

DEFINING THE ROAD AHEAD

Challenges and solutions for
developing and implementing
National Action Plan to reduce
mercury use in Artisanal and
Small Scale Gold Mining

Acronyms

AGC	Artisanal Gold Council
ASGM	artisanal and small-scale gold mining
ASM	artisanal and small-scale mining
CEDAW	Convention on the Elimination of All forms of Discrimination Against Women
DRC	Democratic Republic of the Congo
EEA	Eswatini Environment Authority
GEF	Global Environment Facility
GOLD	Global Opportunities for the Long-term Development of the ASGM sector
ECOWAS	Economic Community of West African States
IUCN	International Union for Conservation of Nature
LSM	large-scale mining
MRU	Mano River Union
NAP	National Action Plan

This report has been prepared by Mr. Jorden de Haan for the Africa Institute and UN Environment. It draws lessons from a regional NAP workshop that was held in Manzini, Eswatini, 21-23 May 2019.

Photo credits: Sandile Jele, Eswatini Environment Authority (pages: 4, 34, 35); and Duncan Moore (pages: 10, 22, 28), Veejay Villafranca (pages: 25, 30) and Malgorzata Stylo (cover), UNEP.



Key findings and recommendations

Countries need more support in conducting health and socio-economic assessments and more guidance in developing the NAP's public health strategy

If approached comprehensively, ASGM formalization can serve as a vehicle for effective mercury management and broad-based sustainable and socio-economic development

There is no 'one-size-fits-all' alternative' to mercury use, and it is critical to integrate considerations of sustainability and scalability in the introduction of new technology

Management of mercury trade needs to be approached regionally, with inter-ministerial, multi-sectoral, bilateral and multilateral collaboration and regional projects

Use of audiovisual materials (e.g. documentaries) can be an effective means of awareness raising and leveraging political will among decision makers for mercury and ASGM issues

A good starting point for mobilizing financial resources for implementation is linking the NAP to national priorities and related national, regional and international development frameworks

Regular stakeholder consultations at the local and national levels for priority setting (or the development of a national vision for the ASGM sector) can enhance coordination and pave the way for NAP endorsement and implementation



Background



Development of National Action Plans (NAPs) for artisanal and small-scale gold mining (ASGM) is an obligation under Article 7 of the Minamata Convention on Mercury for each country that determines that ASGM in its territory is “more than insignificant”. Because the ASGM sector is closely linked to complex economic development and poverty issues, the Convention allows flexible, country-specific solutions through the development of an ASGM NAP. Taking a holistic approach

to the sustainable transformation of the ASGM sector, Annex C of the Convention requires the NAPs to include a variety of implementation strategies, ranging from the introduction of better mining practices to strategies for formalizing the sector.

In collaboration with the Africa Institute, the United Nations Environment Programme (UN Environment) organized a three-day workshop

for African countries implementing their NAPs with the agency. This work has been undertaken as part of UN Environment’s Global Component support to countries implementing their NAPs with UN Environment, which are all financed by the Global Environment Facility (GEF). The workshop was hosted by the Eswatini Environment Authority (EEA) and took place on 21-23 May 2019 in Manzini, Eswatini. The overarching aim of the workshop was to promote regional cooperation and exchange of information and experiences, and to identify and explore challenges and corresponding (potential) solutions for NAP development and implementation.

This report discusses those challenges and solutions. The target audience is NAP-executing countries and associated agencies, regardless of the status of their NAPs or the implementing agency they are working with. Besides workshop discussions, it builds on data collected through a detailed electronic pre-workshop survey that was completed by 13 participating countries, and a brief post-

workshop survey that was completed by 23 workshop participants. The report is organized around six key issues that were discussed during the workshop:

1. Developing a national overview of the ASGM sector
2. Developing formalization strategies
3. Introducing better mining practices
4. Managing mercury trade regionally
5. Safeguarding public health
6. Addressing gender equality as a cross-cutting issue

Discussion of these key issues is followed with deliberations on the road ahead: paving the way towards NAP implementation, with a focus on leveraging the necessary political will and inter-ministerial coordination, and the mobilization of financial resources. Finally, based on the identified challenges and solutions, the report concludes with a brief summary of key

takeaways/general recommendations for NAP development and implementation.

Details about the workshop agenda and participants are listed in the annex.



Figure 1. Key aspects of the ASGM overview

Key issue 1

Developing a national overview of the ASGM sector

By the time of the workshop, the large majority of NAP countries had successfully finalized their ASGM overviews, including baseline estimates of mercury use. The purpose of the ASGM overviews is to inform the NAP and its implementation strategies. Whereas baseline estimates of mercury use are a direct requirement enlisted in Annex C of the Convention, additional information is required to inform the NAP's strategies and to address the wider development issues related to the ASGM sector. The figure 1 illustrates the scope of the national ASGM overview, highlighting four broad categories of information: regulatory and institutional aspects; technical and environmental aspects; health aspects; and socio-economical aspects.

All participating countries have used the UN Environment & Artisanal Gold Council (AGC) toolkit [“Estimating mercury use and documenting practices in ASGM: Tools and Methods”](#) (hereafter: Baseline Estimates

Toolkit) to investigate (mainly) the technical and environmental aspects, including mercury use and practices employed at mine sites. A handful of countries have used UNITAR's [“Socio-economic ASGM Research methodology”](#)¹, in combination with the mentioned toolkit, to investigate socio-economic and regulatory and institutional aspects in more depth and beyond the mine site. Health aspects have been investigated by very few countries. In the future, they can be investigated with new guidance and tools that are being developed by the AGC, along with existing guidance from the World Health Organization (WHO – see key issue 5).

