

PROMOTING MERCURY FREE GOLD MINING IN UGANDA



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INSIDE:

- ▶ Project Background and Objectives
- ▶ Mercury Exposure And The ASGM Activities In Uganda
- ▶ The Use Of Borax: Promoting An Alternative Technology To Mercury To Use In Asgm
- ▶ Key Project Activities
- ▶ Project Target and Impact
- ▶ Key Action Plans For The Communities And District Stakeholders



A publication of the National Association of Professional Environmentalists (NAPE) with support from partners



The National Association of Professional Environmentalists (NAPE)

Was formed in 1997 and is a registered indigenous Environmental Non-governmental organization (NGO) that works on a number of issues with specific focus on lobbying and advocacy for sustainable use of natural resources in Uganda.

NAPE' Vision

NAPE envisages a Ugandan society that effectively participates in the sustainable management of natural resources.

NAPE' Mission

NAPE's task is to promote sustainable use of environmental resources in Uganda, through training, research, information sharing, advocacy and advisory services so that the people are able to contribute to national development.

NAPE's Development Goal

The following are NAPE's key targets to achieve improved management of natural resources in Uganda:

- Promotion of gender parity in the management of natural resources
- Enhancement of good governance in the management of natural resources
- Increase in public awareness on best practices in natural resources management
- Mitigating effects of environmental /climate change through sound management of natural resources
- Developing and enhancing the capacity of NAPE to achieve its objectives

NAPE' Mandate

NAPE is legally authorized to undertake actions and initiatives that promote sustainable, and equitable management of natural resources in Uganda



The Small Grants Programme (SGP) is a corporate programme of the Global Environment Facility (GEF) implemented by the United Nations Development Programme (UNDP) since 1992. SGP grantmaking in over 125 countries promotes community-based innovation, capacity development, and empowerment through sustainable development projects of local civil society organizations with special consideration for indigenous peoples, women, and youth. SGP has supported over 20,000 community-based projects in biodiversity conservation, climate change mitigation and adaptation, prevention of land degradation, protection of international waters, and reduction of the impact of chemicals, while generating sustainable livelihoods.

Background

Gold mining in Uganda is growing at a high rate done by both big companies and small-scale artisanal miners. This growth is however, associated with increased use of mercury in the gold mines especially by the small-scale artisanal miners and its related consequences on human life and the environment. Mercury is persistent in the environment. It evaporates easily and has the capability of long-range transport and contamination of areas far from the source.

In the ecosystems, mercury is transformed to organic compounds that are built into microorganisms and enter the food chain in plankton, fish, birds and mammals including humans. Non-mercury alternatives are available, better and can post a higher gold recovery. However, the practice of using mercury persists due to many factors, miner habits and misperceptions, and a lack of information on consequences and possible alternatives. With the minamanta convention on mercury coming into force, parties to the convention have set targets of phasing out mercury use. Uganda became a signatory to the Minamata Convention in March 2019 and is developing legal frameworks to facilitate mercury phase-out.

The government of Uganda in collaboration with their national and international civil society are building partnerships for advocacy to raise awareness on the dangers associated with mercury and to promote less harmful alternative mining practices in ASGM which do not involve the use of mercury.

NAPE is part of this collaboration and has been implementing projects on raising awareness of dangers related to mercury use and as a way of continuing to contribute to the global and national efforts of phasing out mercury use among artisanal gold miners, NAPE with support from the GEF Small Grants Program (SGP) is promoting a mercury free gold mining methodology.

Key about the borax methodology, is that there is increased productivity and high gold recovery that results in better overall economics of miners, borax is readily available on the market and is not illegal, the borax method is cheaper than the amalgamation method even before the health of miners and the environment are looked at.

The project is being implemented in Kassanda district of greater Mubende. The specific project area is Kayonza mining site in Kitumbi sub county. Miners in this community of kayonza other than other sites in the district are organized under a small association called Kitumbi kayonza miners association which makes it easy to mobilise and train in mercury free technologies. Like many mining areas in Uganda, kayonza site is frequented by miners from different other districts and foreigners.

Project Objectives

- To help miners' transition from the use of mercury to a more user friendly, less harmful and productive methodology using Borax in artisanal gold mining.
- To Improve the health, social and economic welfare of miners as well as conserve the ecosystems around and linked to gold mining areas.
- To advocate for the review of the mining policies to include artisanal mining sector and formulate regulatory frameworks and guidelines to govern the sector.

