higher gold recovery if the force of the water traveling through the sluice is decreased. A series of rifles can help break the flow to improve recovery.

A zig zag sluice also achieves this by creating a drop between the first and second platform that disrupts the velocity of the water as it travels down the sluice. A simpler alternative to the zig zag sluice is a combination of two sluice surfaces. The first is tilted at a steeper angle then the second, decreasing the velocity of the water as it hits the second sluice, increasing gold recovery.

Sluices can be relatively expensive or affordable depending on the complexity of their design. Simple sluices can be a single angled platform a few feet in length and others can be very elaborate. Having an available and consistent water supply is necessary to have a functioning sluice operation. This can be done with piping, drums, buckets, or natural flowing water bodies. A constant flow will be better than a bucket-driven flow. Sluices are good at concentrating large amounts of ore and sediment in a relatively short time but often do not yield concentrates with high amounts of gold. The resulting concentrate must usually undergo further methods of concentration, such as panning.
Mercury Free Technologies for Gold Recovery

Gravity Concentration Methods

Panning

- Heavy gold particles are separated from other lighter non-gold particles within a medium sized pan.
- Sediment or ore thought to contain gold is placed in a wide, curved pan along with water.
- The pan is moved in a series of motions designed to eject lighter sediments.
- The density of gold keeps it on the bottom of the pan as lighter material is ejected along with water.
- After a series of successful iterations, gold remains on the bottom of the pan.
- Gold recovery methods like direct smelting is used to get pure gold.
- Panning requires time and skill to be effective.

N/B: One of the major drawbacks to panning is that miners must pan small amounts of concentrate. Therefore, panning is often done after other methods of gravity concentration such as sluicing have completed.

Shaker Tables

- Shaker tables are elevated tables tilted to one side with raised ridges running horizontally down their length.
- Crushed ore and water are released at one end of the table.
- The water washes the feed down the table.
- As the material is washed down the table, specialized grooves trap gold and direct it to collection points on the side of the table as lighter minerals are washed away.
- During this process, the table is continually shaken by a motor to agitate the material and aid in the separation of gold particles.
- Shaker tables are very effective and can concentrate sizeable amounts of ore at a time, providing high grade concentrates and liberated gold, but they are also relatively expensive and require some experience to operate.

Spiral Concentrators

- These are specialized pans tilted on an angle with spiraled grooves.
- The spiral grooves in the pan lead toward the center where a hole is connected to a container to catch gold.
- A motor is used to rotate the pan continually as concentrate is fed onto the pan by an operator.
- A pipe extending horizontally across the pan sprays water along the surface of the pan as the concentrator spins.
- The water washes lighter particles down the spiral concentrator into a bucket.
- Denser particles, including gold, are carried by the spiral grooves toward the hole in the center of the concentrator.
- This process is repeated several times, leaving a high-grade concentrate of gold.

Vortex Concentrators

- Vortex concentrators use a rotating flow of water to separate lighter materials from a concentrate and remove them via a raised drain hole.
- It is made of a circular tub with water input on the side of the tub and a raised drain in the center.
The tub is filled with water until it reaches the level of the drain hole.
Then concentrate is added in a thin layer around the bottom of the bowl.
Water is then pumped into the side input, creating a rotating vortex of water that drains in the center.
The vortex pulls lighter material up from the bottom of the bowl and out the drain hole.
Dense materials such as gold remain in the bottom of the tube.
When only gold left on the bottom of the bowl the water source is turned off, gold is ready to be removed.

N/B:

Miners must pay attention to the amount of water flow going into the tub.
If it is too great the velocity of the water will carry gold particles out of bowl, and this will lead to losses of gold.
When vortexes are operated correctly, the result is a fine gold concentrate that is usually very high grade.
Vortexes are easy to operate and are good at capturing fine gold that is hard to extract through other methods.

Centrifuges

A centrifuge is a vessel that rotates about a central point.
It is used to separate materials in a mixture by density.
To separate gold particles from a concentrate, it is fed into the centrifuge through a pipe at the top of the machine in a slurry of around 60-75% water and 40-35% solids.
The material collects in a vessel in the center of the machine where high-speed rotation creates force that moves the material up the sides of the vessel’s walls.
As the material is pushed up the sides of the bowl’s wall, denser material like gold is caught in ridges while lighter material is ejected from the vessel.
Centrifuges operate in cycles that can be preprogrammed or determined manually depending on the equipment and the material processed.
After a cycle is completed, the miner can then extract gold from the ridges of the centrifuge vessel. For small scale centrifuges, cycles usually last around 0.5-2 hours.
Operating a centrifuge takes skill as it must be tuned to the material it is processing.
This is accomplished by adjusting feed grain size, rate of feed, rotation velocity, and cycle duration. Centrifuges can be more effective at concentrating gold than other methods of gravity concentration but are generally more expensive.

Magnets

Magnets can be used to remove magnetic minerals such as magnetite from concentrate.
They can be used after or in conjunction with other method of concentration.
One technique for extracting magnetic minerals is to place handheld magnets on the bottom of a pan containing dried concentrate to separate metallic from non-metallic material.
Care must be taken to avoid losing gold particles during the separation.
It can be helpful to cover the magnet with a piece of paper.
After magnetic minerals are attracted to the surface of the paper, it is removed to easily discard the metallic material.
Flotation

- Flotation is usually used by large scale miners but can also be applied in small scale operations.
- It is a process that works best for processing complex ore types, especially those that are difficult to process using gravity methods.
- Crushed ore, water is added into a flotation machine.
- A tube releases air into the tank of the machine and an agitator creates air bubbles at the bottom of the tank.
- Minerals that are hydrophilic, such as gold, attach to the bubbles’ surface and are brought up to the top of the tank.
- Other minerals fall to the bottom of the tank and are discarded as tailings.
- Bubbles containing gold and other hydrophilic minerals accumulate at the top of the water level as froth.
- This froth is then scraped off to create a concentrate of gold and other hydrophilic minerals.
- Flotation creates high quality concentrates and is good at capturing fine gold. Flotation usually requires a substantial amount of capital investment.
- There are a variety of possible frothing agents.
- Depending on the chemical, specific precautions must be taken when employing the method to protect human health, and waste materials must be disposed of appropriately.

Direct Smelting

- Is employed as the final stage of gold recovery.
- High-grade concentrate is heated until the gold melts.
- The liquid is then cooled to form a solid mass of gold ore, a semi pure gold alloy, that can reach upwards of 95% purity.
- To perform direct smelting, processing shop employs a crucible, a high temperature bowl designed for smelting.
- Gold concentrate is combined with a flux, such as borax or other materials of mixtures, in the crucible.
- The flux acts to decrease the melting temperature and viscosity of non-gold minerals in the concentrate so they are more easily separated from the gold during the cooling process.
- Small amounts of concentrates, usually around 50 to 100 grams, are used in direct smelting.
- Concentrate and flux are heated in the crucible to the temperature at which gold melts, 1065°C.
- A blow torch to generate heat is used.
- After this temperature is maintained for some time the material in the crucible melts and can then be poured out of the crucible to cool and harden into gold ore.

Chemical Leaching

- Chemical leaching makes use of the chemical properties of gold to leach it from ore, concentrate, or tailings.
- This process is mostly used in large scale mining operations but has been increasingly adopted in small scale mining because of its high gold recovery rate and low cost.
- The best practices for chemical leaching are a combination of pre-concentration and mill leaching, as they lead to the least amount of waste, a short processing time for miners, and high gold recoveries.
- First, concentration is done through gravity techniques.
- Then the concentrate is simultaneously milled and leached.
- When chemical leaching is employed, it is important for miners to handle the chemicals properly and ensure that they are properly used and stored to avoid health and environmental concerns.
• Cyanide is often the preferred chemical used in leaching.

**N/B:** Cyanide is highly toxic and great care must be taken when using it. However, in contrast to mercury, cyanide is does not persist in the environment. Cyanide leaching must not be used on tailings where mercury is present, as soluble mercury-cyanide complexes will form, mobilizing mercury to great distances.

**Task: (Small group activity)**
- Ask participants to discuss the mercury free technologies of which they are aware. How did they come to know about them? Can they access them? If not, what prevents them from accessing these technologies?

**Gold Transportation**

Transportation in gold mining is a very important process. Most miners require good means of transporting them as well as ore materials which has been mined by either surface or underground mining methods.

- **Haulage of mined materials**- In ASM, Shovels, wheelbarrows, Truck, rail, LHD, small Belt conveyor, Shuttle cars, cocopans are used.
- **Hoisting Equipment**; Used in transporting the extracted rock materials from the mines to the run of mine stockpiles. Single drum hoist is the commonly used transportation equipment in artisanal and small-scale mining. Most miners in ASM prefer single drum hoist to conveyor belts since conveyor belts are capital intensive to acquire.
Module Objectives

By the end of this module, the participants should be able to:

- Understand the effects of mercury exposure.
- Be aware of the signs and symptoms of mercury poisoning
- Understand the hazards in the ASGM mines and protective equipment that miners can use on site
- Understand the importance of occupational health, welfare, and hygiene
- Understand the impacts of ASGM on the environment
UNIT 8: OCCUPATIONAL HEALTH AND SAFETY

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Understand the various hazards in the ASGM Mines
- Incorporate safety into their mining operations
- Have knowledge on the immediate measures to take in case of accidents in the mining sites
- Identify the appropriate Personal Protective Equipment required
- Improve productivity through safe mining

Convention on Safety and Health in Mines

The International Labor Organization’s Convention on Safety and Health in Mines, 1995 (No. 176) covered all mines. It provided a floor, which was the minimum safety requirement against which all changes to mine operations could be measured. This convention was accompanied by a recommendation (No. 183) which is purely advisory and provides more specific guidance on the different sections of the convention.

The Convention sets out procedures for reporting and investigating accidents and dangerous occurrences in mines. Governments that ratify it undertake to adopt legislation for its implementation, including the designation of the competent authority to monitor and regulate the various aspects of safety and health in mines.

Hazards in ASGM Mines

In ASGM mines, airborne contaminants such as ore dust and mercury fumes, excessive noise generated by ball mills, vibrations, heat and ergonomic problems can create a lot of health risks for the miners, particularly those who are subject to frequent and prolonged exposure to them. Let’s take a look at some of these health hazards:

Dust and Fumes

Dust

In mines, dust mainly originates from crushed ores, blasting and strong winds. Miners exposed to excessive dust for prolonged periods may suffer from permanent lung diseases. The escape of dust into the atmosphere should be prevented as much as possible.

How can we reduce the effects of dust?

Miners exposed to excessive dust concentrations around shafts and crushers more so, should always use personal protective equipment, such as dust masks to prevent from being inhaled.
Fumes

Fumes produced during blasting or burning of the amalgam contain toxic gases such as sulphur dioxide, nitrous oxide or nitric oxide. When these fumes are inhaled, they can lead to serious health damage. Miners should not enter a shaft after blasting until the dust and gaseous products of the blast have completely dissipated.

The exhaust from diesel or petrol engines and generators also release harmful fumes. Frequent and prolonged exposure to such fumes can cause respiratory illnesses.

Noise

Repeated or prolonged exposure to excessive noise levels will lead to hearing impairment.

Potential sources of noise emissions include compressors, drilling machines, pick-hammers, crushers, ball mills or other mechanical equipment used at a mine.

Wherever possible, such noise sources should be muffled with an effective acoustic absorbing material so as to reduce noise emissions to tolerable levels. Increasing the distance between the noise source and the listener is often a practical method of noise control. Where such noise control measures are not possible, comfortable and practical personal hearing protection devices, such as approved ear plugs or earmuffs, should be worn by every person exposed to noise levels exceeding ninety dBA.

Heat

Miners should be informed of the nature of heat stress and its adverse effects, as well as of protective measures. They should be taught that heat tolerance is very dependent on drinking enough water (not merely satisfying thirst) and eating a balanced diet. Workers should also be taught the signs and symptoms of heat disorders (e.g., dizziness, faintness, breathlessness, palpitations, and extreme thirst).

Miners should have ready access to water or other appropriate drinks which encourage re-hydration. Carbonated drinks and drinks containing caffeine and heavy concentrations of sugar or salt should not be offered. Safe, potable water should be located within close to each worker or brought to the worker every hour. Clean cups should be provided, and water containers should be shaded or cooled to 15-20°C.

**What is the difference between dust masks and surgical masks?**

Dust masks are designed to give protection from airborne particulates present in the air in either solid, liquid or gas forms. These could be dust particles, smoke fumes or droplets. Surgical masks, on the other hand, are designed to catch any nasal discharge of the wearer and prevent it from spreading to other people.

N/B:

Simple dust masks do not protect against toxic gases which are present in after blast fumes or in diesel and exhaust fumes.

This is a table with a fixed layout.
Ergonomics

Many aspects of mining work carry risk of injury to the upper and lower limbs or spine, either because of the manual handling tasks involved or because of awkward postures. Basic ergonomic requirements should be considered, including workplace layout, design of equipment and tools, working techniques, working time and rest patterns.

Patterns of movement

• Avoid crooked or twisted positions.
• Aim for rhythmical movements but avoid monotonous ones.
• Horizontal movements are easier to control than vertical ones.
• Avoid reaching out any further than necessary.
• Try to keep movements symmetrical when working with both hands.

Using strength

• Dynamic actions are preferable to static ones.
• Find a movement in which there is sufficient strength to carry out a task or redesign the task.
• For each system of joints, bones, muscles and tendons, there is a range of movements which can be carried out most efficiently. Tasks should use this range of movements.
• The heavier the load that is carried in front of the body, the closer it should be to the body.

How can we reduce heat stress?

Modified work practices can reduce the likelihood of heat stress — e.g., by reducing individual workload through the provision of tools or task-sharing, or by scheduling appropriate breaks.

What are the main causes of injury?

The main causes of injury are heavy loads, awkward working positions, repetition, working under pressure.
Occupational Health, Welfare and Hygiene for Miners

Site managers, CBOs and Cooperatives should strive to provide and ensure appropriate healthcare, welfare and hygiene of ASGM miners.

Healthcare

The health of miners should be checked by a competent physician before being assigned to work in a mine for the first time. Periodic health examinations should also be arranged, especially for workers in places where the material handled, or the process could be hazardous to health.

As mercury use is being phased out, miners who have been using it for panning and amalgamation, and gold dealers who burn the amalgam to remove mercury should go for periodical medical checkups to rule out or monitor any effects of exposure to mercury or mercury fumes.

A mineworker who is ill or in any way incapable of normal activity should not be allowed to work. Pregnant mothers, people with preexisting conditions, children and the aging should not be allowed to work in mines.

Mining imparts various health conditions to miners which in the absence of proper medical records, may result in cases of having people from a workstation being wrongly placed in locations that may further complicate their health or worsen any existing conditions. As such, to decide which department / section of work to deploy a miner, it is important to do a medical checkup to establish the health status of the miner before engaging them. In the event there is a medical condition, it can be diagnosed in time. Such reports can be done annually for all miners on site so that in case one is developing a condition, it can be monitored, and the person can be redesignated to a low-risk workplace or department.

Changing and Bathing facilities

Where possible, the mine owner should provide adequate facilities at the mine site for the changing, storage and washing of clothes and for bathing by miners. Water supplied for washing and bathing should be of sufficient purity and must not come from a sump that is part of the works, unless it has been suitably treated.

Wastewater should pass straight to a drainage system.

Landowners and landlords should build houses with access to adequate water and bathrooms for their tenants. Miners should avoid using water pumped out of flooded shafts for their household chores unless the water is stored and treated.

Sanitary facilities

The site management should ensure that surface mine works are equipped with latrines and urinals that are located and fitted out in such a way as not to spread odors. They should be installed so that they do not pollute the working environment — such as in inactive workings. Latrines and urinals should always be kept clean and disinfected. Other places than the latrines should not be used for such purposes.

Drinking Water

Miners should never drink mine water. An adequate supply of potable drinking water should be provided at all main work sites during working hours. If it is safe to drink from wells on site, they should be located
so that they will not be contaminated by wastewater from the mine (e.g., outside the mining area, higher than the mine drainage level). Drinking containers should be dust proof and kept closed when not in use. Drinking water should not be contaminated in any way.

**Areas for Food**

Food should not be stored or consumed in any area that is exposed to hazardous material, vapor or dust. Food should be stored and consumed in clean, sheltered places. Rest stations may be established for that purpose.

**Alcohol and Narcotics**

Alcoholic beverages and narcotics should not be permitted or used in or around mines. Persons appearing to be under the influence of alcohol or narcotics should not be allowed to work.

Mining imparts a health condition to workers albeit to varying degrees. In the absence of proper medical history, many cases people from a workstation have been wrongly placed in sensitive locations which complicate their lives and worsen their conditions. As such, to decide which department / section of work to deploy a staff, it is important to do a medical checkup to establish the health status of the workers they report. In case there is a condition, it can be established in time to avoid exposing them further in dangerous work environments and locations. Such reports can be done annually for all miners on site so that in case one is developing a condition, it can be monitored, and the person can be redesignated to a low-risk workplace or department.

**First Aid in ASGM Mines**

First aid saves lives. Miners and site management should be able to incidents and accidents and provide basic first aid and treatment to injured persons. Rapid first aid treatment can prevent further serious health damage or even loss of life to injured persons.

The site management should ensure that suitable, regularly replenished and properly maintained first-aid kits are provided at strategic locations where mining is done. These could be within the shafts, at shaft entry and exit points, processing spaces and site offices.

The first-aid kit should be easily accessible and ready for use at any time while any person is at work.

The minimum equipment required to ensure adequate first-aid treatment should include:

- a stretcher for transporting persons unable to walk;
- a blanket for persons in shock;
- sufficient bandages and sterile dressings for open wounds on limbs, body and head;
- splints for fractures of limbs;
- disinfectants;
- any other first-aid material that may be required due to the nature of work and recommended by a competent physician.
Every effort should be made to ensure that at least one or two miners are trained in first-aid applications (the mining authority should provide first-aid training) who should be on site while mining activity is carried out.