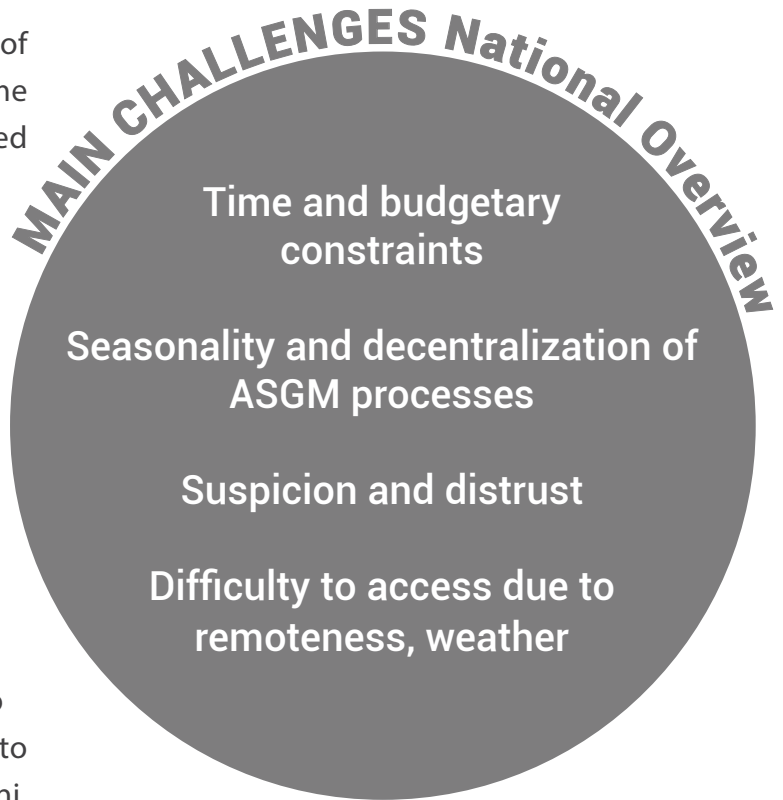
Identified challenges

According to the workshop participants, an important reason for limited use of tools and limited coverage of various aspects of the ASGM overview relates to inadequate training opportunities and inadequate time and

1 UNITAR, 2018. Socio-economic ASGM Research Methodology. UNITAR, Geneva

budgeted allocations for the development of the ASGM overview in the NAP projects. Time and budgetary constraints have also limited the number of ASGM sites and communities that were visited during field studies, as well as the amount of time that could be spend in each locality. These limitations are exacerbated by related challenges. First, ore extraction, processing and mineral trade often take place in different locations, requiring more time to draw a full picture per locality. Second, the number of miners per locality is variable day-to-day and can also change seasonally, which suggests it is desirable to visit each mining locality more than once to capture a more 'average' situation. In Eswatini, this is particularly challenging as many miners (and particularly those operating in National Protected Areas) mine during the night and are absent during the day. This variability is also affected by the transboundary movement of miners. Building on the example in Eswatini, many South African gold miners cross the border at night to extract ore in Northern Eswatini and are gone in the morning.

Another major challenge faced during the field studies concerns the difficulty of retrieving reliable data on sensitive topics, such as mercury use and gold production estimates. Workshop participants have indicated that many miners and traders are reluctant to share such information, and that they are suspicious of government's intentions. As has been documented in elsewhere², for a large part, such suspicion and distrust are caused by the



collision between the typical informality of ASGM on the one hand, and the formality of the field study on the other hand. Indeed, as a result of the sector's informality, there are typically few engagement mechanisms and limited dialogue between government and ASGM actors. In some situations, miner-government interactions are limited to police and/or military interventions, and the security of the field research team may be threatened in areas with augmented social and political tensions. Especially when the field research team visits ASGM areas with a high degree of formality (e.g. in terms of language and clothing), it becomes difficult to retrieve detailed and reliable information.

In addition to this, because of the sector's informality, there are many data gaps.

² Stylo, M., De Haan, J.S., Davis, K. in preparation, Collecting, managing and translating data into National Action Plans for Artisanal and Small Scale Gold Mining. Manuscript submitted for publication with The Extractive Industries and Society.

Especially limited information is available on actual gold production and sales and supply chain dynamics. Likewise, since mercury is often supplied through the same informal networks of gold trade, countries have limited insights into the sources of the mercury used on their territory. Limited cooperation between government departments and reluctance to share information about the sector pose further challenges.

A final set of common challenges relates to logistical factors. ASGM areas are typically spread over the country and located in rural areas where road infrastructure is limited. In tropical environments, ASGM sites are often difficult to access due to a physically challenging terrain, where field research teams may have to cross dense forests, endure heavy rains or cross rivers before reaching selected mine sites.

Methodology introduces a participatory approach which aims to empower miners in supporting the research process. In addition, both this methodology and the Baseline Estimates Toolkit provide concrete guidelines on developing relationships with ASGM communities and adjusting the field researcher's language and dress code to decrease the (perceived) contrast in formality between the research team and the ASGM communities.

Moreover, suggestions have been made to engage ASGM communities in the inception workshop and in periodic stakeholder engagement workshops to build this trust from the outset. By including different government departments in such workshops and in other meetings and taking their needs into account, inter-ministerial coordination can be improved, and data sharing can be encouraged. In particular, early engagement between the relevant

Identified solutions and recommendations

Since many of the identified challenges are related to issues of trust, an identified solution is to proactively plan ASGM stakeholder engagement activities throughout NAP development and communicate the value of miner-government cooperation. Several workshop participants have suggested to work directly with miners, traditional authorities and local informants from ASGM communities to build trust and obtain reliable information about the sector. To support such approaches, the mentioned Socio-economic ASGM Research



Environment and Mining Ministries or Agencies should be ensured.

In addition, in view of the sector's complexities and the logistical challenges encountered during field studies, countries (as well as implementing and executing agencies) should consider committing more funds and time to the development of the ASGM overview and associated training. This is especially applicable to large countries with rugged terrains and poor road conditions, such as the Democratic Republic of Congo (DRC). Budget planning and resource allocation for the ASGM overview should not only aim to enhance the sample size and rigour of data collection, but also sufficient coverage of thematic aspects of the ASGM overview, including especially socio-economic and human health issues.

Finally, the specific issues investigated in the ASGM study should be informed by the NAP's goals, which should reflect both the Minamata Convention's requirements and national development priorities. Ideally, these goals should thus be well considered and discussed with various stakeholders before the ASGM overview study kicks off. While it may not be possible

to investigate all aspects in-depth during the ASGM overview, the NAP's work plan can include steps for investigating certain issues in more depth in coordination with civil society. For example, academia can be engaged to further investigate the extent of mercury contamination in the environment, or the extent of health impacts of mercury exposure to miners and affected communities. In another example, gold and mercury supply chain dynamics and ASGM's complex relationship with local development can be investigated in more depth with local NGOs.