A miner heats amalgam in the open to evaporate the mercury and leave a small gold piece. The gaseous mercury is inhaled by the miner, people around him and communities living around the mining area.

Mercury exposure and the ASGM activities in Uganda

Artisanal and Small-Scale Gold Mining (ASM) is a poverty-driven activity that provides an important source of livelihood for rural communities. There is an emerging consensus that ASM can play a vital role in local life, provide employment, and support development goals when they are officially recognized, regulated and supported.



Miners exposed to mercury poisoning through direct handling without protective personal equipment.

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Artisanal miners in general are driven by the need to survive. To feed their families and pay the bills. Most focus is on immediate benefits and disregard the hazards to themselves and the environment due to the chemicals like mercury they use to extract the precious mineral-gold.

Currently active gold mining in Uganda is in the districts of Mubende, Busia, Namayingo, Buhweju, Nakapiripiriti, Moroto, Bugiri, and Kassanda.

In Uganda, the processing of the gold often takes place in wetlands, near lakes, which directly exposes the ecosystems to mercury and eventually some of it ends up in the air we breathe, and in the fish we eat. The miners in Uganda are exposed to unsafe work environments and lack of safety equipment

Mercury is a slow killer: Why miners should not use mercury

Mercury is a known neurological toxicant it damages the nervous, digestive, and immune systems and the lungs and kidneys as a result of inhaling, ingesting, or even just physical contact with mercury. It can affect speech, sight and cognitive organs in humans, according to the World Health Organization-WHO, and is equally dangerous for animals, and the environment

The main pathways of mercury to humans are:

- Inhalation of mercury vapour from amalgam burning and gold melting
- Ingestion of methyl-mercury from dietary sources such as fish
- Direct contact with the mercury while panning of sediments for amalgamation.

The unfortunate part is that despite mercury being harmful, the mining sector in Uganda is still characterized by uncontrolled use and spillage of mercury. Artisanal gold miners are in contact with mercury in different stages of the mining process, notably amalgamation, panning, and burning of the amalgam

Formalization and regulation of the ASGM

The majority of the artisanal and small-scale gold mining businesses as well as individuals are informal, unregistered and unlicensed. This makes the enforcement of laws and regulations hard as well making the mining sites prone to environmental degradation. The mercury that is widely used by the miners is traded informally in Uganda.

In addition, there is no specific legislation to regulate the use of mercury and cyanide. There is no regulation on its use among the



[ABOVE] Children exposed to mercury poisoning in the gold mining sites.

artisanal small-scale gold miners and generally their activities are not regulated under any specific law in Uganda.

Although the mining policy and legislation provide an overarching framework for the management of ASGM in Uganda, the actual regulation of ASGM falls within various sectoral laws and regulations including national fiscal, environmental and labour policy but this is largely unknown to most miners engaged in ASGM.

The Mining Act of 2003 is silent on activities of artisanal miners and the chemicals used. The process of amending this act is ongoing

and NAPE in the technical meetings attended has strongly urged and recommended that activities of artisanal miners and how they can be properly regulated be included.

NAPE has also used the print media to ask government and related agencies to quicken the process of passing the bill. NAPE believes that with the regulations in place, it will become easier to promote widely other alternatives to mercury use to extract gold like the borax methodology that is currently being implemented in Kassanda district.

The Use of Borax: Promoting an alternative technology to Mercury use in ASGM



[LEFT] Borax added to the gold concentrate on spoon and heated [RIGHT] A piece of pure gold after heating with borax

There is a slow shift by artisanal gold miners to safer methods of extracting gold. This can be mostly attributed to lack of information about alternatives and lacking enough practical demonstrations that alternatives can actually work.

There is also fear that the alternatives can be so costly compared to mercury that has been traditionally used. In order to shift attitudes and behavior ASG miners, efforts must be beefed up to sensitize them more on the potential health consequences from mercury and introduced to new techniques that minimize the amount of mercury used or replace mercury amalgamation with safer alternatives.

In Uganda, mercury remains relatively accessible as gold buyers often avail it to miners on site. Secondly, there is no regulation on the use of mercury among ASGM.

An alternative to the mercury amalgamation method is the gravity concentration method using Borax. This method was introduced in the Philippines about 30 years ago and is still being used. A comparative experiment was conducted in Kalinga (Northern Philippines) where 14 sacks of gold ore were used for comparing the two methods. Seven sacks were used with the mercury method and another seven sacks were for the borax method.