**Actions to take following a mining accident**

At any mine where there has been an accident, the necessary measures should be immediately taken to:

- Remove injured mineworkers to a safe place for first-aid treatment.
- Eliminate further danger arising from the event.

Any worker involved in rescue operations should take reasonable care for the safety and health of himself or herself and not endanger themselves by rash action where there are unknown risks. No person should be allowed to enter the area where there has been an accident, except when it has been made safe and express permission is given by a competent person.

Every injury to a miner, however small, should be reported to the person in charge of first aid at the mine for checking up and treatment before the injured person returns to work or leaves the mine. Arrangements should be made for transporting injured or sick persons to a hospital or other suitable medical facility, for example through cooperation between mine sites in close proximity.
**Occupational Safety**

**Personal Protective Equipment (PPE)**

Site management should provide and where feasible, free of charge, the PPEs that are to be worn when any hazard cannot be eliminated. In addition, they should ensure that the PPEs should be worn properly and maintained in good condition.

Different processes in the ASGM practice require different PPEs as shown in the figure below:

![Figure 23: Different essential PPEs for ASGM Practice](image)

This minimum standard protection should be worn at all times in and around the mines, more so for shaft workers.
Safety when mining

Posting of warning signs or barriers

ASGM mines often consist of deep vertical shafts. There is always a high risk that a miner or member of the public may fall in. Such shafts should be surrounded by a secure fence or a secured barricade. Suitable warning signs to forbid unauthorized entry and subsequent fall of any person should be posted.

Ground conditions or any other dangerous condition in the mine that creates a hazard to persons should be corrected before other work or travel is permitted in the affected area. Until corrective work is completed a warning sign against entry should be posted. When left unattended, a barrier should be installed to prevent unauthorized entry.

Pathways and Safe means of access to mines

Miners often have to use difficult terrain to travel to and from their workplaces within the mine (e.g., climbing or walking along steep pit walls and excavations where there may be a danger of slipping or falling, a slide of material, rock fall, etc.). To reduce these hazards, the stability of any pit wall, bench or slope where persons normally travel to and from their assigned workplaces should be regularly examined and properly maintained. Each place in the mine where any person normally works should be provided with appropriate pathways.

Any access exceeding an inclination of 50 degrees from the horizontal should be provided with fixed stairs or a ladder.

Shaft Ventilation

Any shaft or adit being driven into the face for exploration, drainage or any other purpose should be securely supported as ground conditions warrant. Where such underground adits exceed a length of six meters, arrangements should be made to ensure an adequate supply of fresh air, either by artificial or natural ventilation.

Inadequate ventilation in underground workings may result in a lack of oxygen and high levels of carbon dioxide. Thus, the atmosphere therein should be regularly checked for oxygen and carbon dioxide concentrations. The levels of oxygen should not fall below 19.5%; the level of carbon dioxide should not exceed 0.5%.

Mine Drainage

Most underground shafts encounter strong ground water inflow more so during the rainy season. Whenever possible, surface water should be prevented from entering the shafts by digging ditches to trap the water and conduct it away from the shaft.

Explosives and Blasting

Blasting operations should not take place without the approval of the mining authority.

Only explosives and detonators approved by the mining authority and provided by the mine operator should be used at a mine. Only persons who are trained, certified and experienced in the handling and use of explosive material should direct blasting operations and related activities. The operator of every mine at
which explosives are used should provide the equipment and materials necessary to enable blasting operations to be carried out safely.

Unsafe mining practices can also result in the following:

- Loss in production time as operations are suspended (due to investigation time and rehabilitation)
- Medical Bills for the Injured
- Funeral Expenses
- Loss of Equipment, requiring new equipment to be bought.
UNIT 9: DISASTER RISK MANAGEMENT AND EMERGENCY PREPAREDNESS

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have knowledge on the safe production in terms of standards, procedures, and programs, communication, and compliance
- Understand how the miners can protect themselves from danger while working in the mines
- Understand the response protocols to mining accidents
- Identify the role of relevant stakeholders in Disaster Risk Management and Emergency Preparedness

Introduction

Disaster Risk according to the United Nations Office for Disaster Risk Reduction is the potential loss of life, injury or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time. ASGM activities comprises of a number of hazards as discussed in the previous units which in a big way, contribute to disaster risk within the mines.

Disaster risk management comprises the whole systematic and conceptual framework of measures that are closely linked to each other and that are taken before a natural hazard occurs with the aim of limiting or avoiding adverse impacts of a natural event on society. For ASGM activities, the central aim of Disaster Risk Management is the reduction of the disaster risk for the miners as they work within the mines.

The Hazards discussed in the previous chapter comprise the Disaster Risks that face miners.

Recap:

Some of the Hazards discussed include:

- Exposure to Poisonous Gases within the Shafts
- Collapsing of Shafts
- Flooding in Shafts
- Exposure to dust and fumes
- Exposure to Mercury
- Noise
- Heat
- Ergonomics.

For an effective Disaster Risk Management and Emergency response strategy, ASGM miners will have to adopt a safe production model to ensure safety for all miners. They will also have to establish a clear a clear and effective communication strategy to supplement the safe production model.
Safe Production Model

A safe production model includes standards, procedures, and programs; communication; and compliance, as shown below.

Standards Procedures and Programs

Every workplace must have properly laid out safe working steps for each task conducted. Each employee must be familiar with his or her roles and responsibilities in relation to standards, procedures, and safety programs in the workplace. This typically requires:

Workplace Standards and Procedures

Every site should develop, communicate, implement, maintain, and constantly update suitable arrangements for managing occupational health and safety. The arrangements can be put into documented procedures on how to safely carry out every task at work. Generic standards can be adopted at an organizational level and should therefore adhere to the minimum standards predefined by Kenya's legal and statutory instruments on safe mining practices. Job-specific standards should be adhered to at operational level (i.e., when the actual job is carried out).
Ongoing, Comprehensive Training Programs

All miners must be trained to ensure a competent work force. Modular programs can be effective to avoid overloading trainees by covering everything at once.

Emergency Preparedness Measures

All sites should establish and maintain emergency response capabilities, which will minimize loss from unexpected events.

An Internal Responsibility System

This is a system to advise the entire workforce that safety is everybody’s responsibility and that ‘safety starts with me’. It defines responsibilities such as:

- Stop and correct (if a worker finds a substandard or unsafe condition, he or she should stop whatever he or she is doing and correct it immediately).
- Safely perform assigned duties.
- Use safety equipment as directed.
- Correct or report unsafe conditions.
- Report incidents regardless of severity; they could potentially result in an injury and/or equipment damage.
- Work in a manner that will not endanger yourself or others.
- Advise others of known unsafe conditions or work practices.
- Be aware of and follow all applicable legislation and safe work procedures.

Accident/incident investigation

This is carried out to determine why an accident or incident occurred, so that appropriate preventative action(s) can be implemented to reduce the likelihood of recurrence.

Five-point safety system:

This is a system that assists workers to perform work safely, without exposing themselves to unnecessary risks. The five-point safety system is a step-by-step approach to eliminating hazards and fostering a commitment to safety. It assists workers to perform work safely, without exposing themselves to unnecessary risks. This is a standard system used throughout the world and is applicable to both large-scale and small-scale mines. It was introduced by Neil George in 1942 and is also known as the Quebec System.
What are the five points?

1. **Check the entrance to the place of work.**
   Applying this to security officers/supervisors/management outside of Mining: As part of their rounds, security officers should be checking the entrance to their workplace as they arrive and do their rounds throughout their shift. Is it slippery? Too much snow? Damaged Concrete/Cobble Stones creating a trip hazard?

2. **Are working place and equipment in good order?**
   Is the gear in good order? Are the PPEs in good condition? Are the generator, ball mills, crushers, compressors and any other machine in good condition and working as expected? Is oxygen supply sufficient within the shafts?

3. **Are people working properly?**
   Are the miners working to standard and within their roles in the mining site? Are machines and equipment being used properly? Are the miners wearing the correct PPEs? Are the supervisors actually looking for hazards as they do their patrols? Are the miners behaving in a manner which poses risk to the client/their co-workers?

4. **Do an act of safety.**
   This can be as simple as housekeeping, airing up the tires on the vehicle, wearing the proper PPE, and practicing good communication. Or it can be something like stopping a co-worker and having them do a 5x5 before they do something.

5. **Can, and will, people continue to work properly?**

If a worker finds a substandard or unsafe condition, he or she must correct it immediately (stop and correct). A five-point safety system board/poster should be posted at the entrance of every shaft and at every waiting place to ensure that workers are reminded all the time. All danger warning signs must be posted in appropriate places and must be visible to all.

**Personal protective equipment (PPE)**

PPE requirements should be identified and communicated, and the best products available to reduce exposure to hazards that cannot be engineered out of the workplace should be provided.

**How can miners be protected against danger?**

- Removing the danger (e.g., cleaning up oil spills, barring down any bad hangings)
- Separating the danger and the person (e.g., barricading disused open pits, placing of barricades)
- Shielding the danger from the person (e.g., using safety equipment)
- Shielding the person from the danger (e.g., wearing safety clothing)
- Influencing the behavior of the worker (e.g., using warning signs)
Communication

Thorough and effective communication is critical to safe production. It includes use of safety talks (given by any team member during briefings at the beginning of every shift, prior to embarking on any work) or safety slogans, as well as posters. Display of safety signage at strategic positions. During safety talks, all workers who have reported for duty should, discuss safety topics, which may include a review of any previous accidents/incidents, specific hazards, work practices or legislative requirements. The topic for discussion ideally is selected by a designated Safety, Health, and Environment Representative; however, anyone present from the team can choose the topic for discussion for the day. This provides an opportunity to encourage safe work habits and raise safety awareness. Workers may come up with a safety slogan as a way of promoting safety consciousness among themselves.

Communication does not have to be verbal. It can also include:
- Lights
- Signage
- Barricades
- Whistles
- Bells
- Guards
- Flags (red flag/white flag)

Emergency Response

Mining Accidents

What is an accident? and What is an Incident?

An accident is any unplanned event that results in any of the following:
- Injury or ill health of people
- Damage to or loss of property, plant, materials, or the environment
- Loss of a business opportunity

Incidents, on the other hand, are the ‘near misses’ that could have resulted in these things.

Mining accident means any occupational injury to any person as a result of mining work within the area of mining activity, for which medical treatment is administered or which results in loss of consciousness or death. Common accidents in ASGM mines include:
- Rockfalls
- Gassing
- Shaft accidents
- Accidental detonation of explosives
- Flooding
- Falling
These and other accidents are avoidable.

Task
Ask participants what they think are the most common types of accidents and the most effective ways to prevent them.

Response to Mining Accidents and Dangerous Occurrences

At any mine where an accident or dangerous occurrence takes place, the mine operator should ensure that:

- The necessary steps are taken to evacuate and treat injured mineworkers and immediate action is taken to prevent further danger arising from the event.
- An investigation into the cause of the mining accident or dangerous occurrence is carried out and preventive action is taken to avoid similar events in the future.
- The result of the investigation is recorded in a book provided for that purpose and the mining authority is notified about the event.

After a mining accident or dangerous occurrence, the mining authority should assist the mine to ensure that improved practice will prevent it from happening again.

Role of other Stakeholders in Disaster Risk Management and Emergency Preparedness

ASGM miners may not be in a position to ensure Disaster Risk and Emergency preparedness on their own. For such systems to be effective, support is needed from various external stakeholders. We look at some of the various stakeholders below:

ASGM Communities

The surrounding ASGM households form part of the greater ASGM community. These communities are the most vulnerable to the hazards at the mines. Their input to disaster management designs and their ability to respond ultimately determine the extent of risk associated with ASGM mines.

The Key issues in context with the ASGM communities are as follows:

- The vulnerable communities need to be aware of hazards and potential negative impacts to which they are exposed and be able to take specific actions to minimize the threat of loss or damage.
- The most essential determinant of the selection of the disasters on which system should focus is the key ASGM chain functions of the miners and their communities.
- For example, while the miners within the shafts need to be educated and prepared for the possibility of a fall of ground or flooding, the miners in processing can be educated to respond to an early warning system for landslides or external flooding.
County Governments

The county governments need to have considerable knowledge of the hazards to which ASGM communities are exposed. Thus, the county governments must be actively involved in the design and maintenance of disaster risk management and emergency preparedness systems. They should also have capacity to instruct or engage the local population in a manner that increases their safety and reduces the potential loss of resources on which the community depends.

For emergencies such as FOG, the County governments should ensure, through their health ministries or directorates that there are ambulances and excavators on standby at all times to ensure swift and timely extraction of trapped miners in the event there is an FOG or any other accident within the mines.

The National Government

The National Government is responsible for policies and frameworks that facilitate early warning. They are also responsible for the technical systems necessary for the preparation and issuance of timely and effective hazard warnings for the country. The key issues with national governments are:

- The national government should ensure that warnings and related responses are directed towards the most vulnerable populations, in this case, the ASGM miners through the design of holistic disaster response and early warning frameworks that address the specific needs of the related micro- and macro-level actors.
- The provision of support to local communities and local governments to develop operational capabilities is an essential function to translate early warning knowledge into risk reduction practices.

Regional Institutions and Organizations

These should provide specialized knowledge and advice in support of national efforts to develop or sustain the operational capabilities of ASGM Miners.

International bodies

International bodies should provide support for national early warning activities and foster the exchange of data and knowledge between individual countries. Support may include the provision of advisory information, technical assistance, and policy and organizational support necessary to ensure the development and operational capabilities of national authorities or agencies responsible for early warning practice.

Non-governmental organizations (NGOs)

NGOs play a critical role in raising awareness among individuals and organizations involved in early warning and in the implementation of early warning systems, particularly at the community level. In addition, they play an important advocacy role to help ensure that early warning stays on the agenda of government policy makers.
The Media

The Media plays an important role in improving the disaster consciousness of the general population and in disseminating early warnings. The media can be the critical link between the agency providing the warning and the general public.

The Scientific Community

The Scientific Community has a critical role in providing specialized scientific and technical input to assist governments and communities in developing early warning systems. Their expertise is critical to analyzing the risks communities face from natural hazards, supporting the design of scientific and systematic monitoring and warning services, fostering data exchange, translating scientific or technical information into comprehensible messages, and disseminating understandable warnings to those at risk.

Task: (Small group activity)

Ask participants to discuss in detail the roles of each of the above-mentioned stakeholders in Disaster Risk and Emergency preparedness.

- Are they playing their roles as expected?
- Is there room for improvement? If so, how can the mentioned stakeholders improve?


UNIT 10: ASGM AND THE ENVIRONMENT

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Understand the importance of protecting the environment and preventing pollution
- Conserve and recycle water
- Have knowledge on the measures to reduce mining impact on the environment
- Understand and adopt the Environmental Management Plan

Introduction

Usually, artisanal miners do not make a deliberate effort to protect the environment. Their goal is just to extract the mineral. Visits to ASM mining sites reveal serious land degradation to an extent that lives are lost when people fall into open pits and shafts left after mining. In places where mining of alluvial gold or rubble is done, bare and rocky ground is usually left, which does not support revegetation. Mercury release into the environment is still a concern, though financially able miners now use other gravity separation methods like the germini table. More miners, especially at milling sites, have adopted the use of retorts during mercury amalgamation.

Virtually all stages of mining pose significant risks to the environment and disturb the aesthetic appeal of Kenya’s landscape, flora, and fauna ecosystems. Mining can be sustainably carried out if deliberate practices and systems are put in place to ensure proper environmental management during mining. Such practices include rehabilitating disused mines, reducing the release of mercury into the environment, and using alternatives to mercury for gold processing. Such practices are encompassed in Environmental Management Plans (EMPs) during the operational phase and predetermined by means of an Environmental Impact Assessment (EIA). In this chapter, we will outline the effects of ASM on the various facets of the environment.

Water

ASGM operations can harm the environment by polluting the surface water sources surrounding them. Miners tend to divert surface water and install boreholes to pump groundwater towards water-demanding mining and milling processes. This lowers the quantity and/or quality of water available downstream for terrestrial flora and fauna, aquatic plants, macroorganisms, and microorganisms, as well as depriving other industrial and municipal water users. Mining releases contaminated water into water bodies, thereby increasing the water turbidity and harming water-bound microorganisms that thrive on light (phytoplankton).

Measures to Conserve Water

Whenever new equipment is purchased, there is need to ensure its use promotes the water conservation. If the mine site is located within the municipal water reticulation system, it should ideally be set aside as backup water supply and the use thereof should be monitored on calibrated water meters installed at all points of municipal water inflow. Closed water systems, whereby effluent water is drained, collected, and reused or recycled, reduce demand for fresh water and minimize resultant pollution and should be
constructed. This entails that all processes demanding water operate on recycled or processed water. As a result, surface and underground protection mechanisms should be developed to prevent and minimize any surface and groundwater pollution. All drainage channels in the closed system must be free of any blockages to prevent and minimize restrictions to water flow. This limits water being lost through evaporation and seepage. Miners should proactively deal with any observed faults to the water reticulation system, which might result in any water spillage or leaks. All employees on site should be made aware of this kind of conservation program.

**Land and Biodiversity**

To varying extents, almost every stage of the mining cycle damages the environment. During the mineral exploration phase, land should be cleared, and topsoil removed as the drill rigs maneuver to the potential mine sites, where initial work is used to gather data that defines the extents and qualities of the orebody. Similarly, to define eluvial mineral deposits, massive pitting and trenching exercises leave deep excavations that not only scar the landscape but also pose a threat to humans and animals. Mining indisputably has dire effects on biodiversity, as removal of vegetation negatively impacts the natural ecosystem if not managed well.
Effects of mining on the landscape and Biodiversity

Removal of overburden as the minerals are being evaluated and exploited results in the following impacts on the landscape and biodiversity.