Key issue 2

Developing formalization strategies

ASGM's informal nature has been identified by virtually all participating countries as a key challenge for NAP implementation, and the workshop reflected consensus on the importance of formalization for mercury management and for sustainable socio-economic development in general. In summary, country representatives agreed that ASGM formalization can:

- Facilitate miners' and traders' access to finance, assistance, and the global market, and consequently their ability to adopt better mining practices;
- Facilitate the regulation of mercury trade;
- Make the sector more visible and accessible and address many of the sector's data gaps, thereby creating an enabling environment for stakeholder engagement, awareness raising, public health promotion, transparency and accountability;
- Legitimize rural livelihoods and stimulate sectoral linkages (e.g. agricultural investments), and thus unlock the sector's full development potential

However, formalization is a complex topic. At the time of the workshop, only one

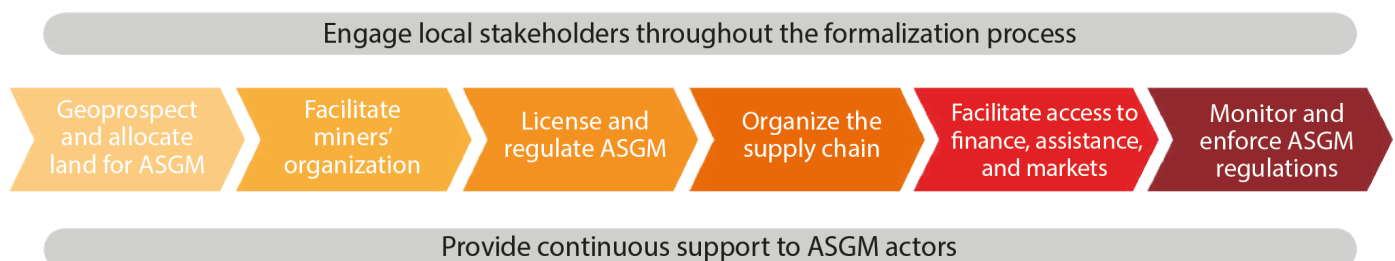


Figure 2. Key components of the ASGM formalization process (from the Formalization Handbook)

country (Sierra Leone) had developed a full formalization strategy for its NAP. Nevertheless, all participating countries showed significant interest in formalization, and several countries had already consulted the UNITAR and UN Environment “[Handbook for developing national ASGM formalization strategies within National Action Plans](#)” (hereafter: Formalization Handbook)³. Moreover, many countries, such as Kenya, Congo and Uganda, had already developed separate approaches for formalizing the wider artisanal and small-scale mining (ASM) sector and shared experiences from ongoing initiatives.

Identified challenges

General challenges identified for ASGM formalization include limited government capacity and financial resources to regulate and monitor ASGM activity throughout the country, and challenges inherent to imposing a formal structure on a sector that has its own logic for regulating behaviour. In addition to this, challenges have been identified across various components of the formalization process (see Figure 2 above).

Geoprospecting and allocating land (component 1) is a key challenge in sub-Saharan Africa as only limited geological data is publicly available and as geoprospecting is an expensive task. Moreover, land allocation is a complex issue as many sub-Saharan African countries have overlapping normative frameworks for land tenure. For example, land may be privately owned by families or

there may be other customary arrangements that dictate land ownership and use. Such situations make it difficult for governments to map land use and to allocate land for ASGM activities. Other identified challenges relate to conflicts between ASM and large-scale mining (LSM) companies over land access, and issues of gender discrimination in land tenure, where customary laws or norms affect women rights to own or inherit land.



Participating countries were making more advance on the second component: facilitating miners' organization. Indeed, many countries have miners' associations, committees or cooperatives. However, participants indicated

³ UNITAR & UN Environment, 2018. Handbook for Developing National ASGM Formalization Strategies within National Action Plans. UNITAR & UN Environment, Geneva.

that such structures often have limited organizational capacity and provide miners with limited benefits. Many participants also shared that they are encouraging ASGM miners to organize into cooperatives. However, experience in countries such as the DRC shows that the requirement to organize exclusively into cooperatives limits miners' freedom of association and that if not properly assisted, cooperatives tend to fall short on the egalitarian values they are supposedly based on.⁴

Component 3, licensing and regulating ASGM, is an issue that virtually all countries are working on. In some countries, such as Eswatini and Uganda, ASGM is 'extra-legal' because at the time of the workshop, those countries had no regulatory framework that recognizes ASGM activity and provides specific guidelines to this subsector. Component 4, the organization of the gold supply chain, is an important component that so far received little attention from participating countries as the focus is often on the mine site (where mercury is mainly used and where other environmental and health impacts occur). Nevertheless, countries such as the Republic of Congo and the DRC shared their experience in adopting a regional certification mechanism designed for the Great Lakes Region⁵. An identified key challenge under this component is incentivizing traders to refrain from gold smuggling, which is often attractive in view of the presence of more favourable taxation and royalty rates in neighbouring countries.

In view of limited time, components 5 and 6 were not discussed. However, it was acknowledged that miners' and traders' limited access to finance, assistance and markets are key obstacles to formalization and the transition towards better mining practice. Indeed, as such issues enable compliance with regulatory frameworks, these aspects should ideally first be addressed before policies are enforced.

Identified solutions and recommendations

A key takeaway about ASGM formalization is that in many contexts, it is not feasible to formalize the entire ASGM sector. It is possible however, to divide the ASGM sector into subsectors and adopt different approaches towards formalizing (parts of) individual subsectors. For example, Sierra Leone's formalization strategy includes an approach for formalizing only a part of the artisanal gold mining sector in so-called 'ASM zones' and simply promoting better practices in the rest of this subsector. In addition, it includes a separate approach for formalizing the entire (but smaller) small-scale gold mining subsector. Selection of the 'right' approaches for the national context requires a good understanding of the ASGM sector (including especially the organization of gold production and trade) and of available government capacity. It also helps if countries have a national vision for the sector (see page 30). Several other best practices and solutions have been identified for specific components

⁴ See for example: De Haan, J.S. & Geenen, S., 2016. Mining cooperatives in Eastern DRC: The interplay between historical power relations and formal institutions, *Extractive Industries and Society* 3(3): 823-831

⁵ To learn more about the Regional Initiative against the Illegal Exploitation of Natural Resources and its Regional Mechanism for the Great Lakes Region, see: <http://www.icglr.org/index.php/en/rinr>

of the formalization process.

Regarding geoprospecting and allocating land, costs can be minimized by focusing geoprospecting activities on areas where shallow gold deposits are known to be located. Moreover, miners and other local stakeholders could be included in the process to capitalize on their knowledge base. This is related to a more general lesson learned: the importance of including miners, traders and other local stakeholders in formalization policy development, monitoring and enforcement.⁶