The results gave 8.4 grams of gold from the mercury method and 23 grams from

the gold method. It was also tested and demonstrated in London and Itumbi in Tanzania (Appel and Jonsson, 2010). In Tanzania, the miners mentioned the high price of acetylene gas, the longer time required to prepare the concentrate and the fact that most miners process small quantities of gold (e.g. 0.3 gram) on a daily basis. To the Tanzanians, the borax method seemed a bit advanced for such small quantities

Advantages of using borax over mercury

The advantage of using borax is that it does not harm the environment and the people within or close to the mining sites.

The borax method is cheaper than the mercury amalgamation method. Borax is readily available and inexpensive compared to mercury. Gold extracted by borax is pure whereas gold extracted by mercury contains up to 10% mercury.

Among the reasons for advocating for Sodium Borate (borax) in the smelting process of ore materials is that it reduces the melting point of metals/minerals.

Borax methodology is a short hand term for range of methods to improve the concentration of gold in ore without using mercury so that the ore can be directly smelted (with borax or another flux). In order to be able to directly smelt gold ore using borax, the concentration in the ore must be around 25% or greater.

To create such high-grade material improved concentration methods must be applied.

These improved concentration methods (and the subsequent use of borax) do not represent a simple one-to-one replacement of mercury for another chemical, but usually require new or improved processing techniques, and will generally require rigorous training and capacity building of miners and assistance to promote their adoption especially the method being new. Like borax methodology (where gravity concentration is employed), there are many other technologies that do not use mercury in the gold recovery process including, flotation method, shaking tables among others that could also be explored.

The method is being practiced in northern Philippines. To this end, NAPE acknowledges that training the miners in an alternative gold recovery is a good step towards phasing out mercury use and promoting sustainable gold recovery among artisanal small-scale miners.

NAPE is implementing a pilot project aimed at promoting the use of mercury free technology in the district of Kassanda. The project is funded by the Global Environmental Facility (GEF) under the small grants program of UNDP. The major aspects of the project is to build the capacity of ASGM miners on the less harmful, more user and environmental friendly gold mining methodology using borax.

Gold recovery using Borax through direct smelting: Steps used

1. Wet crushing of the ore.

Water is added in the ore before the crashing in a ball mill. After one hour or 45 minutes the ore becomes fine, then poured the fine mineral-rich material is poured in a sluicing pan ready for sluicing.



2. Sluicing process

The crashed ore is poured in a sluice box and water is used to wash alluvium down a series of angled platform as water washes sediment down a sluice, gold particles sink and are captured by the carpets on the bottom of the sluice box.



3. Panning process.

After the sluicing process, wash the materials from the basin in a pond of water. Sediment thought to contain gold is placed in a pan along with water. The miner then moves the pan in a series of motions designed to eject lighter sediments. The density of gold keeps it on the bottom of the pan as lighter materials are ejected along with water. After a series of successful repetitions of moving the pan are completed, gold is exposed on the bottom of the pan for the miner to recover. Gravity concentration technique is used here to concentrate the amalgam.



4. Smelting of the amalgam with borax

This is the final stage when borax is added to the concentrate and heated until it melts.

The liquid is then cooled to form a solid mass of gold.

Direct smelting using borax is employed as the final stage.



Key Project Activities

Under this project, NAPE has had a number of accomplishments towards the efforts of phasing out mercury use in artisanal gold mining in Uganda.

A baseline survey on Socio-economic, Health and Environment Management status among Artisanal Small-Scale Gold Miners Kassanda of greater Mubende District was carried and from the baseline the major issues of concern which were noted in the mining districts included, high mercury use to recover gold, miners mismanaging of chemical spills resulting in contaminated ecosystems especially wetlands, pollution of water sources and threatening aquatic life, cutting down indiscriminately all trees as a result there is substantial deforestation, digging and leaving soil, sand and stones everywhere encouraging soil erosion and not covering or restoring the dug pits.

A demonstration site has been set up in Lubaali/ Kayonza mining site, one of the many sites in Kassanda District. The purpose of the site is to build the capacity by training and demonstrating to the miners how the borax methodology works so that they can replicate the practice in their different mining areas. NAPE believes setting up more demonstration sites in the different districts where gold mining will help in causing the change and a shift to the mercury free alternatives.