Siltation

Mining results in topsoil loosening and ultimately leads to soil erosion. The loose soil, if washed by run-off, leads to siltation of rivers and subsequently water supply is decreased.

Loss of vegetation

Deforestation is inevitable in mining but varies in intensity depending on the scale of operation with extreme cases leading to desertification. Where mining is prevalent, the vegetative canopy is barely- to non-existent due to the removal of the nutrient-rich topsoil. In ASM communities where there is an overlap in land use between mining and farming, a comparatively significant reduction in crop yield has been the next stage will be the process of extracting the noted following excavation. Reduction in crop yields is so because most plants but grasses cannot thrive well in heavy metal rich soils.

Ground subsidence

As mineral-rich rocks are extracted from underground for further beneficiation on the surface, huge excavations remain underground. These excavations result in rock strain due to differential rock stresses. A common result of this deformation is the creation of sinkholes and, in even worse cases, ground subsidence causing loss of lives and infrastructure.

Biodiversity losses

Mining results in the emission of heavy metals that can directly or indirectly poison biodiversity. Anthropogenic emissions of mercury unfortunately have a bio accumulative effect on humans and biodiversity, meaning that they build up and continue accumulating over time. Mercury is easily transported in any water released from mining into the soil and water bodies, and therefore easily moves across the food chain as illustrated below. The natural ecology is affected by mining as the pH of soil and water are altered by chemicals released from mining and this leads to the extinction of endemic species of vegetation, animals, and microorganisms in soil and water that required the original environmental conditions. Those that are not killed by the new environment migrate to new ecosystems that are free from contamination. With proper chemical management, some vegetation can survive on the rocky surfaces which characterize mine sites, as nutrient-deficient and heavy metal-rich boulders are laid bare on the earth’s surface.

Measures to reduce mining impact on land and biodiversity

Mineral exploitation is finite—and therefore temporary—land use activity (although some mines can have very long lives), and each operation should close at some point in the future. Restoration of the ecology to its normal state post-mine closure, or as mining continues, therefore calls for appropriate environmental protection through mine reclamation. This is usually achieved through environmental rehabilitation.

Rehabilitation aims to reinstate ecosystem functionality and land productivity, although it will probably assume a different land-use and species composition from the original ecosystem. This may comprise planting of vegetation (trees and shrubs) as well as re-introducing animals that used to occupy the area
before mining commenced. Environmental rehabilitation is also a legal requirement of the Environmental Management Act and is enshrined in best practices and international standards, such as the ISO 14001 series. Any mine that follows these international standards has a competitive advantage and is likely to attract investors due to its progressive code of conduct.

Mine closure generally occurs when the resource is depleted or when the cost of production exceeds returns. Closure, therefore, provides opportunities for land disturbed by mining to be rehabilitated to one or more sustainable function. Successful rehabilitation requires a continuous improvement focus, based on site-specific knowledge, research, and monitoring. Opportunities and threats should be identified as early as the EIA stage so that mining operations do not reduce rehabilitation options. Baseline environmental and social assessments, usually conducted as part of the EIA for mining projects, provide information that will be used during the monitoring of rehabilitation efforts. This information may include data on vegetation cover, soil quality, and water quality.

**Surface roughness**

Surface roughness is an important consideration in mine site rehabilitation. Roughness tends to trap water and seed, and it is generally accepted that a rough surface will provide better vegetation establishment than a smooth one. Rehabilitated areas should be ripped to remove compaction from heavy machinery, encourage infiltration of water. Once areas have been graded and contoured, each area should be ripped to provide a rough and furrowed surface to hold seed and moisture. Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This will avoid stockpiling and double handling of the soil. Topsoil containing viable seed, nutrients and microbes should be placed directly onto the rehabilitation area, allowing it to re-vegetate more rapidly than topsoil that has been in stockpile for long periods. Topsoil is often the most important factor in successful rehabilitation, particularly where the objective is to rehabilitate the natural ecosystem.

**Self-sustainability**

The initial revegetation effort must establish the building blocks for a self-sustaining system, so that successional processes lead to the desired vegetation complex. Seeds should be collected from indigenous plants that are present around the project site. These should be used immediately or stored appropriately and used at the start of the wet season. They should be broadcast onto the soil and applied in conjunction with measures to improve seedling survival, such as scarification of the soil surface or simultaneous application of mulch. A combination of ground cover, shrubs, and tree species should be used. It is usually more economical to establish plants by direct seeding than by planting seedlings.

**Fauna**

Animals will usually colonize rehabilitated areas if the composition and structure of the rehabilitated vegetation are similar to surrounding areas. This is achieved by conserving and re-using vegetation by chipping or re-spread as mulch or branches to provide shelter for small invertebrates and reptiles, erosion protection and nutrients. It is also important because it provides shelter and breeding habitat for many bird and mammal species.
Rehabilitation monitoring

Monitoring and evaluation are essential to better understand and guide rehabilitation practices. Without the progressive evaluation of rehabilitation efforts, there is the risk of reducing the effectiveness and credibility of the mine rehabilitation plan. Monitoring approaches commonly used in the rehabilitation context include tracking water content and quality, soil surface stability and erosion, the hydrology of waste rock dumps and tailings ponds, air quality and gas emissions, the development of vegetation, colonization by fauna, and the extent to which rehabilitation and final land use objectives are being met.

Typically, there are two strategies used to evaluate the progress of rehabilitation work:

- Direct comparison with adjacent sites.
- Attribute analysis comparing baseline data from the initial assessments with the current situation.

Reporting of monitoring results to regulators and other stakeholders such as EMA on a quarterly basis is part of the EIA compliance requirements.

Air

Mining activities and mining support companies discharge particulate matter into the ambient air. Grievances of affected communities have included airborne particulate matter, emissions of black smoke, noise, and vibration. Airborne particulates of major concern within small-scale gold mining include respirable dust, Sulphur dioxide, nitrogen dioxide, carbon monoxide, and black smoke. This particulate matter is produced by site clearance and road construction, open-pit drilling and blasting, loading and haulage, vehicular movement, ore and waste rock handling, as well as heap leach crushing by companies during heap leach processing.

All fine dust at a high level of exposure has the potential to cause respiratory diseases and disorders and can exacerbate the condition of people with asthma and arthritis. Occupational exposure to respirable crystalline silica causes silicosis and lung cancer, chronic renal disease, and autoimmune diseases such as rheumatoid arthritis. Crystalline silica has been classified as carcinogenic to humans. Dust from gold mining operations has high silica content. Crystalline silica in the form of quartz is the most common component of soil, sand, and rocks. Exposures to respirable crystalline silica from large-scale gold mining operations have been documented in the past. Crystalline silica dust is released into the air when miners drill, transport, and crush ore in the effort to extract and process minerals. While some attention is paid to reducing crystalline silica exposures in some large-scale mines in developing countries, ASGM is generally unregulated or illegal and conducted without regard to health and safety considerations.

Environmental Management Plan

Environmental protection refers to any activity to maintain or restore the quality of the environment through preventing the emission of pollutants or reducing the presence of polluting substances in the environment. It may consist of:

- Changes in characteristics of goods and services
- Changes in resource consumption patterns
• Changes in production techniques
• Treatment or disposal of residuals in separate environmental protection facilities
• Recycling
• Prevention of degradation of the landscape and ecosystems

Environmental protection relies on three basic principles:

1. Preserve the existing natural environment
2. Conserve natural resources
3. Where possible, repair damage and reverse trends

In preparing EMPs to develop a mining site, the aim should be to minimize pollution and other adverse effects on the local and natural environment. The EMP emphasizes the need to rectify negative environmental impacts through rehabilitation and restoration of the affected environment and should therefore focus on areas with the least environmental or amenity value for the siting of works. This is usually done during the EIA process. In accordance with the Environmental Management and Coordination Act (EMCA) (2012), mining activities require an EIA to be conducted by environmental consultants.

**Environmental Impact Assessment**

The EIA is a systematic process to identify, predict and evaluate the environmental effects of proposed projects to aid decision making regarding the significant environmental consequences of projects, developments and programmes. The EIA helps with the identification of all the environmental, social and economic impacts of a proposed development before a decision is taken on whether or not to proceed. Particular attention is given in EIA practice to preventing, mitigating and offsetting the significant adverse effects of proposed undertakings.

**Task: (Small group activity)**

Ask participants to discuss the roles and responsibilities of the following stakeholders in ensuring the environment is conserved:

- Miners
- Landowners
- National Environment Management Authority (NEMA)

**Cessation of Mining/Mine Closure**

No small-scale surface mine or mine site should be abandoned without any rehabilitation. Nor should it be left in a condition that could lead potential hazards to the public or damage to the environment. The mining authority should ensure that its requirements for abandonment are met.

Every mine operator should ensure that the necessary steps are taken to meet the requirements of the mining authority to prevent any danger arising from abandoned mine sites, either by progressive
rehabilitation during ongoing mining operations or after the completion of mining activities. Rehabilitation measures should include, but not be limited to:

• Removal of any harmful or toxic substances, machinery, mine structure and any other left-over material likely to be harmful to persons or nature.

• Refilling and levelling of deep excavations or holes that may create a danger of fall to persons. Where this is not possible, such danger areas should be provided with secure fencing or otherwise barricaded.

• Re-contouring (e.g., by trimming slopes to a safe angle), stabilizing (e.g., by revegetation) of potentially unstable faces, pit walls, benches or waste dumps to reduce erosion or potential slope failure.
Module Objectives

By the end of this module, the learners should be able to:

- Have a basic understanding of the Mining Act, Mining and Minerals Policy 2016, and EMCA
- Understand the different licenses and permits existing under each type of ASGM operation
- Understand the Institutional Framework in ASGM
UNIT 11: MINING ACT 2016

Objectives of the unit:
By the end of this unit, the participants should be able to:

- Have basic information on the Mining Act, its benefits, and the key defining features
- Have knowledge on the requirements for obtaining a mining license/permit

Introduction

The Government of Kenya has recognized the potential that exists and has directed efforts to improve mineral exploitation by establishing a ministry dedicated to the development of the mining sector. The Mining Act 2016 establishes a state mining corporation to undertake commercial activities on behalf of government.

The law also recognizes artisanal and small-scale mining operations and stipulates clear processes for establishing safe operations, a clear departure from the previous legislation which also outlawed artisanal mining. Artisanal mining is defined under Section 4 of the Act, as traditional and customary mining operations using traditional and customary ways and means. These changes provide an important platform that allows communities to undertake mining activities in safer environments while allowing them greater opportunity to benefit from minerals within their lands.

The Cabinet Secretary is tasked with establishing offices in the Counties headed by a representative of the Director of Mines. This representative shall have the function of granting, renewing and revoking artisanal mining permits amongst other duties. An Artisan Mining Committee shall also be established in every County. This Committee shall be tasked with advising the representative of the Director of Mines in the granting, renewal, or revocation of the artisanal mining permits.

All the minerals are held in trust for the people of Kenya by the National government, this is provided for under Article 62 of The Constitution of Kenya, 2010 (COK). This Article of the COK gives birth to Section 6 of the Mining Act, 2016 which provides that every mineral in its natural state in, under or upon land in Kenya; in or under a lake, river, stream, or water courses in Kenya; in the exclusive economic zone and an area covered by the territorial sea or continental shelf, is the property of the Republic and is vested in the national government in trust for the people of Kenya.

Reform in the mining sector

The Government of Kenya has recognized the potential that exists and has directed efforts to improve mineral exploitation by establishing a ministry dedicated to the development of the mining sector. The mandate of the Ministry of Mining (MoM) is centered on developing and implementing policies that will allow the country to benefit from its mineral wealth. The Mining Act represents the development of a modernized legislative framework which, for the first time, introduces a grid system to limit mineral rights disputes due to overlaps in licensed areas. There is additional clarity on the license and permit classes, procedures, as well as conditions.
Mineral rights in Kenya are granted either through licenses or permits as provided for under the Mining Act 2016 and the Mining (License and Permit) Regulations 2017. Part III of the Act (General Principles) specifies that a person cannot search for, prospect or mine any mineral, mineral deposit or tailings in Kenya without a valid permit or license. The Mining Act requires a range of mining industry information to be made available to the public, such as mining revenues paid to Government, production volumes of mining operations and copies of signed mineral agreements and their status.

The Act introduces the aspect of Community Development Agreements outlining how large-scale mining companies should work with communities. The question of environmental protection, which has in the past dominated many court cases relating to mining, has extensively been captured as part of the requirements for the grant of mineral rights. The structure of the Community Development Agreement is governed by the Mining (Community Development Agreement) Regulations, 2017. The Regulations provide a framework for regulating the way mining companies engage with communities likely to be impacted by their operations. The key defining features of these Regulations are:

- The outcome (the agreement) is arrived at through fair negotiation.
- Communities, or community representatives, are directly involved in the negotiations.
- The outcome is formalized in a written document, which is in effect a legal commitment binding on both parties.
- The agreement includes provisions that address broader development objectives, rather than being focused narrowly on financial compensation.

Guidelines on access to land for mining are stipulated under the Mining Act 2016,7 as well as the Land Act 2012 and Community Land Act 2016. Under the Act, mining operations may take place on private land, community land or public land in accordance with the relevant provisions on access to land. Section 36 of the Mining Act provides that the Cabinet Secretary shall not grant a mineral right which authorizes prospecting or mining operations on any land that has been restricted or excluded from mining by the Cabinet Secretary; or an area that is subject to an existing permit or license.

In all the above cases, the applicant must satisfy the requirements outlined in the Mining Act 2016 and the Mining (License and Permit) Regulations 2017, for the grant of a license or permit.

- An application for an artisanal mining permit should be submitted to the county representative of the Director of Mines, who shall accept or reject the application within 60 days from the date of application. The permit shall be issued digitally.
- Application for renewal of the artisanal mining permit should be done to the county representative of the Director of Mines, three months prior to the expiry of the permit. This application shall be accepted or rejected within 60 days from the date of application.
Benefits of the Mining Act 2016

• The Act recognizes artisanal and small-scale mining operations and stipulates clear processes for establishing safe operations, a clear departure from the previous legislation which also outlawed artisanal mining.

• The Act seeks to revive the mining industry and attract more foreign investment by defining the agreements for mineral exploitation.

• The Mining Act 2016 breaks the concentration of decision making in the office of the Minister under the previous legislation and spreads those powers to the Mineral Advisory Board which is charged with the responsibility of governing the sector including participating actively in license and permitting approvals in the ASGM sector.

• The Act requires, among other things, that mining operations consider the local community values as well as the conditions of community development.

• The Act introduced a grid system to limit mineral rights disputes due to overlaps in licensed areas; there is additional clarity on the license and permit classes, procedures, as well as conditions that would lead to revocations and suspensions.

• As lands, local communities most likely own the subject of mineral rights, requires that the consent of the local communities and their county governments be obtained before mineral operations are carried out on their land.

• The act has enabled reasonable fiscal provisions that promote equitable distribution of benefits among the miners in the sector-promotes the idea of equality before law.

• The Act addresses transparency and social protection through development of mechanisms that allow the miners a view into the mining operations.

• The act also supports the promotion of local content and community beneficiation in terms of employment and provision of services for the miners.

• There is clarity on which license or permit classes, and minerals are subject to royalty payments, and the types of fees due each.
UNIT 12: MINING AND MINERALS POLICY 2016

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have knowledge on the provisions in the Mining Act covering various mining regulations
- Have knowledge on the types of operations in the ASGM

Introduction

In April 2016, Ministry of Mining launched the Mining and Minerals Policy that sets out the framework for mining activity and underpins the new Mining Act, 2016. The Mining and Minerals Policy, Sessional Paper No. 7 of 2016 was informed by the lack of predictability and certainty hence low investment in the mining sector, thus necessitating the need for policy framework to provide a clear guidance for sustainable mineral resources development. The policy takes a comprehensive approach to the sector, ensuring that key issues related to sustainable exploitation of natural resources such as community engagement, environmental issues, and beneficiation from mining are addressed. The Policy comprehensively addresses the gaps that have existed in the mining sector and provides a basis for reviewing the sector’s almost obsolete legal framework and ad hoc regulations. It further aligns the country’s mining sector with the aspirations of Kenya Vision 2030, the provisions of the Constitution of Kenya (2010) and the African Union Mining Vision (2009) which aims at positioning mining as a key driver of Africa’s socio-economic development.

The development of this Policy was done in a consultative manner as required by the Constitution, involving all stakeholders right from the grass roots level. It also benefitted from inputs of key players, including the Kenya Chamber of Mines, mining companies, academic and research institutions, government ministries and departments, parliament, development partners, civil society, mining communities and the general public. The Policy provides a firm foundation and basis for establishment of an enabling framework for accelerated and sustainable development of the country’s mining and minerals resources sector. At the same time, it ensures that benefits from the growth of the sector accrue to all stakeholders, including investors, local artisanal and small-scale miners, national and county governments, local communities, and the people of Kenya.

County governments have a role under the new legislation and will be involved in the provision of consents for licensing operations and surface rights, promoting community engagement in mining operations and selection of the mining sector operators. The National Land Commission, a constitutional body in-charge of management of land in Kenya, also has a role in the licensing of mining operations especially where such operations involve the acquisition of land and resettlement of communities.

The Ministry in charge of mining retains responsibility for policy, a role it has already commenced with the publication of the Mining Policy of Kenya. In the interest of enhancing commerce and trade in minerals, the Mining Act also provides for the Ministry of Mining to establish a commodities exchange.
Compliance and Regulation

The Mining Act requires the Cabinet Secretary to appoint mine inspectors to monitor compliance and take enforcement action within specific jurisdictional units. The inspectors have the power to enter, inspect and examine land, premises, or area where mining operations or dealings are being conducted.