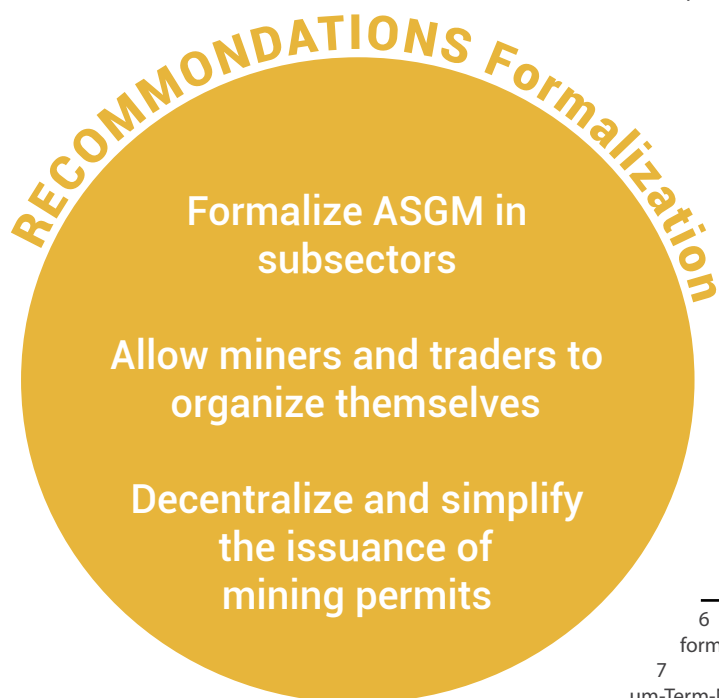
Regarding miners' organization, it has been suggested that the regulatory framework should allow miners and traders to organize themselves into different types of entities (e.g. cooperatives, associations and SMEs) and that they should be guided in the process with workshops and trainings. Likewise, as the Republic of Congo shared, needs assessments need to be undertaken to assess miners' needs.

Based on this,

trainings need to be delivered on issues such as business management and cooperative governance.

In terms of licensing and regulating ASGM, an identified best practice was the decentralization of the issuance of mining licenses and related responsibilities to the local level, as is currently done in countries such as the Republic of Congo and Sierra Leone. This relates to the institutional coordination of formalization efforts. On this issue, Kenya shared promising plans of establishing so-called "ASM committees" under the Ministry of Petroleum and Mining (State Department of Mining), which are mandated with regulating the ASM sector and promoting inter-ministerial coordination and decentralized governance. Such committees can also serve as centers of excellence on ASM, including the provisioning of training extension services. Similarly, the Republic of Congo has established "la Direction de la petite mine et de l'artisanat minier rattachée" (the Directorate of artisanal and small-scale mining) within the Ministry of Mines.

Finally, workshop participations underscored the need to leverage political will and financing for formalization by making it a national policy priority, as has been done in Sierra Leone's Medium Term National Development Plan⁷. Further steps and guidance for addressing this key issue can be found in the cited Formalization Handbook.



⁶ For guidance on this, see also the human rights-based approach to ASGM formalization presented in the Formalization Handbook

⁷ <http://www.moped.gov.sl/wp-content/uploads/2019/03/Medium-Term-National-Development-Plan-Volume-I.pdf>

Key issue 3

Introducing better mining practices

Another key issue that was discussed during the workshop is the introduction of better mining practices and mercury-free technology. At present, ASGM miners use mercury because it is relatively cheap, it is easy to use, and they have easy access to it. For alternatives to be accepted successfully, it must be demonstrated that they yield more gold and that they recover gold fast, and they must be cheaper than mercury.

At the time of the workshop, several participating countries had drafted the NAP's strategies on eliminating the use of 'worst practices' (as identified in Annex C of the Minamata Convention). However, few countries had drafted concrete strategies for introducing better mining practices for mercury reduction and/or elimination. Nevertheless, beyond NAPs, several initiatives have taken place to date. For example, with support from the US Department of State and GIZ (Deutsche Gesellschaft für

Internationale Zusammenarbeit), AGC has established mercury-free processing plants in countries such as Guinea and Senegal, which also participated in the workshop. Such interventions have demonstrated that it is possible to not only reduce, but also eliminate mercury use in ASGM, while at the same time enhancing gold recovery.

The workshop's discussions on better mining practices reflected the fact that there is no 'one-size-fits-all' 'alternative' to mercury use, but that various improvements can be made through the introduction of better mining practices in various steps of the mining cycle. In short, key steps of the mine life cycle include exploration, mine site preparation, extraction, processing (e.g. crushing, grinding, milling), concentration (e.g. sluicing, panning) and refining (e.g. direct smelting). In ASGM, some of the biggest improvements can be made at the processing and concentration stages, where ore particles are reduced in size and gold particles are liberated and separated

from the ore.⁸

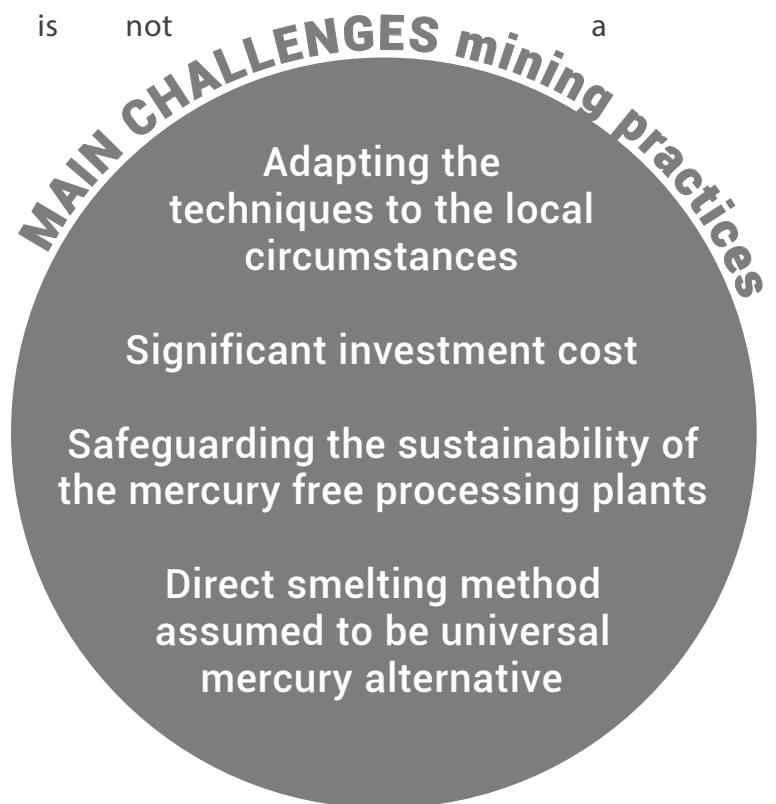
Identified challenges

The most suitable mining practices depend on the local geology, current practices used, economic and organizational capacity of ASGM miners, and cultural acceptance of new methods. Therefore, a first key challenge is to find out what practices could be most suitable to a country's ASGM areas, which may differ in the above-mentioned characteristics in different provinces.

Another key challenge is financing the introduction of better mining practices, and potentially the adoption of mercury-free technology. Experiences from AGC in Senegal have shown that the full costs (including equipment, transport, labour and other costs) for installing a mercury-free processing plant could amount to \$100,000 (USD) – roughly the equivalent of 2,5kg of pure gold – depending on the local context. While these costs are significant, it should be kept in mind that they concern an investment in gold recovery. Depending on the success of adoption, the enhanced recovery would likely offset the costs in one or several years. The next challenge is safeguarding the sustainability of such plants (i.e. their effective use after the project has ended), which will require extensive awareness raising, training, cultural acceptance and technical support. Yet even if one succeeds in permanently eliminating mercury use in a given ASGM community, the bigger question is how such interventions can be scaled up to

other communities in the region.