Dr. Chris Bakuneta of Makerere University, the lead consultant on the baseline study of the Mercury Free Project talking to the miners at Lubaali/Kayonza mining site.



Ms. Peruth Atukwatse of NAPE (in black dotted dress) interacts with the women miners on the artisanal mining activities and the dangers associated with the use of mercury to recover gold.



Miners learning the alternative methodology at the demonstration site at kayonza mining in kassanda.

Key Project Activities

NAPE has engaged the media especially the radio, print media and social media to raise more awareness on the dangers associated with the use of mercury and promoting a safer alternative.

A number of articles have been published in the national news papers and on NAPE's website and other social media platforms.

There has been a facilitated interaction between the miners, local government and journalists on the activities of artisanal miners and the voices of the miners have been played on the radio as features and some miners have been hosted on the community green radio based in Kiboga district.

The media has been found to be an important tool in facilitating awareness raising about the project activities and therefore more engagement in this area would be very crucial.



Precious Naturinda (in red dress) a journalist from the Community Green Radio interacts with the women in Kayonza mining site.

Ban mercury use in artisanal mining

Recently, I visited Kayonza gold mines in Kitumbi sub-county, Kasesa district.

As I approached the area, I was welcomed by noise from the ball mills crushing the ore into powder. In the distance, I could see several open pits, some on the hill and others down in the swamp.

There are just few scattered trees remaining in the area and no signs of farming activities here. From morning to evening women, men and children toil in the mines.

While it is clear that from gold they get money to buy food and other necessities of life, none of them seems bothered about the effects of the chemicals used to extract the precious mineral on their health and the environment.

The purpose of my visit to the area was to interact with members of the Kitumbi Kayonza Mining Association that is registered and licensed to oversee, govern and manage all the activities of the miners at Kayonza/Lubwali Mining Site.

As a member of the National Association of Professional Environmentalists (NAPE), I wanted to get first-hand information on what happens in the mines.

Ivan Kama, one of the administrators, showed me around the mines. He showed me the open pits left by the artisanal miners, some of which have been partially filled with water. He said, "There are so many challenges related to the environment here. Look at all these open pits, they are breeding grounds for mosquitoes and the chemicals used in mining, especially mercury could be contaminating the water we use at home."

"We have had cases of animals dying after drinking water contaminated with mercury and who knows, maybe the food we eat is also contaminated. We are aware of the health risks, but we also lack information on alternatives," Kama said.

I interacted with many other miners who seemed to be aware of the negative consequences of using mercury in artisanal mining but they repeatedly told me "it is better to suffer the consequences of using mercury than die of poverty".

In Uganda, the use of mercury in artisanal small-scale gold mining is on the rise. Mercury is a known neurological toxicant that damages the nervous, digestive and immune systems as well as lungs and kidneys as a result of inhaling, ingesting, or even just physical contact with mercury.

It can affect speech, sight and cognitive organs in humans, according to the World Health Organisation-WHO, and is equally dangerous for animals, and the environment.

The unfortunate part is that despite mercury being harmful, the mining sector in Uganda is still characterised by uncontrolled use and spillage of mercury. Artisanal gold miners are in contact with mercury at different stages of the mining process, notably amalgamation, panning and burning of the amalgam.

There is no regulation of its use among the artisanal small-scale gold miners and generally their activities are not regulated under any specific law in Uganda.

The Mining Act of 2003 is silent on activities of artisanal miners and the chemicals used. The process of amending this Act is ongoing and it is our strong recommendation that activities of artisanal miners and how they can be properly regulated be included. We hope Parliament will speed up the process of amending this Act and that views of environmentalists and civil society actors will not be ignored.

There are many technologies that do not involve the use of mercury in the gold recovery process. Among them is gravity concentration, sluice boxes, shaking tables and using borax. Most of these processes are more friendly to human health and the environment in comparison to the mercury amalgamation process, making them preferred options in gold recovery. But for the artisanal miners to be adopt to these safe mining practices, there is need for enforcement by the relevant government agencies such as NEMA.

The Government and agencies like NEMA should put in place regulations that guide the activities of artisanal small-scale gold miners and the use of mercury in gold recovery. Otherwise, the long-term effects on human health and environment will be severe. There is also need for the Government to collaborate with civil society organisations to promote the already known mercury-free alternatives across the country. This could be done by developing education and information materials to enhance awareness on mercury use and the alternatives.