The Mining Act represents the development of a modernized legislative framework which, for the first time, introduces a grid system to limit mineral rights disputes due to overlaps in licensed areas. There is additional clarity on the license and permit classes, procedures, as well as conditions that would lead to revocations and suspensions. Transparency is a priority in the new law with a requirement for publication of mining activity in the public domain. All mineral agreements will be published by the Ministry and those related to protected and marine land will have to be ratified by the Senate.

The new mining law differentiates between three major types of operations:

- **Large scale operations**
  - These are capital intensive mining operations carried out by large public or private companies using heavy and sophisticated machinery and advanced technology.
    - Reconnaissance License - grants the holder rights to carry out non-intrusive search for mineral resources by geophysical surveys, geochemical surveys, photogeological surveys or other remote sensing techniques and surface geology but excludes drilling and excavations
    - Prospecting License – authorizes the holder to carry out a search for a mineral and define the extent of a mineral deposit to determine its economic value.
    - Retention License – a holder of a prospecting license, having identified a commercially viable mineral deposit, which cannot be developed immediately due to temporary adverse market conditions, economic factors, may apply for a retention license.
    - Mining License is granted to an applicant who is a holder of a prospecting license, to win a mineral where it occurs, or extract metal or precious minerals. It is granted for a period of 25 years or the forecast life of the mine. The holder of the mining license enjoys exclusive rights to carry out mining operations

- **Small scale operations**
  - These are operations that are labor intensive but with low levels of mechanization. The required permits include:
    - Reconnaissance Permit – This provides the holder to enjoy nonexclusive rights to conduct preliminary search for minerals in the area specified by the permit.
    - Prospecting Permit – a permit issued in relation to small scale operations authorizing its holder to carry out prospecting operations.
    - Mining Permit – this authorizes the holder to carry out small scale mining operations

- **Artisanal mining operations**
  - An Artisanal mining: miners involved in traditional and customary mining operations using traditional or customary ways and means.
- Essentially, artisanal mining rights are reserved for citizens of Kenya. Individuals, groups, cooperatives or associations may apply for an artisanal mining permit.
- The Cabinet Secretary is required to establish offices in the Counties headed by a representative of the Director of Mines.
- This representative shall have the function of granting, renewing and revoking artisan mining permits amongst other duties.
- Each county shall have an Artisan Mining Committee whose function shall be to advice the representative of the Director of Mines in the granting, renewal or revocation of the artisanal mining permits.

Different licenses and permits exist under each type of operations. Under law, the Cabinet secretary may also designate new categories of licenses and permits on the recommendation of the Mineral Rights Board. Licenses and permits may be revoked if holders fail to make payments on time, fail to comply with conditions in the Act or subsidiary legislation, make false statements, commit offences covered by the Act, face financial difficulties rendering them unable to fulfil their obligations, and/or, file bankruptcy- must be given written notice of non-compliance and have an opportunity to remedy the situation.

The Mining Act 2016 contains financial provisions that comprise various fees, royalties, and taxes that mineral right holders will be required to pay. These payments will be prescribed in regulations and gazetted from time to time. The payments will be payable to an account designated by the State for collection of payments, royalties, taxes, bonds and fees.

Essentially, artisanal mining rights are reserved for citizens of Kenya. Individuals, groups, cooperatives or associations may apply for an artisanal mining permit. Each county shall have an Artisan Mining Committee whose function shall be to advice the representative of the Director of Mines in the granting, renewal or revocation of the artisanal mining permits.

The Mining Act requires the Cabinet Secretary to appoint mine inspectors to monitor compliance and take enforcement action within specific jurisdictional units. The inspectors have the power to enter, inspect and examine land, premises or area where mining operations or dealings are being conducted. The Act also empowers the inspectors to arrest, with the assistance of police officers, any person who is reasonably believed to have committed an offence under the Act.

The Act specifically requires a mineral right applicant to provide proof of submission and approval of an environmental and social impact assessment report and social heritage and environmental management plans to NEMA.
The Mining Act has provisions covering various mining issues including but not limited to mineral rights disputes relating to license and permits; Regulations covering the areas and matters in question such as:

- a) Mining (Dealings in Minerals) Regulations, 2017
- b) Mining (License and Permit) Regulations, 2017
- c) Mining (Work Programmes and Exploration Reports) Guidelines, 2017
- d) Mining (State Participation) Regulations, 2017
- e) Mining (Use of Local Goods and Services) Regulations, 2017
- f) Mining (Employment and Training) Regulations, 2017
- g) Mining (Use of Assets) Regulations, 2017

The foregoing Regulations are meant to streamline the mining sector in the country by ensuring that some of the main provisions in the Mining Act 2016 are fully and efficiently implemented. These Regulations mean well for the local communities and local industries, a lot still needs to be done to ensure that the environment favors the implementation of such Regulations. For instance, the Regulations on use of local goods and services require that the holder of a license, its contractors and sub-contractors shall, to the maximum extent possible, when purchasing goods and procuring services required with respect to operations or any activity to be conducted under a license, give first priority to materials and goods made in Kenya; and services provided by citizens of Kenya or entities incorporated and operating in Kenya or owned and controlled by Kenyans; provided that such goods and services are equal in quality, quantity and price to, or better than, goods and services obtainable outside of Kenya.

There have been attempts at modernizing the laws to make the country attractive to the foreign investors while safeguarding the country’s interests. The Mining Regulations gazetted after the enactment of the Mining Act 2016 are part of these efforts. The Act has highlighted these regulations and how the same can contribute to the vision of making the mining sector a bigger contributor to the country’s development agenda.
UNIT 13: ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT 1999 (EMCA 1999)

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have knowledge on the institutions that are established under EMCA
- Understand the mandate and key roles played by the institutions

**EMCA 1999**

The Environmental Management and Coordination Act (EMCA), 1999 (revised 2012), is the framework law on environmental management and conservation. EMCA establishes among others the following institutions; National Environment Management Authority, Public Complaints Committee, National Environment Tribunal, National Environment Action Plan Committees, and County Environment Committees.

The National Environment Management Authority (NEMA) was established as the principal instrument of government charged with the implementation of all policies relating to the environment, and to exercise general supervision and coordination over all matters relating to the environment. In consultation with the lead agencies, NEMA is empowered to develop regulations, prescribe measures and standards and, issue guidelines for the management and conservation of natural resources and the environment. The Act provides for environmental protection through:

- Environmental impact assessment
- Environmental audit and monitoring
- Environmental restoration orders, conservation orders and easements.

The authority is managed by a board consisting of a chairperson, permanent secretary, director general (all appointed by the president), seven members appointed by the cabinet secretary and secretary appointed by the secretary. The cabinet secretary also determines the composition of the district and provincial environmental committees and Public Complaints Committee.

NEMA under section 37 (1) establishes the National Environmental Plan Committee which prepares after every five years a national environmental action plan for consideration and adoption by the national assembly. Subsequent subsections mandate provincial and district environmental committees to prepare actions plans that are incorporated into the national plan. The revision in 2015 align the committees to fit with the new administrative divisions of the new constitution, such as the counties.

The Act is explicit on the conservation of water resources in Kenya in section 42 and 43 and development in these areas is only possible after an Environmental Impact Assessment and written approval of the Director-General. Section 46 commands District Environmental Committees to identify areas in need of afforestation and reforestation in their areas. Directives on protection of hill and mountainous areas (47),
forests (48), renewable energy (49), biological diversity and genetic resources (50-54), coastal zone (55) and stratospheric ozone (56) are also outlined in EMCA.

Under Kenya’s environmental laws, Environmental Impact Assessment is required for all projects that are likely to have a negative effect on the environment. The law classifies these projects into three groups according to the seriousness of their likely effects, namely: Low Risk, Medium Risk, and High-Risk projects. The full list of projects classified under these three categories is outlined in the Second Schedule of the Environmental Management and Coordination Act.

The position of an environmental inspector under section 117 mandates him/her to perform the duties of inspections without a warrant to monitor the compliance of environmental regulations as stipulated by EMCA. Section 118 gives the environmental inspector with the control and direction of attorney general the mandate to institute and undertake criminal proceedings against persons allegedly commit offenses against the environment. The Environmental Management and Co-ordination (Water Quality) Regulations 2006 apply to water used for domestic, industrial, agricultural and any other purposes. The objective is to regulate the discharge of effluent and provide guidelines and standards for disposing of other pollutants. The EMCA empowers NEMA to make regulations that provide for the labelling, classifying and handling of hazardous chemicals. It also prohibits and creates the offence of discharging chemicals into the environment contrary to the regulations enacted.

The Integrated National Land Use Guidelines provide for methods of preventing the contamination of land through ensuring compliance and enforcing licensing conditions. They provide for the maintenance of a Contaminated Land Register, which will be made accessible to the public. Furthermore, the Integrated National Land Use Guidelines empower NEMA and other relevant authorities to undertake site investigations of the contaminated land and evaluate the remedial reports filed by proponents. NEMA is further empowered to develop and approve site management plans to guide in the management of health and environmental harm.

The draft Environment Management and Coordination (Toxic and Hazardous Industrial Chemicals and Materials Management) Regulations 2018 have subsequently been developed.

Section 87 of the EMCA prohibits the discharge of waste in a manner that causes pollution to the environment or ill health. It also requires any person operating or transporting waste to have a valid license from NEMA. Any person operating a waste disposal site is required take adequate measures to minimize pollution. Under the Environmental Management and Co-ordination (Waste Management) Regulations 2006, persons who engage in activities likely to generate any hazardous waste need to have a valid Environmental Impact Assessment license from NEMA.

While mining operations have the potential for transforming economies and boosting the fiscal phase of the county, they also raise fundamental environmental challenges.
UNIT 14: INSTITUTIONAL FRAMEWORK OF MINERS

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have knowledge on the various institutions that play a key role in regulating the operations of the miners
- Understand the types of licenses/permits and their application processes
- Have knowledge on the legal instruments and their key provisions, expected outcomes and the responsible institutions

Regulatory Institutions

Under the mining Act 2016, there are several institutions that play a key role in regulating the operations of ASG miners. Some of these institutions are also tasked with issuing licenses, permits and enforcing compliance of the provisions of the mining Act 2016, EMCA and relevant Environmental Management Acts for counties.

Let us discuss some of these institutions below:

Ministry of Mining

The Ministry of Mining in Kenya oversees the Mineral sector in the country. The function is charged under section 17(1)(a) of the Mining Act, 2016, to among others promote the effective and efficient management and the development of mineral resources and the mining sector; and exercising regulatory administration over mining and prospecting operations.

The Ministry is mandated under the Mining Act 2016 to exercise regulatory administration and supervision over all prospecting, mining, processing, refining and treatment operations, transport and any dealings in minerals, monitoring and ensuring compliance with the law, regulation of conditions relating to mineral rights, preparation of the necessary reports required under the Mining Act, 2016, exercising regulatory administration and supervision over the use of Commercial explosives in accordance with the Explosives Act (Cap. 115), Provision of advice during the negotiation of mineral agreements; minerals related litigation and arbitration.

Promotion of co-operation among state agencies, county governments, the private sector, research bodies, non-governmental organizations and other organizations which are engaged in programmes related to mining and activities to enhance the administration and operation of the Mining Act, 2016.

Director of Mines

The Act establishes the Directorate of Mines under the Ministry of Mining. The Directorate will supervise and promote activities related to the development of mineral and mineral resource exploitation.

In addition, it will take up the chief role in monitoring and enforcement of provisions under the Act, working through mine inspectors appointed by the government.
Mineral Rights Board

Section 30 of the Mining Act 2016 creates the Mineral Rights Board. Its function is to advise and make written recommendations to the Cabinet Secretary on the grant, rejection, retention, renewal, suspension, revocation, variation, assignment, trading, tendering, or transfer of Mineral Rights Agreements; areas suitable for small scale and artisanal mining; areas where mining operations may be excluded and restricted; the designation of certain minerals as strategic minerals; and the cessation, suspension, or curtailment of production.

Artisanal Mining Committee

In every county where there are ASGM operations there is an established Artisanal Mining Committee. The purpose of this committee is to assist the Ministry of Mining in managing mining activities in the counties together with the county office. The Committee comprises of a representative of the Governor, who is the chairperson of the committee; a representative of the Director of Mines who serves as the secretary; three persons who should not be public officers and must be elected by the association of artisanal miners in the county; a representative of the inspectorate division of the Ministry of Mining; a representative of the National Environment Management Authority; and a representative of the county land board. The main function of this committee is to advise the representative of the Director of Mines in the granting, renewal or revocation of artisanal mining permits.

National Environment Management Authority

The National Environment Management Authority (NEMA) is established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA) as the principal instrument of Government for the implementation of all policies relating to environment. EMCA 1999 was enacted against a backdrop of seventy-eight sectoral laws dealing with various components of the environment, the deteriorating state of Kenya's environment, as well as increasing social and economic inequalities, the combined effect of which negatively impacted on the environment.

The supreme objective underlying the enactment of EMCA 1999 was to bring harmony in the management of the country's environment. The object and purpose for which NEMA is established under EMCA is twofold: to ensure sustainable management of the environment through exercising general supervision and coordination over matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment.

The functions of NEMA are not only stipulated in EMCA, 1999 but also in the Climate Change Act, 2016. Section 17 of the said Act empowers NEMA on behalf of the National Climate Change Council to monitor, investigate and report on whether public and private entities are following the assigned climate change duties and to regulate, enforce and monitor compliance on levels of greenhouse gas emissions as set by the Council under the Act. The Constitution of Kenya, 2010 under Article 42 also creates obligations for NEMA in a bid to help the citizens achieve clean and healthy environment.
County Directorate of Environment and National Resources

The county government is obligated to implement specific national government policies on natural resources and environmental conservation including, soil and water conservation and forestry.

Environment, health, and safety provisions have been strengthened with the Act making provisions for natural resources and mining through the National Environment Management Authority (NEMA) which produces the State of Environment Report every two years as provided under EMCA section 9 (2) (P). Recognizing the value of the environment and natural resources in the economic development of the country and the challenges these resources face, the Government of Kenya, in collaboration with local and international stakeholders’ places environment and natural resources governance as a national priority.

Over the years, as a sign of commitment to strengthening environmental and natural resources governance for enhancing conservation of these resources, Kenya has developed several relevant policies, enacted a range of relevant legal frameworks, and established institutions meant to advance the conservation of the environment and natural resources in the country.

Land Use, Water Rights Laws and Pollution

A holder of a mineral right is also required to comply with the prevailing laws on water rights and use the land in accordance with the terms of the permit of license. In doing so, the holder of the permit or license will ensure that the land is used in a sustainable manner.

Section 179 of the Act which deals with land use requires the holder of a mining permit to ensure the sustainable use of land through restoration of abandoned mines and quarries; that the seepage of toxic waste into streams, rivers, lakes and wetlands is avoided and that disposal of any toxic waste is done in the approved areas only; that blasting and all works that cause massive vibration are properly carried out and muffled to keep such vibrations and blasts to reasonable and permissible levels in conformity with the Environmental Management and Coordination Act, (Cap. 387); and that upon completion of prospecting or mining, the land in question shall be restored to its original status or to an acceptable and reasonable condition as close as possible to its original state.

Licensing and Compliance

The new mining law differentiates between three major types of operations: large scale operations, small scale operations and artisanal mining operations. Different licenses and permits exist under each type of operations. Under law, the CS may also designate new categories of licenses and permits on the recommendation of the Mineral Rights Board.

Types of Licenses/Permits and their Application Processes

Artisanal Mining Permit

Pursuant to Clause 95 of the Act, an artisanal mining permit specifies, the full name, nationality and address of the applicant, in case of a cooperative, association or group, the place of registration and the address of registered office, the mineral or minerals sought, the cadastral coordinates of the polygon in the prescribed format defining the permit area, a map showing the approximate location of the permit area together with...
any directly adjacent mineral right areas, excluding reconnaissance permits, the duration of the permit, the approved artisanal mining programme to be carried out, an environmental license and the relevant land holder’s written consent where the land has not been designated as an artisanal or small-scale mining area.

An application for grant of an artisanal mining permit is submitted to the Representative of the Director of Mines is granted for a period not exceeding three years and is renewable once only for a period not exceeding three years.

When an artisanal mining permit application is registered, the artisanal mining permit area applied for is recorded online on the cadastral map and be shown on the Ministry’s website. The registered permit application is then reviewed by the Artisanal Mining Committee, established pursuant to Clause 94 of the Act.

Any person who otherwise qualifies to apply for an artisanal mining area is ineligible to apply for an artisanal mining permit in circumstances where the applicant is a former artisanal mining permit holder whose permit has been revoked for the same mining area, if such application is made within two years from the date of such revocation, the applicant has been employed by the Ministry in the administration of the Act or has been a member of the Technical Committee within two years of the application submission or the applicant holds five artisanal mining permits at the time of registration.

In the event an artisanal mining permit application is rejected by the Representative of the Director of Mines the artisanal mining permit register and the cadastral map will immediately updated by the Registrar. Pursuant to Clause 93 of the Act, the Representative of the Director of Mines, on the advice of the Artisanal Mining Committee, will approve or reject an application for an artisanal mining permit within fifty-six days of the official registration date. Once an application is approved, the grant notice, issued by the Representative of the Director of Mines, requires the applicant to accept or reject the grant of the permit within fourteen days from the date of notification.

An application for renewal of an artisanal mining permit is made to the Representative of the Director of Mines by the holder, or by a person acting on the holder’s behalf, not less than forty-nine days before expiry of the permit and includes conditions such as the proposed duration of the renewal period that will not exceed three years, a revised and updated artisanal mining programme, a summary report describing environmental remediation actions taken since mining first began and an environmental license.