In terms of potential 'alternatives' to mercury, one method discussed during the workshop is direct smelting. In terms of the mining cycle discussed above, direct smelting takes place at the refining stage, after the gold particles have been liberated and for a large part separated from the host ore during processing and concentration. In the direct smelting process, a small amount of high-grade concentrate is melted to further separate the gold from other minerals, and to produce a solid gold doré. To facilitate the melting process, sodium tetraborate (borax) can be used as a flux at the end of the process, but other fluxes can equally be used. However, it is important to understand that direct smelting is not amenable to all ore types and mining situations and is not a



direct replacement for mercury because it is not applied at the same stage of processing. Indeed, whereas mercury is typically applied to large masses of concentrate, direct smelting is applied to small masses of high-grade concentrate (50 to 100 grams)⁹ at the very final stage of the mine life cycle. Given that direct smelting requires a high-grade concentrate, effective comminution (grinding) to liberate gold particles from host rock and the best available concentration methods are a prerequisite for good results. During the discussions, it became clear that there is limited understanding of the direct smelting method and that it is often wrongly assumed to be a universal mercury alternative in ASGM production systems.

A final key challenge that was identified in the workshop is the use of cyanide for the processing of mine tailings, which may or may not be contaminated with mercury. Uganda shared that this is causing major problems, where mine tailings are frequently dumped in Lake Victoria after the cyanidation process. Related to this is the issue of contaminated sites, as was highlighted by the Minamata Secretariat in regard to forthcoming guidance at COP 3 (2019). All over Africa, there are abandoned gold mines which may be contaminated with mercury and other chemicals, posing significant risks to human health and environment. However, it takes rigorous and often expensive methods to identify and characterize mercury contaminated sites, let alone mobilize the

resources required to remediate them.

Identified solutions and recommendations

At least two things have become clear: i) there is no 'one-size-fits-all' alternative to mercury use; and ii) whatever new methods are introduced, they need to build on current methods used and ASGM miners' knowledge, skills, attitudes and social and economic organization. Thus, a key starting point is understanding the ore mineralogy, practices used, local perceptions concerning the use of mercury and new technologies, as well as the organizational structures and financial capacity of ASGM miners and their communities. Countries should ideally investigate all such aspects as part of their ASGM overviews.

Moreover, in view of the costs of introducing processing and the challenges for safeguarding the sustainability and scalability of such mercury-free methods, the workshop participants agreed that greater emphasis should be put on taking a holistic approach to mercury reduction in ASGM, which addresses root causes of mercury use and other issues of concern. At all times, the introduction of better mining practices should be combined with extensive education and support with formalization. This should start with awareness raising on mercury issues and educating communities on steps that could first be taken for the elimination of the worst practices used, and improvement of existing methods. For example, restricting mercury-gold

⁹ UN Environment, Global Mercury Partnership, Artisanal Gold Council, UNIDO, University of Victoria and International Union of Geosciences Commission on geosciences for Environmental Management, 2012. A Practical Guide. Reducing mercury use in Artisanal and Small-scale Gold mining. https://www.unido.org/sites/default/files/files/2017-11/ASGM_English%20%281%29.pdf

RECOMMENDATIONS mining practices

New methods need to build on current practices, skills, and social and economic organization of miners

Introduction of better mining practices should be combined with extensive education and support with formalization

Further disseminate the guidance on cyanide and acid use

amalgamation and burning of amalgams to 'buffer zones' outside of communities and water sources to protect local residents and the environment. Moreover, cooperatives, associations or SMEs could be established and assisted to institutionalize knowhow of better mining practices, and they could be assisted in developing economies of scale and accessing finance to fund the acquisition of new technologies. Furthermore, whenever new technologies and methods are considered, they should be tested with ASGM miners and where possible, amended to suit local practices and source local materials and skills. Likewise, their use should be demonstrated, and convincing business cases should be developed to demonstrate their

profitability over time.

Regarding mine tailings and abandoned mines, identification of mercury and cyanide contaminated site clusters or regions where ASGM activity has been documented to take place should be considered in NAP implementation. Criteria for targeting sensitive ecosystems such as wetlands, floodplains or transboundary river systems near agricultural production should be considered.

Finally, there is a need to further disseminate and promote the use of existing guidance on direct smelting, to enhance understanding of when it may and may not be effective. Moreover, guidance for the use of acid and cyanide, which are respectively used for gold purification and the processing of tailings in sub-Saharan Africa, should be developed and harmonized with guidance related to mercury¹⁰. Further steps and guidance for addressing these issues can be found in the "[Practical Guide. Reducing mercury use in Artisanal and Small-scale Gold mining](#)" (see footnote 9), "[Illustrated Guide to mercury free artisanal and small scale gold mining](#)" and the "[Manual for training Artisanal and Small-Scale Gold Miners](#)" (see footnote 8).

¹⁰ For example, the "International Cyanide Management Code For the Manufacture, Transport, and Use of Cyanide In the Production of Gold", which was developed under guidance by UNEP, could be engaged in Minamata and NAP work. See also: <https://www.cyanidecode.org/>

Key issue 4

Managing mercury trade regionally

Whereas the introduction of better mining practices can serve to decrease miners' demand for mercury and formalization can facilitate the regulation of mercury trade, it is still necessary to develop a dedicated strategy for managing mercury trade and preventing the diversion of mercury from other sources. At present, mercury is largely supplied to ASGM through informal trade networks. As a result, relatively little is known about mercury trade dynamics (e.g. the key actors involved, informal governance of mercury, the intermediary and ultimate sources of mercury) in Africa. But more recently, several organizations such as the World Bank, International Union for Conservation of Nature (IUCN) and UNIDO have commenced studies about illegal mercury trade on the continent, and several countries have started to investigate mercury

trade as part of their ASGM overviews.^{11 12 13}

In short, early findings indicate that mercury, which is not produced at significant amounts on the continent, enters sub-Saharan Africa through three main hubs: Durban (South Africa), Mombasa/Nairobi (Kenya); and Lomé (Togo)¹⁴. Through these hubs, mercury enters Southern Africa, East Africa and West Africa respectively. As has been mentioned before, mercury is often supplied to miners by the same traders that buy gold in informal arrangements, so mercury often passes through gold supply chains in the opposite direction. However, this is not always the case. Mercury also finds its way to ASGM areas through other networks, for example, through hospitals, pharmacies and imports of mining equipment.