The writer is in charge of chemicals management and climate change at the National Association of Professional Environmentalists (NAPE)

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Regional News

Artisanal miners call for mercury regulation

Loss of soil fertility and miners poor health blamed on mercury exposure.

BY EDISON NYAMAKA

A section of artisanal gold miners at Kitumbi Sub-county in Kasesa District have asked government to restrict the use of mercury in gold mining, citing health risks and ecological effects on the environment.

Mr Ivan Mubwema, a member of the Kitumbi-Kayonza Miners' Association, on Wednesday said continued use of mercury has caused huge losses at his farm.

"I discovered the effects of the mercury after visiting soil scientists who collected me about the mercury substances that have permeated the soil and caused loss of soil nutrients. The tomatoes and cabbage gardens that I planted failed to grow," he lamented.

"After several trials, I attended the farming projects on land near the gold mines. When we visited the experts in the field under the tomatoes and cabbages, we were getting dry, the answer was the effects of mercury substances within the soil," he added.

Mr Mubwema said attempts to introduce the use of borax as an alternative that has been proved to be safe for health and environment have been futile.

He called for regulation of mercury importation and a possible ban to save the miners with better alternatives.

The miners want government to join up with civil society organisations to boost sensitisation programmes about the dangers of amalgamation.

Mr Michael Apulwa, another gold miners' secretary, said his colleagues have enough of absorption of mercury substances causing rashes, headache, backpain and constant body tremors.

The National Association of Professional Environmentalists (NAPE) is in collaboration with Global Environment Facility (GEF) small grants programme and the United Nations Development Programme have already rolled out training sessions for some gold miners on the use of borax.

Mr Joel Mulyira, a miner in Kayonza Village, claims he has suffered constant rashes and flu as a result of exposure to mercury. "When I visited Mukono hospital, the doctors advised me to use antiseptic ointment," he said.

Mr John Waweru, another miner, says he suffers from skin itching whenever he smelts the mines. "I pray that we get alternative chemicals that do not contain mercury," he says.

"It is our prayer that government rolls out a deliberate programme targeting all the artisanal miners in the country," Mr Apulwa said.

Mr Peruth Atukwatse, the officer in charge of chemicals management and climate change at NAPE, last week said, with the support from the GEF Uganda, she is optimistic that the health of miners and the environment will be safeguarded.

The said body has been used by miners in Bulweria, Nanyangwa and other districts, adding that it has been more effective than mercury.

Recommendations

Mr Atukwatse said the introduction of borax is in line with International Convention on mercury which was adopted in 2001, of which Uganda is a signatory.

"The convention left clear time-bound target to phase out the manufacture, export and import of mercury and mercury alloy products."

"As NAPE, we aim at reducing the health and environmental risks of mercury and we shall continue to assist other miners on how to use safer mercury use in completely phased out," Mr Atukwatse said.

In its government advice, the artisanal gold miners to use borax as an alternative to mercury, but it has not been much on over what government formed as a legal mineral extraction.

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Key Project Activities

Facilitated knowledge and experience sharing visits among the artisanal miners. Miners that have already been trained by NAPE in the use of gravity concentration method using borax have been instrumental in training and sharing their experience on the use of borax methodology.

Sande Patrick, an artisan trainer from Namayingo district said he was ignorantly using mercury to extract gold from iron ore not knowing its negative impacts on health and environment until 2014.



Jane Ahimbisibwe from Buhweju demonstrates to the kayonza miners the gravity concentration technique.

"I started using mercury in 2009 when I joined artisanal gold mining. We used to get challenges like corrosive skin, headache and general body weaknesses not knowing that it's as a result of absorption of mercury into our bodies," Sande told artisanal miners during training.

Sande added, "However, when we met NAPE in 2014, we were sensitized about the dangers of mercury and trained in Borax use as an alternative and since then we have never looked back. A few of us who were trained have been able to train others and we are slowly phased out mercury use in Namayingo because we need life."

Jane Ahimbisibwe, another artisanal trainer from Buhweju said for the time she has been using Borax she has observed that the gold recovery from iron ore is high and borax is readily available and less expensive in the market since it is not illegal like mercury.

"As women, we are the ones who normally move with children to the mines, who inhale mercury vapor even when we are pregnant and this puts our children's growth at stake. Its better we spearhead this campaign against mercury use," she said during the training.