The Representative of the Director of Mines then notifies the applicant if any further information or clarification is required, and the applicant is expected to respond within thirty-five days of receipt of the notice. On the advice of the Artisanal Mining Committee, the representative then approves or rejects an application for renewal of an artisanal mining permit within thirty-five days of receipt of a complete application allowing an applicant who is aggrieved by the decision of the Representative of the Director of Mines to appeal to the High Court within a period of thirty days.

The Cabinet Secretary can revoke a permit granted under the Act if the holder fails to comply with a condition specified in the permit or an obligation imposed on the holder by the Act and fails to take action
to remedy a breach within a reasonable time, makes a false statement or gives false information to the Cabinet Secretary to the grant of the permit.

**Reconnaissance permit**

Subject to Clause 111 of the Act, a reconnaissance permit grants a person or body corporate the non-exclusive right to carry out non-invasive investigations for minerals within the permit area. Pursuant to Clause 117 of the Act, a reconnaissance permit is to specify, the full name and address of the permit holder, the mineral or minerals to be included under the permit and the County in which the reconnaissance operations are to be carried.

Pursuant to Clause 125 of the Act, an application for the grant of a reconnaissance permit will be submitted to the Cabinet Secretary, not be renewable and is granted for a period not exceeding one year. When a reconnaissance permit application is registered, the mineral right area applied for will be recorded online on the cadastral map and be shown on the Ministry’s website.

Pursuant to Clause 33 of the Act, the Cabinet Secretary, on the advice of the Mineral Rights Board, will approve or reject an application for a reconnaissance permit within ninety days of the formal registration.

Before suspending or revoking a permit under the Act, the Cabinet Secretary gives the holder of the permit written notice requiring the holder to comply with the condition or obligation within a reasonable period of time, where this is not possible, to show cause within that period, why the license should not be suspended or revoked.

**Prospecting Permit**

Subject to Clause 132 of the Act, a prospecting permit grants a person or body corporate the exclusive right to prospect for a mineral or minerals in the permit area according to an approved programme for prospecting operations. The term of a prospecting permit is specified in the permit and does not exceed five years, renewable once only for a further term of up to five years, which is the maximum period of the prospecting permit issued under the Act. An individual may apply for a prospecting permit to the cabinet secretary in the prescribed form and upon payment of the prescribed fee.

Where the Cabinet Secretary intends to reject an application, he or she issues a notice of intention to reject an application to the applicant including the grounds for the intended rejection of the application, a period within which the applicant is required to make an appropriate proposal to correct or remedy the ground for the intended refusal. In the case an applicant does not respond to the notice within the period stated in the notification, the Cabinet Secretary will reject the application.

Pursuant to Clause 129 of the Act, a prospecting permit is to specify, the full name, nationality and address of permit holder; the mineral or minerals in respect of which the prospecting permit is sought, the cadastral coordinates in the prescribed form defining the prospecting area, a map showing the approximate position of the prospecting area and any directly adjacent mineral right areas, with the exception of reconnaissance licenses or permits, the duration of the permit, the approved programme of prospecting operations, details of the experience and financial resources available to the applicant to enable the prospecting operations, a
statement of any significant adverse effects that carrying out the prospecting programme is likely to have on the environment and mitigating measures to be undertaken.

**Mining Permit**

A mining permit grants an eligible person or body corporate the exclusive right to carry out small-scale mining operations in the permit area according to an approved mining permit programme. An individual may apply for a mining permit to the Cabinet Secretary and mining permit shall be granted for a period not exceeding five years and shall be renewable. The term of renewal does not exceed five years or the commercial life of the mine. A person or company cannot hold more than five mining permits per County. Pursuant to Clause 136 of the Act, a mining permit is to specify, the full name and address of permit holder, the mineral or minerals to be mined, the cadastral coordinates of the polygon in the prescribed format defining the permit area, a map showing the approximate location of the mining area together with any directly adjacent mineral right areas, excluding reconnaissance permits, the duration of the permit, the approved mining permit programme of work, details of the mining experience, financial resources available to the applicant to conduct the mining operations and an environmental license.

A mining permit is not to be granted unless the Cabinet Secretary is satisfied that a commercially viable mineral deposit exists and that the proposed mining permit programme exploits the mineral resource in the best interests of Kenya and its citizens.

Pursuant to Clause 33 of the Act, the Cabinet Secretary, on the advice of the Mineral Rights Board, can approve or reject an application for a mining permit within ninety days of the official registration date. The date that the Mining Cadaster Office officially issued the digital mining permit, and which is included on the permit, to be considered the start of the permit year for all permit related matters including ongoing reporting, fees and expiry date purposes and shall be recorded by the Registrar in the mining permit register. Upon receiving a valid application for a mining permit, the Cabinet Secretary then issues a notice in writing to the relevant land holder, community, County Government and within the same period, publishes an announcement in a local newspaper with wide circulation.

Where an objection to the grant of a mining permit has been submitted, the Cabinet Secretary, on the advice of the Mineral Rights Board informs the applicant and objector of his or her decision in respect to the objection within twenty-one days of receipt of the objection. Pursuant to Clause 33 of the Act, the Cabinet Secretary, on the advice of the Mineral Rights Board, can approve or reject an application for renewal of a mining permit within forty-nine days of the formal registration date, in addition to that, on renewal of a permit, the Cabinet Secretary will notify the holder of any change in the amount and or nature of the environmental protection bond and any other financial security.

**EIA License**

Environmental Impact Assessment (EIA) is a critical examination of the effects of a project on the environment that identifies both negative and positive impacts of any development activity or project, how it affects people, their property and the environment. EIA also identifies measures to mitigate the negative impacts, while maximizing on the positive ones and is basically a preventive process that seeks to minimize adverse impacts on the environment and reduces risks. The National Environment Management Authority
(NEMA) is mandated by the Environmental Management and Coordination Act (EMCA) No 8 of 1999 to administer the EIA. Only registered licensed environmental expert by NEMA are the only ones licensed to carry out all EIA/EA studies by law in Kenya. The applicant for the EIA license will be required to present documents such as Copies of the project study report, payment receipt of requisite fees, dully filled application form, a plan to ensure the health and safety of the workers and neighboring community, an action plan for the prevention and management of foreseeable accidents and ways of mitigating the same during the project cycle, the entire design of the project and finally a project budget.

The project report can take a period of 5 days to complete and costs approximately Ksh.50,000, then once the EIA project report is done, it is submitted in form of hard copies to NEMA with the initial payment of 50% of 0.05% of the Total Project cost. At this point NEMA dispatches the EIA report to lead agencies for review. If the EIA project report is approved, the proponent will obtain a notice for gazettement from NEMA. At this point NEMA shall publish in two successive weeks in the Kenyan Gazette and a newspaper circulating in the area or proposed area of the project once a notice which will state a summary description of the project, the place where the project is to be carried out, the place where the environmental impact assessment study, evaluation or review report may be inspected and a time limit of not exceeding ninety days for the submission of oral or written comments by any member of the public on the environmental impact assessment study, evaluation or review report. If there are no objections raised from the gazette notice. NEMA approves the EIA report and final payment of 50% of 0.05% of the total project cost is made and the EIA license is issued to the proponent. On the other hand, the EIA report can be rejected with sufficient reasons. After issuance of the EIA license, NEMA monitors and Audits conditions of approval on a yearly basis. The EIA license is valid for 24 months within which the project must start. If it does not start within the 2 years, validity can be extended for a maximum of 4 years at a fee of KES 5000.

The holder of an environmental impact assessment license is required surrender the license issued to the NEMA after ceasing to be responsible for the implementation of the project. NEMA can, at any time after it issues a license, on the advice of the Standards Enforcement and Review Committee suspends the license on such terms and conditions as the NEMA deems fit for a period not exceeding twenty-four months or can alternatively revoke or cancel the license. This is dependent in a situation where there is a substantial change or modification in the project or in the manner in which the project is being implemented or the project poses an environmental threat which could not be reasonably foreseen before the license was issued.

**Single Business Permit**

A single business permit is vital in ensuring that a business complies with the established rules for that specific type of business. The procedure for obtaining a business permit is the same, but the cost might vary depending on the size, model, and location of the company. Application of a single business permit requires the applicant first to register their business and have a business ID number, and address, and a business name, together with a copy of certificate of incorporation, proof of business ownership and national ID or Passport number.
Once the applicant has registered the company or business, secured a business name, and obtained the necessary documentation, he can proceed to apply for a business certificate/permit at any county government offices in Kenya. The business permit is obtained from the county government in whose authority it operates. The fees charged for registering a business, but which vary depending on the number of employees or size of the establishment and is renewed annually. Business permits shall not be issued for businesses being carried out in a building where land and ground rent are in arrears.

**Dealer permit**

A mineral dealer’s permit is issued, to citizens of Kenya or in the case of a body corporate, where citizens of Kenya hold sixty percent of the shareholding. the permit is issued by the Cabinet Secretary upon application and payment of the requisite fees and expires on the thirty first day of December of the year in which it is issued. The holder of a mineral dealer’s permit cannot export minerals but has the right to buy and sell locally.

The permit can be revoked if the holder of it is proven to be of unsound mind, is adjudged bankrupt or is subject to financial difficulty or otherwise ineligible to hold the permit.

**Organization of Miners**

At the local level, the miners form a mining group/ welfare group. The organizational structure consists of leaders at the site level. 5 to 10 sites in groups come together and they form a CBO at the ward level. Different wards come together to form Saccos at the sub- county level. These Saccos come together and form cooperatives within the County.

As with most things law and policy, the key to how the legal and regulatory framework will impact the mining sector remains predicated on implementation and enforcement. The Mining Act 2016 addresses these critical issues and for the most part has provisions that promote good practice in accordance with the best interests of miners in the country.
The table below summarizes the Legal Instruments, their key provisions, their expected outcomes and the responsible institutions.

**Table 7: Summary of Legal Provisions**

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<th>Legal Instruments</th>
<th>Key Provisions</th>
<th>Expected Outcomes</th>
<th>Responsible Institutions</th>
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| Mining Act No. 12 of 2016 | • Defines artisanal mining to mean “traditional and customary mining operations using traditional or customary ways and means”  
• Gives the Cabinet Secretary upon recommendations of the Minerals Rights Board, to designate any area of land to be reserved exclusively for ASGM mining operations.  
• It establishes the County office of the Ministry of Mining (sec.93) with the Cabinet Secretary designating a representative of director of mines who is in charge of the county office overseeing the operations at the county level. List one of the functions (Sec.93.3.a) as granting, renewal and revoking artisanal mining permits.  
• The Mining Act 2016 establishes a state mining corporation to undertake commercial activities on behalf of government.  
• Establishes promotion of job creation under Mining (Employment and Training) Regulations, 2017 through the use of local expertise in the mining industry, the entire mining value chain and to retain the requisite skills within the country.  
• The Act establishes a National Mining Corporation as the Government’s investment arm mandated to invest on behalf of the Government, engage in mineral prospecting and mining, and hold interests in mining projects.  
• It establishes the artisanal mining committee (section 94) with mandate of among others (sec.94.3) advising the representative of director of mines in the granting, renewal or revocation of artisanal permits  
• The Act establishes the Directorate of Geological Survey under the Ministry of Mining. Its functions are to consolidate governments efforts in the collection and storage of geological data related to prospecting in a national repository.  
• The Act provides for the holder of mineral right to develop a comprehensive community development agreement that secures socially responsible investment and provides for employment preference for those living | • The National Mining corporation will ensure that mineral wealth is protected and harnessed for present and future generations  
• The directorate of geological survey under the Act will participate in various geological surveys including geo-environmental studies and facilitate promotion of private sector interest and investment in mineral exploration.  
• Promote the private sector interest and investment in mineral exploration by providing geological information and services to prospective investors.  
• Recognition of artisanal mining coupled with the ministry’s current initiative of developing an ASM strategy will provide a real opportunity for the country to harness the transformative potential of the ASM sector especially as regards job creation, skills development and socio-economic development.  
• Development of a modernized legislative framework which, for the first time, introduces a grid system to limit mineral rights disputes due to overlaps in licensed areas  
• An opportunity to build up on an existing public finance management system that is founded on openness and accountability  
• Additional clarity on the license and permit classes, procedures, as well as conditions that would lead to revocations and suspensions.  
• An opportunity to build up on an existing public finance management system that is founded on openness and accountability in accordance with the Act. | • Ministry of Mining  
• Director of Mines  
• Mineral Rights Board  
• National Mining Corporation  
• National Land Commission.  
• County Artisanal Mining Committee |
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| **Mining and Minerals Policy Sessional Paper No. 7 of 2016** | • The policy takes a holistic approach to the sector, ensuring that key issues related to sustainable exploitation of natural resources such as community engagement, environmental issues, and beneficiation from mining are addressed. (Part III)  
• Provides long term policy direction and legal frameworks that conform to current industry needs, trends and international best practices. (Part III)  
• Provides a strategy for clear, simple, predictable, transparent and accountable licensing procedures including access to land. (Part III)  
• Provides a framework for equitable sharing of mineral benefits between the National Government, county governments and community where mining takes place. | • Will ensure that benefits from the growth of the sector accrue to all stakeholders, including investors, local artisanal and small-scale miners, national and county governments, local communities and the people of Kenya  
• Provision of structures for negotiating mineral agreements and stipulations that mineral agreements will include terms and conditions for minimum activity and spend for work programs, structure for payments (i.e., royalties, fees, etc.).  
• It will in place a simple, stable, predictable, transparent, efficient and unified regulatory framework for the mining sector.  
• Development of a transparent licensing system which will enable the efficient management of concessions and allocation of mineral rights. | • Ministry of Mining  
• County Artisanal Mining Committee  
• National Mining Corporation |
| **EMCA 1999 (Rev 2012)** | The act advocates for the protection of rivers, lakes and wetlands and further gives power to the minister to issue general and specific orders, regulations or standards that may include management, protection, or conservation measures in respect to any area at risk of environmental degradation including the ASGM areas (PART IV). The National Environmental Management Authority (NEMA) is established under the EMCA. Its main purpose is to exercise general supervision on all matters related to the environment and to implement policies related to the environment. | • Provision of an important platform that will allow communities to undertake mining activities in safer environments while allowing them greater opportunity to benefit from minerals within their lands.  
• Strengthen environment, health, and safety provisions with the Act stipulating regulations for mine closure through a requirement for operators to deposit environmental protection bonds with the Ministry.  
• Ensure strict compliance with provisions of existing water | • NEMA  
• District Environmental Committees  
• County Directorate of environment And natural resources.  
• National Environment Council  
• National Land Commission.  
• County Artisanal Mining Committee  
• Ministry of Environment and Forestry |
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| The Act mandates that mining license be granted on condition of having obtained environmental impact assessment license, approved social heritage assessments, approved environmental management plans, as well as site mitigation and rehabilitation or mine closure plans. |  | * Productive use of land on a sustainable basis  
* Achievement of an acceptable balance between mining and environmental conservation and ensuring that the sector operates within the approved (national and where necessary international) standards of health, safety, human rights and environmental protection.  
* Establishment of criteria and procedures for the measurement of air quality, set air quality standards and other measures to control air pollution, such as issuance guidelines to minimize GHG emissions.  
* Regulation of the discharge of effluent and provide guidelines and standards for disposing of other pollutants. | |
| Section 87 of the EMCA prohibits the discharge of waste in a manner that causes pollution to the environment or ill health. It also requires any person operating or transporting waste to have a valid license from NEMA. The National Environment Tribunal is established under section 125 of the EMCA with jurisdiction to entertain appeals from parties aggrieved by decisions made by NEMA, such as e.g., the grant of a license or permit or a refusal to grant a license or permit, or the transfer of a license or permit, under the EMCA. Under its second schedule section 58 (1), (4) the instrument lists projects to undergo environment impact assessment which includes ASGM mining including quarrying and open-cast extraction of precious metals; gemstones; metalliferous ores; coal; phosphates; limestone and dolomite; stone and slate; aggregates sand and gravel; clay; exploration for the production of petroleum in any form; and extracting alluvial gold with use of mercury. The Act provides for measures on prior informed consent procedures for certain hazardous chemicals (Sec.91) and the regulations of the hazardous and toxic materials and their subsequent prohibition of discharge into the environment (Sec.92 &93). |  |  |
Module Objectives

ASGM at community and household levels can be done as small-scale business ventures by members of the public. More often small businesses in the SME sector have failed along the way due to inadequacies attributable to entrepreneurial skills, records management and accounting skills, funding, marketing skills and the legal constraints. The aim of this training module is to equip the participants with these entrepreneurial skills to create wealth out ASGM. Specifically, the participants at the end of this unit are expected to be able to:

▪ Understand basic business and entrepreneurial terminology
▪ Articulate how small ASGM businesses can be organized
▪ Understand some of the common reasons that a small business thrives or fails
▪ Understand potential sources of financing for a small-scale mining enterprise and strategies to attract investment
▪ Acquire the ability to construct both a personal and a small business budget
▪ Acquire record keeping knowledge and skills
▪ Acquire the ability to construct a basic business plan
▪ Acquire team management skills
Introduction

The objective for this module is to address the fundamentals of entrepreneurship and small business management in the ASGM sector, thereby increasing the overall capacity of the sector. The curriculum includes teaching materials, student materials, guidelines for trainers, and additional learning resources. The module is customizable in order to be adaptable to a range of geographical, cultural and educational circumstances, and under consideration of local realities.

Entrepreneurship is becoming the backbone of wealth creation in many emerging economies; thus, this unit is aimed at imparting entrepreneurial skills to groups and miners to develop profit motivated ventures in ASGM set ups within Kenya.