¹¹ World Bank & COWI, 2016. Mercury trade and use for artisanal and small-scale gold mining in Sub-Saharan Africa - Final Report. Tech. rep., COWI.

¹² UNIDO, 2018. Curbing Illicit Mercury and Gold Flows in West Africa: Options for a Regional Approach. <https://www.unido.org/sites/default/files/files/2018-11/UNIDO%20ECOWAS.pdf>

¹³ IUCN – Netherlands has recently commenced a field study into mercury trade in Burkina Faso, Tanzania, Kenya, Uganda, Guyana, Suriname, Bolivia and the Philippines. The results are expected to be published in November 2019.

¹⁴ While Sudan is the largest importer in the region, it is also a major user, and evidence on mercury exports from Sudan to other countries in the region requires further research (see the report cited in footnote 11)

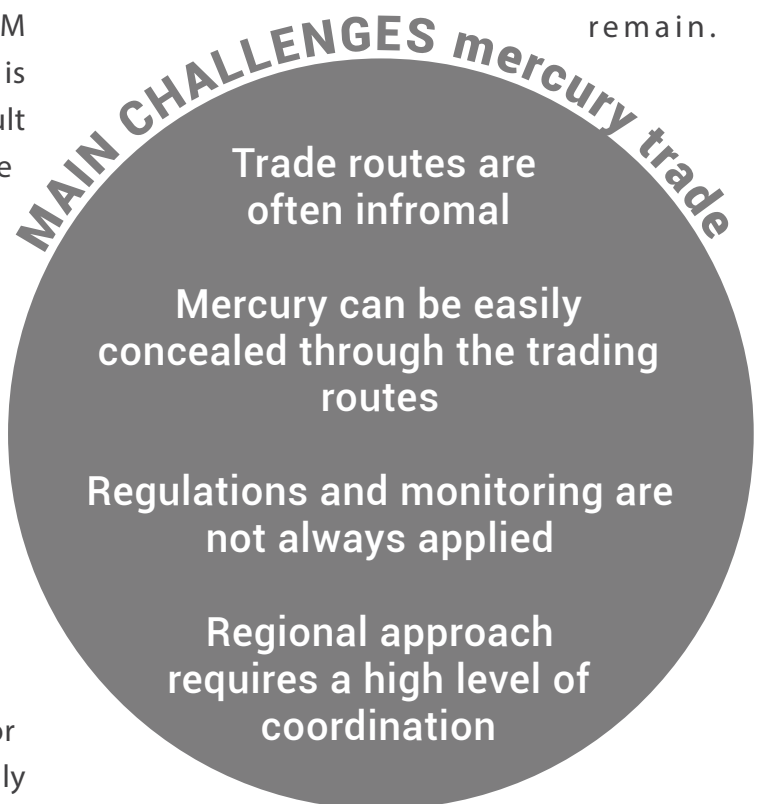
At the time of the workshop, about half of the participating countries had indicated that they had started drafting the strategy for managing mercury trade, while each of them indicated that they wanted to learn more about this topic.

Identified challenges

Many challenges regarding the management of mercury trade were identified during the workshop. First, since the ASGM sector is largely informal and mercury typically enters ASGM sites through the same informal networks, it is difficult to understand and even more difficult to control mercury trade. By extension, there are large data gaps in illegal mercury trade dynamics, especially as we move more upstream in the mercury supply chain (i.e. further away from ASGM mines). Many preliminary findings, such as the way that mercury presumably enters Sudan, need scrutiny and verification.

Besides informality, field investigations about mercury trade are challenged by the fact that mercury, which is typically transported in small containers, tubes or bottles, is not easily traceable and can be easily concealed. For example, several countries reported that mercury is imported along with large shipments of mining equipment, which poses challenges for detection. Likewise, mercury is often supplied to ASGM miners by foreign-owned semi-mechanized mining companies, who often operate under ambiguous legal circumstances and do not (or pretend not to) speak the local language and are thus difficult to access.

Further challenges relate to the regulation, monitoring and enforcement of mercury trade. Many participating countries indicated that they do not currently have regulations in place for the supply and trade of mercury and mercury compounds. But even if they would, there are significant challenges in translating policy into practice. In general, when there are no projects or dedicated budgets for implementing regulations, gaps between policy and practice often remain.



Moreover, similar to ASGM regulations, regulations concerning mercury trade tend to be perceived as cumbersome by mercury traders, motivating them to operate informally. In addition, many Sub-Saharan African countries have porous borders where monitoring and enforcement capacity may be low and where small goods can be smuggled

relatively easily.

Finally, the workshop discussions reflected clear consensus that mercury trade needs to be addressed regionally, which brings its own set of challenges. Indeed, regional approaches require smooth regional collaboration and harmonization of wider policy frameworks. For example, as the discussions on the organization of the gold supply chain have demonstrated (a key component of ASGM formalization),

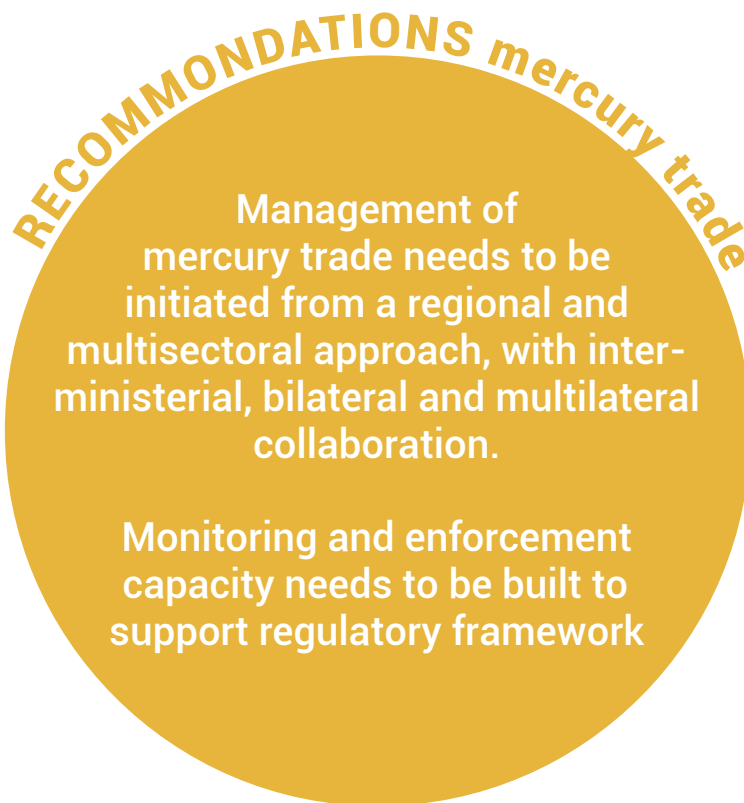
r e g i o n a l

Identified solutions and recommendations

A general recommendation is that the management of mercury trade needs to be initiated from a regional and multisectoral approach, with inter-ministerial, bilateral and multilateral collaboration. Regional bodies such as the Economic Community of West African States (ECOWAS) and sub regional bodies such as the Mano River Union (MRU) can be used as negotiation platforms for harmonizing regulatory frameworks and facilitating as aspects of regional approaches. Moreover, regional projects should be considered to address this issue. Based on the results of an exercise that was conducted during the workshop, several concrete steps that could be taken in such projects are discussed below.