We have also been able to engage with the respective Local Government at the District so that they appreciate the need to go mercury free in artisanal gold mining and therefore enforce the alternatives to mercury use.



NAPE meeting with the District officials of Kassanda District to introduce the project and explore of working together towards mercury free gold mining.

Project Target And Impact

The project targeted 100 miners men, women and the youth involved in the day to day mining activities at kayonza mining site. The project targeted the women more.

In Africa and mainly Uganda, women are the most bread winners in the families especially in rural settings. Also, many studies indicate that women play an important role in convincing their fellows young ones, spouses and fathers that change is needed especially if there is an except to do with health and income.

Therefore, this project targeted mainly women as instrumental in ensuring long lasting changes in the miners practices. We have learned that women can be strong advocates for phasing out mercury and good champions for mercury free technologies if empowered and continuously building their capacity on the impacts of mercury and the better alternatives. By teaching women mercury-free mining techniques using the demonstration site constructed in kayonza, 20 women out 60 targeted were able to earn and contribute more economically to the household. This is mainly because, they were able to access and use the ball mill to crush their ore at no cost compared to when they were crashing a sac of ore at 20000 ugx -30,00ugx.

The other important aspect is that women were quick to understand the in toxification of mercury to their health especially when pregnant and when they in the mines with their children and secondly women being the most care takers, when they understood that there is more gold recovery with borax, most were learning eagerly and trying hard to grasp how the gravity concentration technique works and they pledged to shift to the use of borax as soon as they are well equipped with the skills.

The artisanal miners in kassanda have had increased knowledge on the dangers associated with mercury use and the need to move to safer alternatives of extracting gold. We realized this from their demand for intensive training for mercury free alternatives during the different trainings and meetings in the project. This is important to NAPE because it proves the acceptability of the new methodology within the target locality.

There has been increased coverage of the dangers associated with the use of mercury in gold mining on the NAPE Community Green Radio and print media giving an opportunity to other mining communities reached by the radio to know the dangers associated with the use of mercury.

As a result of various engagement, the district local government of Kassanda has appreciated the need to initiate the process of developing a by law on the mining activities specifically regarding mercury use and good environmental practices in the artisanal mining sector in the district.

Artisanal miners in kayonza mining site formed radio listeners clubs which seeks to give communities capacity to effectively participate in social and economic change processes. The radio offers listeners with information and trainings to assist communities in solving the problems they encounter in their daily life regarding unsustainable gold mining practices.



Women at kayonza mining site practicing the gravity concentration technique



Ms. Peruth Atukwatse, the NAPE officer in charge of chemicals management in radio talk show to discuss the impacts of mercury use on human health and environment in the artisanal mining.

The biggest challenge in promoting the mercury free methodologies is lack of sustainable financial support and material resources to train the miners and engage with all the stakeholders. The available alternatives are new and expensive which necessitates prolonged engagements and trainings for the miners to adopt fully.

Key Action Plans For The Communities And District Stakeholders

The project has been an important demonstration on use and application of the safer alternative to mercury use among artisanal miners. To have a bigger impact in promoting this alternative especially the fact that it's still new, the following is recommended:

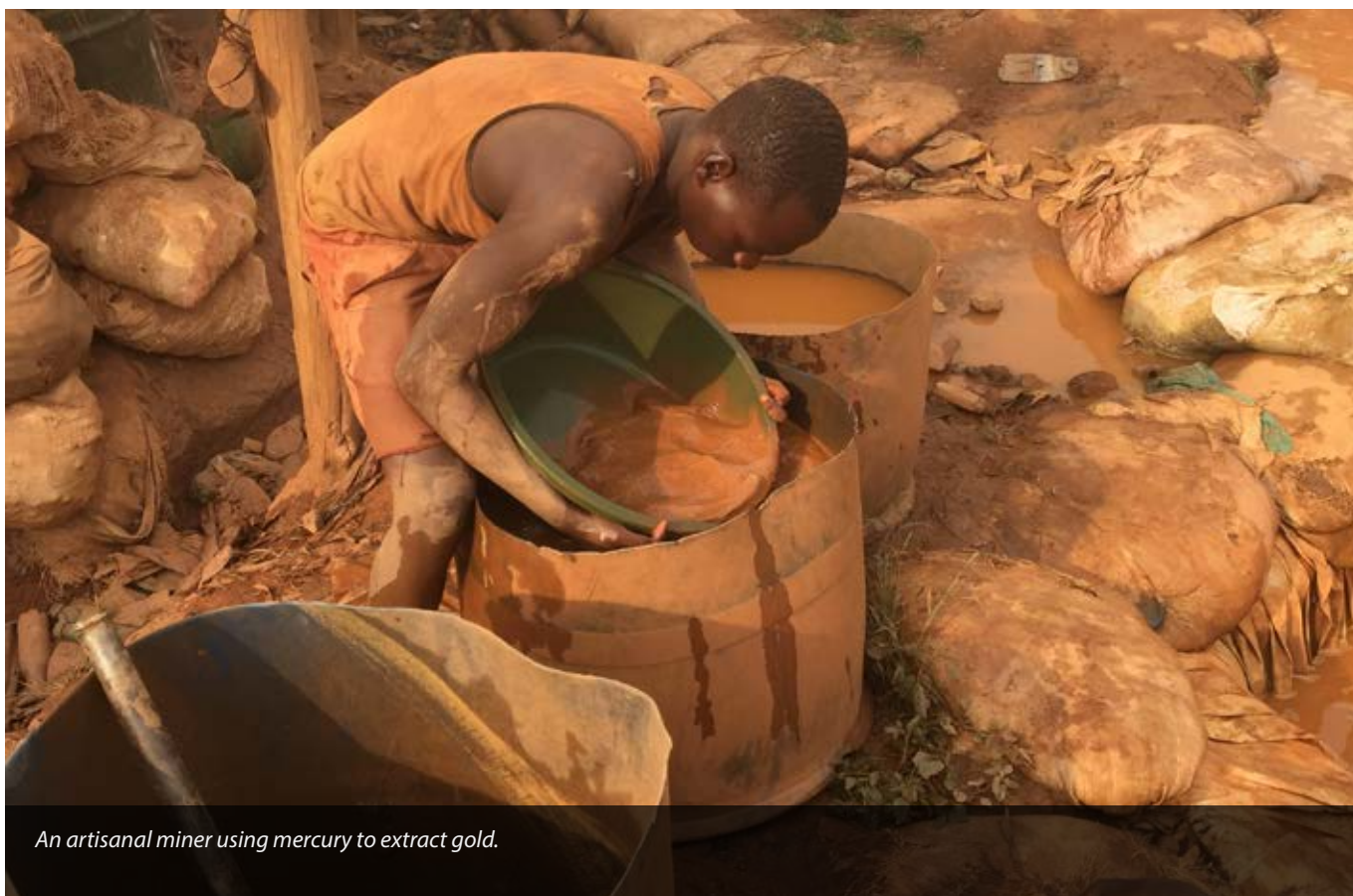
- More trainings on the operation of the new mercury free methodology using borax.
- More demonstration pilots for other mining sites in the district given the fact that the district has over 30,000 miners in different sites. Women especially need their own demonstration site.
- Awareness raising materials and documentation on the health and environmental impacts of mercury. Important also are the education materials on the new alternative methodology. These materials also need to be translated in local languages.
- Following up and being involved in the process of amending the 2019 Mining and Mineral bill currently ongoing and in draft form that seeks to among other things regulate the activities of the artisanal miners including the chemicals used in the sector is an important task for NAPE.
- More media engagement both the radio and print media as this has been found to be instrumental and effective in educating the communities and general public.
- Strengthen sensitization and awareness on occupational health safety and environment- OHS&E hazards, prevention and control measures in ASGM activities
- Promote use of PPEs.
- Also, in the face of Covid-19, there is need for the miners to be sensitized on the various health safety guidelines and behavior especially given the nature of their activities that makes them more vulnerable to respiratory complications and susceptible to corona virus especially in a situation where they lack personal protective equipment and formidable health facilities



Water washed from the tailings that contains mercury finds its way to water sources used by the community and animals. It was reported that some animals died as a result of drinking such water.



Mr. Ivan Kauma (2nd left-light blue shirt) one of the administrators of Kitumbi Kayonza Miners Association points to the underground pit where there are about 100 miners. He said the mine does not have adequate engineering and administrative controls and safe systems in place which puts the lives of the miners underground in danger. The pits sometimes collapse and trap the miners inside.



An artisanal miner using mercury to extract gold.







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