The curriculum has been designed as an introductory level course on basic knowledge, skills and attitudes that will enable artisanal and small-scale miners to run more sustainable, responsible, and profitable enterprises. Key knowledge outcomes include financial literacy. Skills outcomes are hard and soft entrepreneurial skills such as budgeting and record keeping. Attitudinal training focuses on seeing ASGM enterprises as responsible community actors.
UNIT 15: BASIC BUSINESS KNOWLEDGE AND ENTREPRENEURSHIP

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Develop a business/ financial plan
- Understand the important business aspects such as business goals, business expenses, basic business structure and ASGM business components, Entrepreneurship and Business formation
- Have knowledge on how the business concepts can help increase the mining productivity, reduce costs, and generate profit

Introduction

The purpose of this unit is to build a basic understanding of what constitutes a business as it relates to ASGM, what important business aspects relate to ASGM, and how an understanding of these concepts can help increase gold production, reduce costs, and generate profit. The topics to be discussed include Business goals; Business expenses; Basic business structure and ASGM business components; and Entrepreneurship and Business formation.

Business goals

It is important to recognize that ASGM businesses have a role in building communities. For instance, ASGM activities often lead to mining “booms” whereby communities grow and experience an influx of people and even wealth. ASGM activities often create complimentary jobs in the local economy such as mechanics, food services, transportation services, etc.

The primary goal of a business is to make money or generate a profit, however, there are important secondary goals to highlight: when the business owner is from the community and employs friends, family, and members of the community, the general community will thrive; by employing community members, the business owner is directly impacting the skills pool of that community; by growing and expanding the business, the owner may gain a sense of pride and accomplishment from the business’s success.

Task:

Ask the class to list and discuss some of the common expenses in ASGM operations and how best they account for them
Entrepreneurship and Business formation

Entrepreneurship, generally speaking, refers to the overall course of action undertaken by an owner in starting and managing his/her enterprise for profit. Entrepreneurship may be defined as the visualization and realization of new ideas by insightful individuals, who are able to use information and mobilize resources to implement their vision. Entrepreneurship is the ability (i.e., knowledge plus skills) of a person to translate ideas of commencing a business unit into reality by setting up a business on ground to serve the needs of society and the nation, in the hope of profits.

ASGM is entrepreneurial in nature as parties venturing into the sector take risks especially when it comes to gold prospecting due to lack of specialized equipment that can confirm availability of gold deposits in an area with high degree of certainty. It is common for one to invest a lot in the activities before production and end up with little or nothing at all as a result of not coming across ores with viable gold deposits.

What are the features of entrepreneurship?

The unpredictable nature of the sector requires one to have the essential features of entrepreneurship which are fundamental in guaranteeing success, these include:

- Innovation - Entrepreneur comes up with new ideas and turns them into viable business and find new ways to market the products that make their business stand out from the crowd and sometimes create a new crowd. Examples are Ibrahim Ambwere and S.K Macharia
- Risk-taking: This ability is essential for an entrepreneur. Without the will to explore the unknown, one cannot discover something unique. And this uniqueness might make all the difference. Risk-taking involves a lot of things. Using unorthodox methods like in ASGM is also a risk.
- Leadership: Entrepreneurs should possess the quality of leadership. Leadership is the ability to exert interpersonal influence by means of communication towards the achievement of goals. Entrepreneurs as leaders should provide the necessary spark of motivation by guiding, inspiring, assisting and directing the members of the group for achievement of unity of action, efforts and purpose.
- Focus on profits: Successful entrepreneurs always have the profit margin in sight and know that their business success is measured by profits.
- Ability to accept change (Adaptability): Change occurs frequently when you own your own business, the entrepreneur thrives on changes and their business grow. An entrepreneur may need to change his/her plans in order to help the business grow and look at many solutions to their problems.
- Hardworking: Most entrepreneurs start out working long, hard, hours with little pay. Entrepreneurs are always at work even when other people have stopped. They are persistent and strongly believe that working hard will help them attain their goals hence focus on the end result.
- Independence: They enjoy being their own boss alike and like doing things their own way. The characteristics of independence and the sense of determination are the drives that make an entrepreneur start their own business. In a way, their own business fulfills their need for independence
• An eye for opportunity: Many entrepreneurs are always alert to opportunities and are very quick to see and grab them. They, plan intellectually and anticipate carefully how to achieve their goals in realizing an opportunity.

**Task:**
Discuss each of these entrepreneurial features in detail

### Roles of an entrepreneur

In ASGM it is necessary for the parties to embrace the roles of an entrepreneur in business which entail:
- Understanding own capabilities,
- Identifying new opportunities,
- Managing Finances,
- Managing production operations,
- Managing work force,
- Managing market demands.

### Business Formation

When starting a business, owners must decide what form of business entity to establish, entrepreneurship ventures can take the form of all businesses, Family-owned businesses, SMEs, and corporate ventures. However, the nature of ownership of the above can be in the following forms:

**Sole proprietorship**
This is the simplest and most common structure chosen to start a business, and there is no distinction between the business and owner. The owner is entitled to all profits and is responsible for all of the business’s debts, losses, and liabilities.

**Partnerships**
This is a single business where two or more people share ownership. It is owned by a minimum of 2 and a maximum of 20 except for partnership who provide professional services e.g., medicine and law which have a maximum of 50 persons. Each partner contributes their expertise or other skills, money or property to have a share in the business so that they can share in the profits and losses of the business.

**Private Limited Liability Company**
It is a legal entity separate from the owners and has rights and obligations. It can be formed by a minimum of 1 and a maximum of 50 shareholders, excluding the employees and does not advertise its shares to the public, but sells them privately to specific people.

**Public Limited Liability Company**
It can be formed by a minimum of 7(seven) shareholders and no set maximum. If it advertises its shares to the public/ invites the public to subscribe for/buy its shares and debentures and must publish their end of year accounts and balance sheets. Most of the other features are similar with those of a private limited company.
Cooperatives

A co-operative society is a form of business organization that is owned by and run for the economic welfare of its members. It is a body of persons who have joined together to do collectively what they were previously doing individually for mutual benefit. Membership is open to all persons so long as they have a common interest and members are also free to discontinue their membership when they desire so. Co-operative societies have a perpetual existence; death, bankruptcy or retirement of a member does not affect its operations. They are managed in a democratic manner and every member has one vote when electing the managerial committee irrespective of the number of shares held. Co-operative societies have limited liabilities and have a separate legal entity from the members who formed it i.e., they can own property sue and be sued.

Community Based Organization

A registered non-governmental, non-profit and non-political organization. Within community-based organizations (CBOs), there are many variations in terms of size and organizational structure. Some community-based organization (CBOs) with a written constitution and directors are formally registered and incorporated. Others are much smaller and informal, are registered by the Ministry of Labor and Social Protection.

Business Plan

Upon identifying the ideal form of business, it is necessary to formulate an ideal business plan that will effectively run the venture. The business plan provides a vehicle for communicating the potential of the venture, the opportunities it faces and the way it intends to exploit them in a way which is concise efficient and effective. The business plan may be read by employees, investor's bankers, venture capitalists, suppliers, customers, advisors, and consultants and as such must address their concerns. The business plan is important to each of these groups because:

- It helps determine the viability of the venture in a designated market.
- It provides guidance to the entrepreneur in organizing his or her planning activities.
- It serves as an important tool in helping to obtain financing.

Essential features of a Business

<table>
<thead>
<tr>
<th>Simplicity</th>
<th>Enable organization of resources</th>
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<tbody>
<tr>
<td>Flexibility</td>
<td>Provides purpose and direction</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Facilitates control</td>
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<tr>
<td>Acceptability</td>
<td>Generate harmony</td>
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<tr>
<td>Create efficiency</td>
<td>Motivate workers</td>
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</table>
Components of the Business Plan

An exhaustive business plan should include the following subtopics:

i. Executive summary,
ii. Vision and mission statement,
iii. Company history (for ongoing businesses),
iv. Business and Industry profile,
v. Business Strategy,
vi. Company products and services,
vii. Marketing strategy,
viii. Location and layout,
ix. Competitor analysis,
x. Description of management team,
xii. Plan of operation,
xii. Financial forecasts (suitable for an Appendix): Finance statements,
xiii. Loan or investment proposal, and
xiv. Appendices

Task:
Discuss each of these.
UNIT 16: LEADERSHIP, NEGOTIATION SKILLS AND TEAM MANAGEMENT

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Describe what leadership means and how it differs from management, authority, and power
- Identify the types of leadership styles
- Describe the principles of leadership
- Acquire necessary skills and knowledge required to effectively manage groups/personnel involved in ASGM
- Understand the required characteristics and skills the mining leaders should possess to effectively manage key players in the ASGM value chain
- Have knowledge on the steps that are key to improve team management skills

Leadership

This unit aims to impart the basic knowledge on leadership and negotiation to the learners. At the end of the unit, you will be able to:

i. Describe what leadership means and how it differs from management, authority and power
ii. Identify the types of leadership styles
iii. Describe the principles of leadership.

What is leadership?

Leadership is the action of leading a group of people or an organization, or the ability to do this. It is a quality of influencing people, so that the objectives are attained willingly and enthusiastically.

- Managers – persons whose influence on others is limited to the appointed managerial authority of their positions.
- Leaders – Persons with managerial and personal power who influence others to perform actions beyond those that could be dictated by those persons’ formal authority (position) alone

“Not all leaders are managers, nor are all managers leaders”
Leadership isn’t management.

- This is the big one. Leadership and management are not synonymous.
- Managers need to plan, measure, monitor, coordinate, solve, hire, fire, and so many other things.
- Typically, managers manage things. Leaders lead people.

**Key Aspects of Leadership**

- Leadership stems from *social* influence, not authority or power.
- Leadership requires others.
- Personality traits, attributes, or even a title don’t necessarily make a leader; there are many styles, many paths, to effective leadership.
- There must be a *goal*, not influence with no intended outcome.
- So even though the definitions of leadership may vary, it is in essence the process or ability to influence others to achieve a goal through the maximization of their efforts.

Leadership is independent of authority and position. Leaders are trusted for their judgment and respected for their expertise, integrity etc., and hence followed - not because of the position they may hold.

- An Authority is a legitimate power that people follow because the position itself demands so irrespective of who is holding the position.
- A Leader may involve formal authority, but mainly relies on the informal authority that the leader exercises on people to influence them.
Key differences between leadership and management

The major difference between leadership and management are:

- Leadership is visionary through influencing and inspiring persons within an organization. Whereas management is implementing policies and procedures to deliver results within an organization.
- Leadership requires trust of the team, unlike management, which needs control over its team.
- Leadership demands long term, strategic thinking (foresight), unlike management which has a short-range vision.
- In leadership, principles and guidelines are established, whereas, in the case of management, policies and procedures are implemented.
- Leadership is proactive. Conversely, management is reactive in nature.
- Leadership brings change. On the other hand, Management brings stability.
- Recognize that not all leaders are good managers and not all managers are good leaders. Leaders and managers are both important and play significant roles in achieving the vision.
- Therefore, it is important to recognize your strengths and know that one size does not fit all. Each person has their own style and own way of doing things, however the most important thing is to work together as a team, recognizing unity through diversity to achieve a common goal.

Remember

- EVERYONE HAS THE POTENTIAL TO BE A LEADER. It is within all of us. It is up to you to choose whether you want to be a leader or a follower.
- Not all leaders are born leaders, but leaders learn from everything around them, experience and knowledge is key. Learn something new every day, learn from your successes, learn from failures.

Qualities of a leader

- Honesty & Integrity
- Trustworthy
- Determination – Initiative & perseverance
- Humility – modesty; with focus on collective rather than personal recognition/achievement
- Competence & Initiative
- Sense of responsibility & Forward-looking
- Good Listener
Principles of leadership

- **Leadership is an ability**, to change people or influence the change in them based on leadership traits, character and skill. The ability is a natural one, but the skill is proficiency gained through training and experience.

- **Leadership is adaptive** - the leader adjusts. A leader who fails to adjust to the territory will lose their way. Only fools willingly follow someone who is lost. Adaptation triggers long chains of further adaptations that ultimately solve seemingly impossible problems.

- **Leadership acts on a setting** - a leader adjusts the state of the surroundings and people. A leader carefully observes those states and discerns significance looking for how to adapt the setting most effectively.

- **Leadership empowers** - a leader inspires confidence and self-esteem, and that inspiration comes in many flavors. Some leaders inspire by bold talk; others by soft talk; and yet others by their example.

- **Leadership fosters creativity** – through innovative use of limited resources. A leader that enables people to use their creativity and innovation is a step closer to solving problems faster, better and cheaper.

- **Leadership solves problems** - closing the gap between things as desired and things as perceived/occurred. In doing so, involves everyone to work on the solution.

- **Leadership is shared** by everyone in the organization. It should reinforce that everyone on a team can be a leader. The most successful teams create chain reactions of leadership.
How effective leaders motivate teams

- Work with members to understand their motivational /satisfaction needs
- Effectively manage conflict and difficulties
- Regularly review with the team the how of teamwork
- Regularly review and reinforce the team purpose and objective

Types of Leadership Styles

**Autocratic**

Also called the authoritarian style of leadership, this type of leader is someone who is focused almost entirely on results and efficiency. They often make decisions alone or with a small, trusted group and expect employees to do exactly what they’re asked. Authoritarian leadership is best applied to situations where there is little time for group decision-making or where the leader is the most knowledgeable member of the group. The autocratic approach can be a good one when the situation calls for rapid decisions and decisive actions. It can also be beneficial when used with employees who need a great deal of supervision—such as those with little to no experience. However, this leadership style can stifle creativity and make employees feel confined. It tends to create dysfunctional and even hostile environments, often pitting followers against the domineering leader.

**Laissez-faire or hands-off**

This leadership style is the opposite of the autocratic leadership type, focusing mostly on delegating many tasks to team members and providing little to no supervision. Because a laissez-faire leader does not spend their time intensely managing employees, they often have more time to dedicate to other projects. This leadership style is applied when all team members are highly experienced, well-trained and require little oversight. However, it can also cause a dip in productivity if employees are confused about their leader’s expectations, or if some team members need consistent motivation and boundaries to work well. It often results in groups that lacked direction where members blamed each other for mistakes, refused to accept personal responsibility, and produced a lack of progress and work.

**Democratic**

The democratic leadership style (also called the participative style) is a combination of the autocratic and laissez-faire types of leaders. A democratic leader is someone who asks for input and considers feedback from their team before deciding. Group members feel engaged in the process and are more motivated and creative. This leadership style is best for managing groups.

**Servant**

Servant leaders live by a people-first mindset and believe that when team members feel personally and professionally fulfilled, they’re more effective and more likely to produce great work regularly. Because of their emphasis on employee satisfaction and collaboration, they tend to achieve higher levels of respect.

**Coach**

A Coach is someone who can quickly recognize their team members’ strengths, weaknesses and motivations to help each individual improve. This type of leader often assists team members in setting smart goals and
then provides regular feedback with challenging projects to promote growth. They’re skilled in setting clear expectations and creating a positive, motivating environment. This style can best be utilized in mining sites as a lot of apprenticeship is practiced.

**Transformational**

This leadership style is similar to the coach style in that it focuses on clear communication, goal setting and employee motivation. However, instead of placing the majority of the energy into each employee’s individual goals, the transformational leader is driven by a commitment to organization objectives. Because these types of leaders spend much of their time on the big picture, this style of leading is best for teams that can handle many delegated tasks without constant supervision. This style is best utilized by group leaders.

**Task:**

**Activity 1:**

*Indicate briefly what this session will be about.*

**What is leadership?**

- Ask the participants to share their definition of leadership.
- Note the responses shared on flip chart paper.
- Share your definition of leadership.
- Ask participants to note the differences in your definition and that of theirs.
- Ask participants to identify key leadership functions.

**Activity 2:**

*Qualities of a Good Leader*

- Divide participants into groups of 4 or 5.
- Tell the participants to discuss whether leaders are born or made.
- Tell the participants to list qualities of a good and bad leader in their groups.
- Explain to participants that it is important for individuals to be able to identify both sets of qualities in a leader.

**Activity 3:**

*Evaluation and reflection*

To conclude: have each participant say “My Leadership Style is...” have the participants discuss the differences between leadership and management.

- Tell the participants that as their facilitator you are also willing to answer their questions.
- Ask the participants to answer the questions, what did you learn about yourself through these exercises? What is your leadership style?
- Ask the participants to remember what they learnt on leadership, the different styles and the difference between leadership and management.
Negotiation

Negotiation is important to achieve agreements in business. Yet the importance effective negotiation is not limited to international treaties or crises. The ability to negotiate is valuable to business managers because the skills developed through practicing negotiation skills develop critical thinking aptitudes and effective communication skills. This topic deals with definition of negotiation, scenarios where negotiation is required in ASGM, types of negotiations and tactics, and persuasion tactics.

What is negotiation?

Negotiation, a way to resolve conflicts or disagreements or divide resources among two or more parties, carried out willingly by free choice. The two sides make contact for suggestions and counter suggestions and in this manner, communication takes place between the parties. Each side employs its own tactics in an effort to reach maximum results.

When is negotiation required in ASGM?

- During discussions between landowners and miners over rights to use the land for mining.
- During discussions over sale of gold between miners and gold traders.
- During discussions between miners and financiers over securing of funds for mining operations.
- When sharing ore containing gold deposits among miners, investors, landowners, and shaft owners.
- During discussions for payment of some of the activities in the value chain such as transportation, crushing, milling, washing, and amalgamation.
- During discussions over hiring and lease of equipment and machinery required for mining operations.
- During discussions with over payment to some of the experts such as geologists, blasters, and electricians that miners may engage from time to time.
- During purchase of some of the PPEs and equipment used by miners in operations.
- During sale of tailings to leaching plants.

Negotiation skills.

The most important question is what skills are required to lead the process of effective negotiations?

Communication skills

To achieve your ideal outcome at the bargaining table, it’s essential to clearly communicate what you’re hoping to walk away with and where your boundaries lie.