First, it is necessary to better understand mercury trade dynamics. In short, further research needs to focus on key players, key hubs and key sources of mercury supply in the region. Ideally, NAP-executing countries should investigate the mercury supply chain along with the gold supply chain as part of the ASGM overview, where mercury baseline estimates could be compared to official trade statistics to gain insights in the scale of illegal mercury supply.

Second, regulatory frameworks need to be developed or amended for mercury trade, which should aim at incentivizing mercury traders to formalize. This should be done in coordination with the ASGM formalization strategy, including particular its component on organizing the gold supply chain and

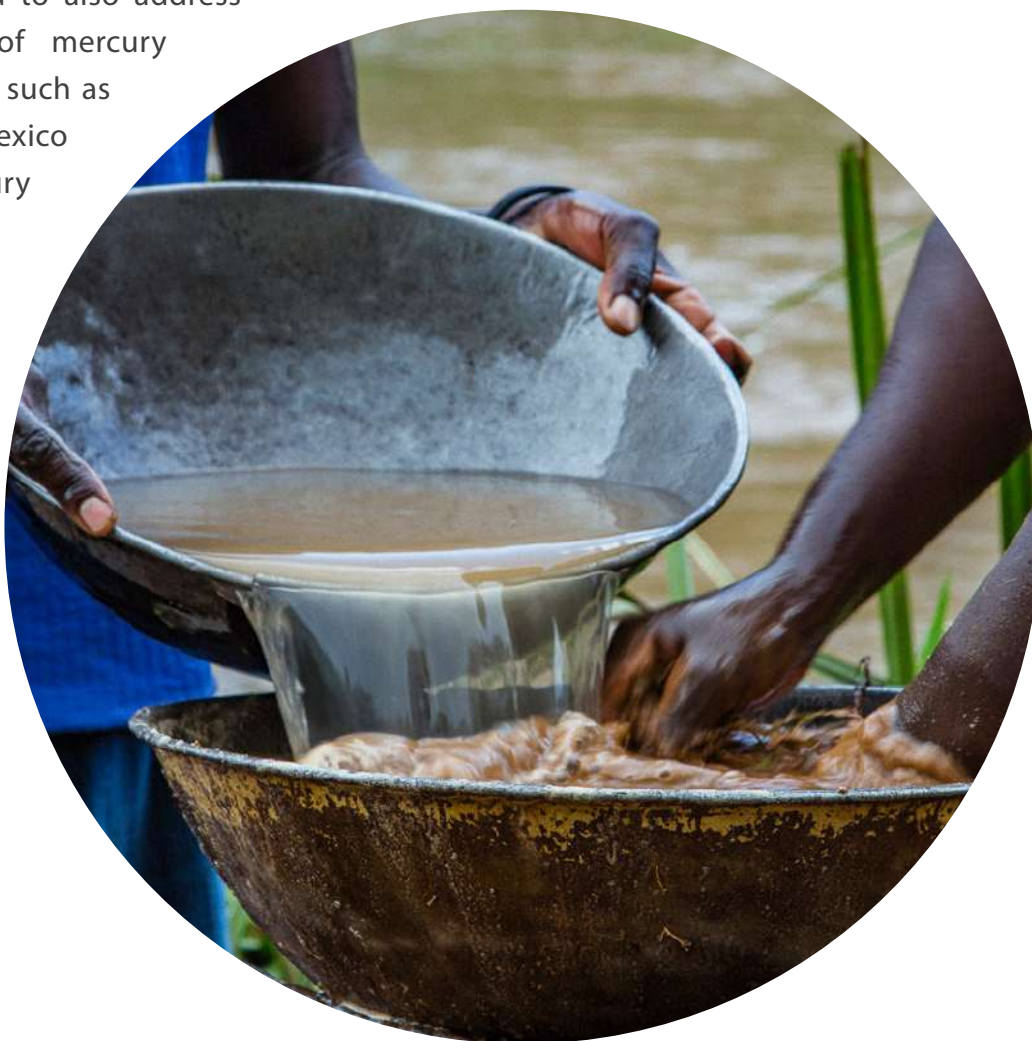


inconsistencies in applicable tax and royalty rates persist in sub-Saharan Africa. Such inconsistencies incentivize gold traders (who may be mercury suppliers) to continue operating informally.

related regulatory issues.

Third, monitoring and enforcement capacity needs to be built. National or regional mechanisms should be established to monitor mercury supply and trade. Such mechanisms should ideally build on existing structures, such as mechanisms that are established as part of the formalization strategy for monitoring gold production and trade. Moreover, customs, port and police officers need to be trained on illegal mercury and gold trade and their enforcement capacity needs to be strengthened. Taking a regional approach, this should be done in coordination with such authorities from neighboring countries.

Finally, it was suggested to also address the ultimate sources of mercury supply: overseas sources such as Indonesia, China and Mexico where extensive mercury mining still takes place. Given the sensitivity of such issues, they should be discussed in multilateral settings. Further steps and guidance for addressing this key issue can be found in UN Environment's [“Quick Start Guide for managing mercury trade in artisanal and small-scale gold mining”](#).



Key issue 5

Safeguarding public health

A public health strategy is important for NAP implementation as mining communities and nearby communities are vulnerable to the exposure of mercury and other health effects. The workshop briefly discussed this strategy, following several guidance documents and tools that have been developed and that are currently being developed by AGC. Existing tools include AGC's manual entitled "[Health Issues in Artisanal and Small Scale Gold Mining: Training for Health Professionals](#)" and WHO's working document entitled "[Addressing health aspects in the context of developing national action plans under the Minamata Convention on Mercury](#)".¹⁵

In short, following the mentioned guidance documents and workshop discussions, the public health strategy should include the following elements:

- Rapid assessment of health issues related to ASGM activity
- Institutional capacity assessment of

the national healthcare system and structures, including its gaps regarding the ASGM sector, and ASGM miners' access to health services and related costs

- Training of health staff on health risks associated with ASGM activity
- Strengthening institutional capacity of the national healthcare system and structures, and coordinating inter-sectoral action regarding health issues of the ASGM sector
- Awareness raising about ASGM-specific health risks and elimination of worst practices (this is also a separate NAP strategy)

At the time of the workshop, few countries had investigated health issues of the ASGM sector beyond the sector's mercury use, and very few had conducted an institutional health capacity assessment. Likewise, only few of them had develop the NAP's public health strategy.