Emotional Intelligence

Emotions play a role in negotiation, for better or worse. While it’s important not to let them get in the way of reaching a mutually beneficial deal, you can use them to your advantage. A high degree of emotional intelligence is needed to read other parties’ emotions. This can enable you to more easily pick up on what they’re implying rather than explicitly stating.
Planning skills

Planning ahead with a clear idea of what you hope to achieve and where your boundaries lie is an essential step in any negotiation. Without adequate preparation, it’s possible to overlook important terms of your deal. It’s beneficial to understand your best alternative to a negotiated agreement (BATNA). If your discussion lands in a negative bargaining zone, your BATNA is the course of action you plan to take if the negotiation is unsuccessful. Knowing your BATNA ahead of time can help ensure you have a backup plan in case an agreement can’t be reached and avoid leaving the table empty-handed.

Value Creation

Creating value in a negotiation is one of the most powerful skills you can add to your toolkit. To illustrate its importance, consider this analogy: When participating in a negotiation, each party is typically concerned with obtaining the biggest “slice of the pie” possible. With each party vying to maximize their slice, this inherently means some will be forced to leave with a much smaller piece.

Strategy

In addition to thorough preparation and the ability to create value, you need a clear understanding of effective negotiation tactics. Knowing what works and what doesn’t can allow you to create a tailored strategy for every negotiation you participate in. To develop a strong negotiation strategy, consider the following steps:

- Define your role
- Understand your value
- Understand your counterpart’s vantage point
- Check in with yourself

Reflection

Finally, to round out your negotiation skills and develop your proficiency, you need to reflect on past negotiations and identify areas for improvement. After each negotiation—successful or not—reflect on what went well and what could have gone better. Doing so can allow you to evaluate the tactics that worked in your favor and those that fell short.

Types of negotiations.

One time negotiation

A single, unprecedented occurrence, which offers maximum success in minimum time and yields predictable result in which one or the other party wins and the other loses. There are no expectations for further implications on relations in the future and total attention is focused on successful resolution of the issue at hand.

Continuous negotiations

Continuous negotiations are conducted in the framework of ongoing relationship, such as landlord - tenant, miner-gold trader, investor - miner, etc. This type of negotiation is characterized by bearing the influence of experience and the nature of former relationship between the parties. Additionally, it carries each side’s expectations for the future, replete with emotional involvement accumulated over the years, which could
lead to more conciliatory behavior on the part of both sides. Even in the case where no agreement is reached, there is an opening for a possible chance in the future, when both parties have deep enough motivation, which might enable them to reach a resolution, satisfactory to all. It is desirable to conclude in a win/win situation; otherwise, the disappointed party will often find ways to violate the agreement, or worse, take measures to inflict hurt on the other party.

**Task:**

Discuss some of the situations in ASGM where this type of negotiation should be applied

**Direct negotiation** whereby continuous personal and direct contact between the involved parties exists e.g., Miner – Investor, Gold dealer – Miner. The advantage in this case is also the disadvantage: in other words, the two parties meet with one another directly and see the others’ behavior.

Discuss some of the situations in ASGM where this type of negotiation should be applied

**Indirect negotiation** takes place in the presence of representatives or mediators. The problem here lies in the vested interests of the mediators, which might be different from those of the party they are representing. Another problem might be the communication difficulties between the mediators and between parties e.g., Miners – Large Scale Mining Companies, Miners – Leaching plant owners

**Negotiation Tactics**

These tactics can be subdivided into five categories and making use of more than one can improve one’s chances of not being perceived as being stubborn.

**Hard tactics**

- Threatening the other – expression of readiness to inflict future damage;
- Scaring the other party – taking offensive action that will cease only when other party concedes;
- Attacking the other party – on the opponent’s stance or a verbal attack;
- Issuing ultimatum to the other party – pushing the opponent into a corner by setting limits;
- Cutting off ties with the other party – either temporarily or permanently.

**Time related tactics**

- Delay - postponement until the other side becomes uncomfortable or gets used to the idea;
- Setting a final date – natural or artificial;
- Controlling schedule and setting the agenda – whoever decides negotiation place and timing has a distinct advantage.

**Authority related tactics**

- Limited authority – often prevents or eliminates pressure, allows consultation during negotiations or even appending additional demands after conclusion of negotiations.
**Persuasion Tactics**

During negotiations it is important to apply persuasion skills so that one can have the best outcome. This involves:

- Convincing the other party to accept facts and accede to logical demands,
- Persuading the other side that it is worth their while to agree with the demands.
- Persuading the other side that there is no basis to their demands.
- Persuading the other side that they should not abandon the negotiations at this late stage after having invested so much of time and energy.

**Soft tactics**

- Revealing Information – sharing the problem with the other party;
- Concessions, even small ones, in order to give the other side a positive feeling for further cooperation. It is recommended to open the discussions with maximum demands to ensure ample allowance for concessions, and still keep concessions to a minimal level. One can decide in advance one's own limits in conceding to the other party's demands, however, this could lead to a dangerous situation of reaching our "red line" too quickly.
- Active listening – this is the most economical of all concessions – to hear the other side out. Usually, the persuading side speaks more than it listens. The guidelines for active listening are acknowledgement and understanding of the other side's position, asking questions, raising doubts, and non-provocative attitudes and examining the understandings that develop via interim summaries.
- Promises - exactly the reverse of threat: readiness to reward in the future.

**Importance of Negotiation Skills**

Why should we have effective negotiation skills in ASGM?

- To ensure we get better prices for our products and services.
- To ensure we get the best credit terms when securing finances.
- To ensure we get fair share during distribution of ore containing deposits.
- To assist us get better pay for the services offered.
- To ensure we get the best deal when leasing land and hiring equipment.

**Task:**

Ask the learners practice these negotiation and persuasion tactics in pairs.
Team Management

Introduction

Field visits at the seven project mining sites revealed that ASGM operations are labor intensive requiring a significant number of workforces to undertake all the activities from gold prospecting, extraction, processing, and selling. The ASGM value chain has provided opportunities for people in the various communities it is practiced and earn a living as the roles are distributed in accordance with expertise and gender. Engagement with key stakeholders has revealed that miners are encouraged to organize themselves in groups which should be registered in form of CBOs, SACCOs, and Co-operatives. This is meant to promote pooling of resources, access of financing and capacity building opportunities, sharing of workload, and to ease the process of formalization of ASGM in general.

Therefore, it is important for mining groups leaders and officials, shaft owners, and people at the management levels in the sector to equip themselves with necessary skills and knowledge to effectively manage the groups and the personnel involved in ASGM operations.

Team management

To effectively manage the mining groups and personnel, the leaders and officials need several key characteristics and skills. Without them, it can be difficult to rally everybody to work toward common goals and perform at their best—which can be disastrous for both your organization and overall site management. Whether a shaft owner, foreman, mining group leader and official, and employer developing these critical skills will prove crucial to the success of any venture in ASGM:

Clear, Effective Communication

As a leader or manager, the goal is to help the members of the team complete tasks in a manner that is efficient, consistent, and aligns with the group or organization's overarching goals. To accomplish this, one must clearly articulate what those objectives and goals are while also detailing the specific work and processes that will be required of your team to reach them. By communicating effectively, one removes confusion among the team and ensure everyone is aligned and working toward the same goals.

Emotional Intelligence

Emotional intelligence refers to an individual's ability to manage their emotions, as well as those of others. A highly developed level of emotional intelligence is a hallmark of strong managers and leaders. ASGM requires leaders to have a keen sense of self-awareness, empathy, and other social skills resulting in managers who can motivate and influence others.

Organization

As a manager, mining group leader, or shaft owner, one may be responsible for overseeing budgets and project timelines in addition to the daily tasks that members of the team perform. Juggling so many moving pieces and making necessary adjustments along the way requires a high degree of organization.
Ability to Delegate

The urge to micromanage members of the team may be tempting but it is important to note that doing so can be detrimental to progress. A good manager must know how to delegate work to others, which involves understanding who is best suited to complete a particular task. It also requires ensuring an employee or a member has the required resources to be successful and feels empowered to make their own decisions.

Openness

Openness goes hand in hand with both emotional intelligence and effective communication. It is important that the members of the team feel comfortable approaching you when they have questions or concerns, or when they need clarification on what is expected of them. If the employees or members do not believe they can reach out to the leadership, there is a risk that problems or concerns will go unaddressed before it is too late to correct them.

Problem-Solving

No matter how well prepared, organized, or established an ASGM project or process is, every time or another, the venture faces challenges that could be in the form of unfavorable weather conditions such as rainfall, budgetary in nature or an unforeseen event of nature such as accidents. Whatever the case, managers must be skilled problem-solvers, with the ability to evaluate a challenge, think critically about potential solutions, and formulate a response are essential to anyone who is tasked with leading a team.

Decision-Making

Over the course of a day, managers might be responsible for making several decisions that impact their team or the site they are overseeing which include prioritizing tasks, allocating resources, delegating duties are some of the decisions that fall on the manager. Sometimes, a manager will need to make an authoritative decision to resolve an issue and other times, decision-making might involve consensus building, wherein members of the team are invited to participate in the discussion and help guide the process. Ultimately, the manager is responsible for the outcome of the decision and, as such, must be comfortable with ensuing results.

How can you develop your team management skills?

The following steps are requisite for improvement of team management skills and taking them to the next level:

Taking stock of your current skills. To chart a path for your professional development, you first need to understand where your management skills currently stand. What are your strengths? What are your weaknesses? Where are your greatest opportunities to turn development into career success? These insights will help you create a plan that is right for you.

Setting goals for improvement and development. Once you have a sense of your current skills, you need to set goals for your development efforts. Which skills do you need to improve? How will you measure success? What is your timeframe? By setting specific and attainable goals, you give yourself something to work toward and increase your chances of success.
Inviting feedback from your team. If you are unsure about your current abilities or where you should prioritize growth, consider turning to co-workers for feedback. This can be invaluable in helping you identify your strengths and weaknesses.

Practicing your skills. Practice your skills both in and out of the office. If you find that a project has suffered setbacks due to poor communication, for example, identify the point of confusion and make a mental note to avoid this in the future. Or, if a project has become bogged down due to micromanaging, find methods to help you manage from a perch instead of down in the trenches.

Pursuing professional development. Professional development can be a valuable asset in helping you reach your managerial potential. Signing up for a management training course can help you quickly develop your management skills, while pursuing mentorship opportunities can aid you throughout the trajectory of your career.

Task:
Ask the participants to describe some of the team management skills they possess and those they feel they need to improve on.
UNIT 17: SECURING FUNDING, FINANCING, AND INVESTORS.

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Have knowledge on the sources ASGM players can venture into for financing
- Understand the key aspects to consider when securing financing
- Have knowledge on the expectations of investors/banks

Introduction

The term financing is a "catch-all" term used to describe various means of securing money to help support a business. Typically, investors and banks who provide financing will require repayment of the entire amount financed, as well as an additional amount called a premium, or interest, on the initial loan.

Financing is an important tool a prospective business owner may choose to consider when starting or running a business. It can help with large expenditures associated with starting a business or can be used to cover unexpected costs incurred while operating a business. It is important to understand that it is not just “free” money, and that there is a cost associated with financing in the form of interest; one must pay someone for the ability to borrow their money, and sometimes interest rates can be very high and may not be worth the financing you receive; you must evaluate your options carefully when considering financing and decide whether you really need it or not.

Sources of financing.

ASGM business ventures can source for financing/initial cash from the following: Banks; Venture capitalists (sponsors); Gold buyers; Micro-finance institutions/mining co-operatives; Friends and Family; Personal Savings; and Financing equipment with the supplier directly. In ASGM, the access to loans are limited due to the lack of institutions ready to loan money, and because many people work in an informal setup. As a result, financing is severely limited, and it becomes a barrier to starting a business for many. With that in mind a little bit of extra work and consideration is required to secure financing from the various sources:

Bank loans

Bank loans are paid back over time in full plus extra money to the bank who loaned you the money, which is their business revenue. Most banks have lending options for good business ideas provided the potential borrower shows good business acumen, however, this will require appropriate knowledge and skills in business management and maintaining proper records.

Private financing and investors

There are some organizations or individuals who seek out small business opportunities with the desire to assist in community growth and development. These can include both profit and non-profit organizations. Local non-profit groups can sometimes help to connect you with these organizations or individuals.
Informal loans

Informal loans from friends and family, or community lending from a local co-op or business association; this can be a good option if you maintain a good relationship with friends and family. However, it is worth noting that borrowing from friends and family can create conflict and other problems if the money is not paid back in a timely fashion.

Savings

Either personal savings or a savings specifically for the business from money set aside from profit can be used to either start a business or upgrade business operations, or even maintain business operations if there is a downturn in profits.

Some important things to consider when trying secure financing are:

i. Maintain an adequate savings. When you approach investors or loan agencies, they will want to see that you are personally invested in your potential business or have money to fall back on in case the business does not work. They want to make sure that their money is safe and that you are a good investment.

ii. Only borrow money that you need. If you think you need a certain amount to successfully start a business, but have access to double that, only take what you need. The more you borrow, the harder it is to pay back, and the more interest diminishes profit.

iii. Only borrow money if you need it. For the same reasons above, borrowing money you do not need can be tempting to spend on things that may be luxuries in the business.

In ASGM, it is very rare for income streams to be constant, and they will typically change throughout the year. By having a savings, it allows the business owner to maintain operations and pay employees when income may be lower. The owner should: Always anticipate months with losses in income by tracking how much money and sales the venture makes which allows it to set aside a certain amount of profit from each sale into a savings account where money can be obtained in harder times; Reinvest profits back into business by upgrading equipment to more efficient options resulting in savings in operating costs, and thereby increasing profits; and Cashflow/financial accounting record keeping to assist in determining how much one needs to save or identify areas where one can reduce expenses to maximize profit from the sales attained.
What Do Investors Want When Lending/Financing?

Banks/investors will not invest in business ventures that are seen as high risk or are liable to fail. Proving that your business venture is not high risk requires appropriate documentation and financial information. If a business does not have any record of financials or previous business, then there is no proof or record of money coming into and out of the business. Other things banks/investors will look for might include Proper business permits and licenses to operate; A business plan; An outline how the business will operate, and inclusive considerations given to basic costs, pricing, and potential sales/income; A list of the assets (property, equipment, etc.); A list of any savings, and investments held by the owner of the business that will help it grow/start.

Other things future investors might want to look at include appropriate record keeping of health and safety plans, pollution control, environmental permits, and other things which prove the business venture is low risk. Investors are interested in making money and will not be willing to invest in a business that is high risk without a significant return on investment. Things that may dissuade investors from considering a certain business investment opportunity include the following: Environmental liabilities; Workers’ injuries and lawsuits; Lack of formal accounting/tax payments; Lack of business license; Poor financial performance; Bad relationships with surrounding communities; and Criminal activity or conflict near the mining site.

The downside of taking loans from banks and investors is the need to pay back interest as this is how financiers make money. Interest is the amount of money charged by the lender to allow you to borrow the money and is expressed as a percent of the total amount of money borrowed.
UNIT 18: BUDGETING AND RECORD KEEPING.

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Understand the basic budget preparation knowledge and skills.
- Have knowledge on basic record keeping and management skills
- Understand the common expenses incurred in ASGM
- Understand the benefits of having a budget in ASGM

Introduction

A budget is an estimate of income and expenditures of a business or person/family unit over time. Budgets allow you to see how much money you will have come in or going out at any given point in time and allow people to plan for the future.

Budget preparation

The first step in preparing a budget is to identify the budget goals and how they will be achieved. Factors such as the business’s socio-economic surroundings, sales trends, etc., have to be taken into consideration for setting the goals. Also, these goals have to be set according to the economic resources available because a budget will be of no use without proper funding. When preparing budgets, one scrutinize the costing for the business and evaluate factors that can affect input costs during the budget period. To make the budget realistic and achievable, proper provisions should be created for variations in costs and compensation plans in case of accidents.

The implementation of the budget is not the last step in the budgetary process. The setting of proper budgetary controls comes next. This is necessary for the comparison of the actual performance with the provisions and estimates of the budget. Continuous reporting of variances has to be done to enable the management take corrective actions accordingly.

Record Keeping and Management.

Record keeping is one of the most important responsibilities of a small business owner, as the success of the business depends on creating and maintaining an effective record system, whether the business is a sole proprietorship, partnership, or a company. Whether simple or complex, a record keeping system must be easy to use and provide adequate storage and retrieval of records. Most importantly, the record keeping system chosen must be suited to the particular business needs of the ASGM sector which require accurate records especially for personnel involved in gold prospecting and extraction for ease in accountability in case of accidents.

In ASGM, good record keeping is essential as it brings a clear understanding of the business, now and in the future and ease detail tracking. Effective and efficient ASGM requires miners, CBOs, SACCOs, and managers to track a significant amount of information, such as personnel records, ore inventory, gold production quantity, gold sales volume and prices, expense records, equipment inventory, and profitability.
i.e., a foreman needs to keep adequate records of personnel who enter the shaft at the beginning of every shift to ensure everyone is accounted for at the end of the shift.

**Best practices in record keeping**

- **Document Retention** - Knowing which of your records to keep, and for how long, is essential to ensuring legal and regulatory compliance.
- **Indexing and Categorization** - It’s important to know exactly where your information is at all times. First, you should accurately number and categorize every document you maintain. So, at any point in the information lifecycle, you should be able to locate each and every file. You should also be able to distinguish between active files and archival documents.
- **Secure Storage** - Protecting documents from disaster and unauthorized access is a pillar of records management.
- **Training** - Every person in your organization should be up to speed with the records management policies and procedures. Training sessions should be organized to keep staff up to date on evolving compliance and information requirements.

The basic records which should be kept in ASGM business include Business expenses, Sales record, Debtor, Creditors, Customer list, Vendors, Personnel information, Levies and fees paid, Bank statements, Contracts and lease agreements, and Equipment list.

When you keep these records, it will assist in:

- Know how much money to invest in your operations
- Set pricing of the gold and all services undertaken
- Compare budgeted amounts to actual costs
- Track spending and expenditure
- Access customer and employee information easily
- Protect your business in the event of an audit or employee issue
- Calculate expected profit

**Common Business Expenses in ASGM**

The primary goal of a business is to make a profit, hence one of the key concepts an entrepreneur should focus on is reducing business expenses. The kinds of expenses to be incurred in an ASGM business venture include Equipment/chemicals for gold processing; Rent and utilities such as electricity and water; Employee wages; Licenses, permits, and taxes; Fuel for generators; Buying ore from miners, if the local arrangements are set up that way. In ASGM most of these expenses are incurred pre-production (Before reaching ore that contain gold deposits, hence it is necessary for the shaft owners, sponsors, and mining group leadership to factor in the cost of activities such as shaft construction, drilling, blasting, water drainage, and air pumping.

ASGM operations are unique, and participants are required to consider all cost centers as business expenses which must be accounted for in the proceeds of the sale of the gold produce from respective sites to get clear picture of the profitability of the venture. It should be noted though that a large chunk of these expenses may be incurred for an extended period of time without getting proceeds from any gold sales during that time which may come all at once hence the need to record and account for all expenditure.
Case study on Demystifying Record Keeping in ASM [online] The Impact Facility. Available at:
https://www.theimpactfacility.com/demystifying-record-keeping-in-asm/

Discuss each of these
Module Objectives

By the end of this module, the learners are expected to be able to:

- Understand the impact of marginalization of women in gold mining processes
- Advocate for equality in the work environment in terms of access to resources and involvement in decision making.
- Understand the disadvantages of child involvement in the mining processes.
Introduction

The objective of this module is to sensitize learners on the forms of gender-based violence in the ASGM sector, the effects of marginalization of women, and the need for mainstreaming gender in the ASGM sector and promoting gender equality in access to and control of resources, and decision making. The module will provide guidance on gender mainstreaming in ASGM sector to create practical guidance on how to address gender inequalities.
UNIT 19: GENDER IN ASGM

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Promote an all-inclusive working environment
- Understand the impact of gender inequalities in the ASGM sector
- Have knowledge on the approaches to adopt in order to mainstream gender into ASGM
- Understand the impacts of cultural aspects in the mining sector

Gender Roles in ASGM

ASGM is a male-dominated industry. There is a huge gender gap between the roles played by men and women in the ASGM sector. This is mainly caused by cultural and religious beliefs/ factors that inhibit women from taking part in some activities, development of mechanized mining that deems them less physically strong and lack of skills to operate the machinery.

Roles of Women in ASGM

Most of the women in ASGM are involved in lighter processes of gold mining. Women are prevented from going underground due to a myth that this may lead to the disappearance of gold reefs. They often must rely on the benevolence of male miners, who usually donate a 20-litre bucket of ore to the women as payment for the general errands they undertake. Women who fail to get menial jobs end up sweeping up scraps of ore from the ground, which they pile up for days before they can send them for milling. In this way, women can send their children to school, purchase groceries and maintain a stable lifestyle despite the prevailing harsh economic environment. In addition, ore must be guarded at night, when women are expected to remain home for their reproductive duties. It is in this time that male counterparts steal some of the ore, to the disadvantage of women.

Most women who participate in ASGM are the main breadwinners in their households. They majorly participate as ore cleaners, mineral processing such as digging, collecting rocks, rock crushing, panning, and sluicing, re-washing tailings, amalgamation using mercury, burning, and trading.

Generally, women are more exposed to the hazards of mercury causing long-term effects on them and their children.

Women are also responsible for other domestic tasks, such as preparing food, caring for children, cleaning, etc. (International Labor Organization, 2007) and in some locations, some supply food and drinks, equipment, and sexual services.

Women are left out of more valuable work and as a result, their earning potential is limited.

Women are not involved in prospecting and exploration stage due to limited access to resources, adequate skills, and they face difficulties in attaining land and mineral rights. Marginalization at this early stage affects their level of compensation and involvement in the later stages. They are not allowed to extract the ore in
many communities and are tasked with working in shallow pits and being dependent on the waste rock dumps and tailings.

In general, women often work longer hours but earn less than the male counterparts. They are engaged in ASM business as employees due to lack of enough capital to participate in ASM as the owners. There are very few women who own shafts and do business within the mining area.

**Task:**

“Women are prevented from going underground due to a myth that this may lead to the disappearance of gold reefs.”

Ask the participants to debate this myth. Should women be allowed in the shafts?

**Roles of men in ASGM**

In general, men have greater access to and control of land and resources and are more involved in decision making regarding mining prospecting and benefit directly from it. They are more engaged in well-paying activities along the value chain in ASGM such as prospecting, ore extraction, transportation, gold trading and value addition. They are more likely to suffer from underground injuries and fatalities due to the nature of the work they are involved in.

**Gender Equality and Human Rights**

**Gender-based violence (GBV)**

GBV refers to any act that is perpetrated against a person’s will and is based on gender norms and unequal power relationships. It encompasses threats of violence and coercion. It can be verbal, physical, emotional, psychological, or sexual in nature, and can take the form of a denial of resources or access to services.

Male violence against women is often accepted as a form of controlling behavior.

The environment of ASM work is often unfavorable and risky for women. While working together, women have to contend with men dressed in undergarments in some cases. The language used at mining sites is often crude and abusive towards the women. Alcohol and marijuana use are prevalent. The lure of money has also resulted in young girls becoming pregnant by often uncommitted and migrant men who have families back home. While consensual sex is a feature of the mining sites, the rise of transactional sex itself is a major moral and health concern.

Men are often in control of all the operations within mining, meaning female miners cannot access tools, information, or even mining sites easily. Access is usually through sexual exploitation or through women offering a significant amount of the profits they make to male intermediaries. Women’s subservient position makes them vulnerable to GBV, sexually transmitted infections, and economic dependence on men. Moreover, if a woman who works in mines fall pregnant, tension in her home may increase as her husband may claim he does not know who the father of the child could be. Ultimately, these conditions constrain...
women’s ability to work in the mining sector, thereby limiting their access to the potentially high income. This has negative consequences for their wellbeing, as well as that of their families and communities.

For men, the expectation that they must be leaders strong and in control at all times places stress on their mental and emotional wellbeing. In tough economic times with lack of employment, men may be unable to provide for their families. Instead of expressing emotion through dialogue, men may tend towards violence, which causes conflict in the home and in the community. While leadership is an important quality in the workplace, in the mining sector, men use their leadership power to exploit women’s vulnerability. Instead, they should be challenged to use this power to increase women’s access to opportunities and resources to support their economic independence and the wellbeing of their families. This section calls upon men to examine their own use of violence against women and girls and encourages men to make a commitment towards ending physical and sexual violence in their community and encourage women’s access to opportunities and resources to support their economic independence and the wellbeing of their families.

**Gender Inequality**

Women make up 30% of the global ASGM workforce though is often undervalued and impeded. Gender equality and women’s empowerment is a fundamental human right.

Some of the challenges associated with the gender inequalities in the ASGM sector include:

i) Policy, regulatory and institutional aspects, e.g., limited gender mainstreaming capacity.

ii) Socio-economic aspects, e.g., women’s work is often constrained by their domestic responsibilities and gender norms

iii) Limited access to opportunities and resources, for example low literacy rates impede many women’s ability to access opportunities and acquire skills.

iv) Health and safety aspects, for example women are often at higher risk of mercury exposure due to the division of labor, hence they are forced to work in low paying tasks in the mining sector subject to exploitation from traders.

v) A lot of concern, patriarchy, a few cases of gender-based violence, sexual harassment.

vi) Some cases of women and children being abandoned by men at the mines.

vii) Limited gender capacity within this institution

viii) Securing land tenure rights for women

ix) Conflict and corruption in ASGM disproportionately impacts women

x) Gender norms and values perpetuate the power imbalance

xi) Few initiatives exist that cater to women in ASGM, making it difficult to pool resources and coordinate their efforts.

xii) Social-cultural practices have a negative and significant relationship on the effective participation of women in the ASM sector.
Addressing Gender inequality and GBV

Chapter four of the Kenyan Constitution is the Bill of Rights. Every person is equal before the law and has the rights to equal protection and benefit of the law. Women and men have the right to equal treatment, including the right to equal opportunities in political, economic, cultural and social sphere. Both direct and indirect discrimination is forbidden. The State is expected to take legislative and other measures, including affirmative action programmes and policies designed to redress any disadvantage suffered by individuals or groups because of past discrimination. The law prohibits sexual violence of any form.

It is every miner’s responsibility and full implementation of the relevant legislation to promote gender equality in the mining sector. There is need for policies that aim at sensitizing women through educational and training programs and organizing them into groups to increase their bargaining power: gender-mainstreaming whereby women are made to know that they have equal rights just like men.

Sensitization will help them know that they are all responsible for their own thoughts and actions, will break the bias in our communities and at workplaces.

Overcoming the barriers to mainstreaming gender into ASGM is possible using a variety of approaches, including:

i. Enabling collective action, e.g., through establishment of women’s mining cooperatives, savings clubs, and miners’ associations

ii. Providing services and resources, e.g., by creating financial products specifically targeted at women miners, and lastly,

iii. Design and implementation of interventions with a gender perspective, e.g., by organizing gender awareness workshops for policymakers and miners to promote gender inclusive policies in the mines themselves.

Key interventions to mainstream gender into the implementation include:

i. Stakeholder engagements and guaranteeing consultative process

ii. Ensuring that both men and women receive appropriate training for adapting to mercury-free technologies

iii. Ensuring that the stakeholder advisory group includes both women and men,

iv. Identifying and engaging civil society and women support groups working on gender aspects

v. Ensuring that the technical improvement options are accompanied by funding solutions that are accessible to both men and women

vi. Ensuring mechanisms to encourage equal participation of women and men, such as timing, language, and safe space for the expression of ideas and opinions.

vii. Developing gender-responsive national legislations such as laws.

[The Minamata Convention National Action Plans (NAPs) for ASGM Gender Context in the ASGM]
Gender and Culture in ASGM

Cultural factors greatly influence the roles of women in the ASGM sector, level of access to and control of resources, and the level of their involvement in decision making.

Gold mining has given unfavorable impacts on cultural aspects of many communities.

- Mining affects the strong cultural ties of Indigenous communities, leads to loss of cultural identity.
- Decrease in spiritual mutual aid. Many people spend more time at the mining sites, and this affects family unity. Loss of the original social fabric, no social systems, communities are torn apart, family separation.
- Local knowledge used in environmental conservation has not been maintained. Before ASGM, young trees were not being cut down, today people cut down young trees without regard to their age.
- Migration leads a shift in way of life, land alienation and displacement of Indigenous people, leading to industrial-urban sector expansion. Immigrant outsiders have legally/by fraud displaced the original inhabitants.
- Increased criminalization of society due to industrial-urban sector due to robbery, prostitution, communal riots among others.
- Agricultural/farming is a cultural heritage that has been abandoned.
- Indigenous/cultural activities have been abandoned around mining areas e.g., caning, towing of wood.
- Increased social vices.
- Conflicts.
- Destruction of socio-cultural life through massive influx of outsiders.

Task
Ask participants how they will personally pledge and make a commitment to creating a more gender-equal community by changing their behavior towards each other irrespective of their gender.

Task
Ask the participants to discuss on what role the men can play in supporting women miners.
UNIT 20: INVOlVEMENT OF CHILDREN IN ASGM

Objectives of the unit:

By the end of this unit, the participants should be able to:

- Advocate against any form of child labor
- Understand the impacts of involvement of children in ASGM operations
- Have knowledge on children’s rights

Introduction

The International Labor Organization (ILO) estimates that about one million children aged 5-17 years are engaged in artisanal and small scale mining (of all types, not just gold mining). Almost all work performed by children in ASGM is hazardous and has characteristics that fit the definition of a “worst form of child labor” under ILO Convention No. 182.

Why do children work in ASGM?

In some cases, adult miners have limited awareness of child labor laws and/or see children as cheap labor. Others believe that employing children from child-headed households or families with elderly guardians is an act of kindness. Children may feel pressure from peers who are engaged in ASM and making money, or from parents and guardians who see other children engaging in ASGM and adding to the household income. Some children drop out of school due to poverty and see ASGM as a livelihood source, but a growing number of children no longer see the benefits of continuing with education due to high youth unemployment rates.

ASGM is hazardous work for children. Child miners are more vulnerable to health and safety risks than adults. They are exposed to high levels of toxins such as mercury. Exposure is often proportionally higher for children given their lower body weight and is compounded by childhood behaviors (e.g., playing with mercury or putting their hands in their mouths). Children also face risks such as cave-ins, rock-falls, and asphyxiation. An estimated 22,000 of children engaged in hazardous child labor across the world die every year at work while more are injured and fall sick. While statistics are not readily available in Zimbabwe, media reports show that children often fall victim to accidents in ASM.

Beyond the direct health and safety risks of mining itself, child miners are often involved in sexual relationships and drug use.

Children’s Rights

Children’s rights include all basic human rights such as decent shelter, education, adequate food, health care and clean water. These are things every child should have to survive and grow to reach their full potential. Children also have specific rights to protect them from the dangers, exclusions, and discrimination to which they are vulnerable. According to Section 10 of the Children Act, “every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child’s education, or to be harmful to the child’s health or physical, mental, spiritual, moral or social development”.

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Jobs in artisanal and small-scale gold mines are often linked to poor working conditions, with limited rights, lack of access to social protection, without a voice and freedom to join unions etc. There are risks with respect to safety and health with no stable income for miners to lift their families out of poverty. Children can be found inside mining tunnels or on surface collecting gold and hauling sacks of ore or smelting gold. This is associated with many labor issues such as hazardous working conditions that have led to work-related injuries, diseases, and deaths. Evidence from various ILO surveys and research studies show that mining is by far the most hazardous sector for children with respect to fatal injuries. In this respect, families need proper sensitization to make them know the risks involved in sending their children to work in this sector. Also observed is that “child labor is not the solution to the households’ economic problems, rather, it only creates long-term problems.” This is because most of the operations are done with improper mining practices not covered by any sound government regulations. This makes child labor and poor working conditions be the worst two issues are common in ASGM.

Although there are various global organizations working on ASGM issues, concerns on child labor and other labor-related issues could be better coordinated, especially at the local level. Ghana and Philippines have made efforts to tackle this situation, they have not fully enforced laws related to ASG mining and child labor.

In many developing countries, mercury is used to extract gold from ore in small-scale mining areas. Exposure through mercury in these small-scale mining communities is a serious health hazard, especially to the children living and working there. Many children begin working with immediate contact to mercury from the very early age of five. In Indonesia and Zimbabwe, 166 children were clinically examined for mercury. The mercury concentration in the blood, urine, and hair was analyzed. Compared to the control groups, the exposed children showed typical symptoms of mercury intoxication, such as ataxia. The children working with mercury had high levels of this substance in the various bio monitors. The exposure derives mainly from the liquid mercury used to bind gold, forming an amalgam. The amalgam is heated, and the smelting amalgam releases mercury vapor plus the wanted gold. Mercury vapor in contrast to liquid mercury is highly toxic. This elemental, vaporized mercury is the main form of exposure.

Since in over fifty countries children live in small-scale gold mining areas and are exposed in a similar way to mercury, immediate action is needed to reduce this severe chemical health hazard for children. “Child labor with hazardous substances such as mercury must be stopped.”

In Kenya, there is little information documented about child labor in ASGM, however, it is a known fact that this practice is rampant in this sector although presence of school-going children is discouraged at the mining sites.

**Task: (Small Group Activity)**

Ask the participants to mention how children involved in mining and what are the tasks given to them.

- What are the effects of child labor on children’s health and education?
Solutions

How can the government develop and implement strategies to reduce child labor?

1. Strengthening of laws, policies and action plans and their enforcement and implementation to better address child labor and working conditions in ASGM.
2. Facilitating the access of vulnerable households living in ASGM communities to social protection and livelihood programmes and supporting their transition to formal operations.
3. Setting up and operationalization of mechanisms to increase transparency and monitoring of child labor and working conditions in gold mining supply chains, particularly ASGM, by mandated Government agencies and mining related stakeholders.
4. Setting up of global networks to reduce child labor and to improve working conditions in ASGM.
5. Supporting and disseminating innovative solutions to reduce child labor and working conditions in ASGM.
6. Formalization of the ASGM and good monitoring of gold supply chain.
7. Address poverty and social exclusion in ASG mining communities
8. Government stakeholders to design and implement strategies to address child labor and working conditions in ASGM.
9. Local society organizations working with children and youths to increase advocacy for access to social services and improve livelihood.
10. Implementation of the ASGM module of the Child Labor Guidance Tool for business development by ILO and the International Organization of Employers which stipulates that: “As a starting point, all businesses, of whatever size, need to ensure that children are not working in their own facilities or operations. The ILO and IOE have produced practical guidance for employers3 that explains how to identify child labor and prevent it in the employers’ own business.

This Guidance Tool focuses on the three “H’s”:

i. **Hiring**: End the practice of hiring children
ii. **Hazards**: Eliminate hazardous child labor
iii. **Hours**: Reduce the working hours of any children above the minimum age to ensure that they do not work more than the number of hours allowed under national law for light work and regular work.
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5. UNEP. (2021). GENDER IN NATIONAL ACTION PLANS FOR ARTISANAL AND SMALL – SCALE GOLD MINING [Review of GENDER IN NATIONAL ACTION PLANS FOR ARTISANAL AND SMALL - SCALE GOLD MINING].