Identified solutions and recommendations

A key recommendation concerns the engagement of relevant stakeholders for addressing health issues from the outset. Naturally, the Ministry of Health and local health workers should be engaged. But equally important, the Ministry of Labour should be engaged, since issues of occupational health and safety and related issue of child labour are typically part of their mandate. The timely engagement of such stakeholders can help to ensure that the NAP's public health strategy builds on the country's existing knowledge base. Moreover, it can help to ensure that ASGM-related occupational health and safety issues (including mercury use) are streamlined in a country's health programming and enhance inter-ministerial coordination on ASGM issues.

Moreover, local health workers (e.g. community health clinics) should be trained on ASGM's various health hazards. Such trainings should pay specific attention to underage children and women of child-bearing age, who are recognized by the Minamata Convention to be the most vulnerable to mercury poisoning and are typically most vulnerable to other health hazards of the ASGM sector. Moreover, they have should focus on the complexities of the ASGM sector itself, emphasizing its importance for local development to ensure that the sector is not marginalized and that ASGM miners' livelihoods are protected. This point was illustrated by AGC, who shared a quote from an ASGM miners from Suriname:

"Stopping mining [with mercury] is like telling me that my children won't go to school anymore"

Finally, workshop participants stressed the fact that concrete, step-by-step guidance on developing a public health strategy as part of the NAP needs to be urgently developed and disseminated.



Key issue 6

Addressing gender equality as a cross-cutting issue

Based on survey results, women represent on average about 33% of the ASGM workforce in the countries that participated in the workshop, which may be an underestimation.¹⁶ Some countries, like Guinea, have reported a female participation as high as 65%. African Union's (AU) Agenda 2063 recognizes the importance of relying on

women's potential for driving development on the continent, with its goal of achieving "Full gender equality in all spheres of life".¹⁷ This is supported by the AU "[Strategy for Gender Equality & Women's Empowerment](#)" for 2018-2028. Needless to say, it is critical for African countries (and beyond) to address gender equality as a cross-cutting issue in the NAP and its formalization strategy, as it addresses the root causes of vulnerability that underly women's exposure to mercury and other socio-economic and health threats.

However, at the time of the workshop, few participating countries had conducted thorough investigations of women's role and position



¹⁶ The actual average may be higher, because surveyed two countries reported unlikely low percentages (0-2%). Indeed, the average estimated percentage of women participating in sub-Saharan Africa's ASM sector is 40-50% (see: Hinton, J., Beinhoff, C., and Veiga, M., 2003. "Women and Artisanal Mining: Gender Roles and the Road Ahead." In *The Socio-Economic Impacts of Artisanal and Small-Scale Mining in Developing Countries*, edited by G. Hilson, 161-203. Taylor & Francis.)

¹⁷ See also: <https://au.int/agenda2063/sdgs>

What is gender and why do we need to consider it in ASGM?

A key point that was made during the workshop is that gender and sex are not equal, and are often misunderstood. Gender is a socio-cultural norm that defines the accepted roles of women and men. Whereas sex is an innate (fixed) biological trait people are born with, gender is an acquired (dynamic) trait that is constructed (and can be reconstructed) by people in a given society. However, as a consequence of traditional beliefs, cultural norms and practices, human rights are not equally distributed among women, men, boys and girls, which results in gender inequalities. As long as sex is not distinguished from gender and local gender norms are not questioned, gender inequalities are likely to persist and result in various forms of discrimination against women.

This is no different in the mining sector, which is often viewed as a masculine activity. As a result of cultural myths traditional beliefs, women in Africa's ASGM sector (and beyond) face disproportional barriers in accessing assets such as land, finance, equipment, mining groups and markets

in their ASGM sector as part of their ASGM overviews. Moreover, whereas the Minamata Convention requires NAPs to include a strategy for protecting 'vulnerable groups' against the harmful effects of mercury poisoning, few participating countries had thus far developed an elaborate strategy for advancing gender equality and women's empowerment in the sector.

Nevertheless, many of the countries did indicate in the pre-workshop survey that they wanted to learn more about this topic, and contributed generously to discussions on gender during the workshop, which yielded insights into what gender entails and what

could be ways to reduce gender inequalities in ASGM.

Identified solutions and recommendations

To address gender inequalities, a first step is to assess and understand local gender dynamics. In order to understand gender dynamics, it is important to consider myths, traditional beliefs and other issues that underly gender inequalities. Subsequently, the possible repercussions (i.e. discrimination) of such beliefs need to be understood. In the context of ASGM and NAPs, this can be

done by investigating women's involvement in the sector and the motives that underly their involvement. Moreover, it is important to examine the hazards they are exposed to, the gendered-barriers they are faced with, and their ambitions for the future. All this can be done as part of the socio-economic aspects of the ASGM overview, with the use of UNITAR's Socio-economic ASGM Research Methodology. To illustrate this with an example, one of the workshop participants found that male miners in Sierra Leone do not allow women to mine gold on the hills (where the richer hard rock gold deposits are) due to a traditional belief that there is a devil spirit up there who gets jealous and stops 'reproducing' gold when other women are around.

Based on the understanding of gender issues and women's position in the national ASGM sector, mitigation measures must be identified and streamlined in each of the NAP's strategies. If this is not done consistently, NAP implementation risks impacting women negatively (e.g. exclusion from formalization or mechanization processes). For example, possible mitigation measure can be identified from Sierra Leone's NAP. First, the NAP's formalization strategy includes measures for recognizing women's important role in the amendments of the 2009 Mines and Minerals Act, and for reserving land specifically for female alluvial gold miners. Besides this, Sierra Leone's NAP strategy for "preventing the exposure of vulnerable population to mercury" includes various measures for advancing gender equality and women's empowerment in ASGM.

For example, it includes a step for updating Sierra Leone's gender policies and regulations developed under the Convention on the Elimination of All forms of Discrimination Against Women (CEDAW), and streamlining ASGM issues in each of these regulations.

In addition to addressing issues of gender equality, various practical steps can be taken to prevent women's and children's exposure to mercury. For example, the DRC and Sierra Leone have adopted measures for educating healthcare providers and other stakeholders on women's and children's specific vulnerabilities to mercury poisoning and other health hazards. Moreover, they plan to establish 'buffer zones' for mercury amalgamation which are far removed from schools and other areas where women and their children frequently come. Further specific measure

RECOMMENDATIONS gender equality

Learn about local gender dynamics

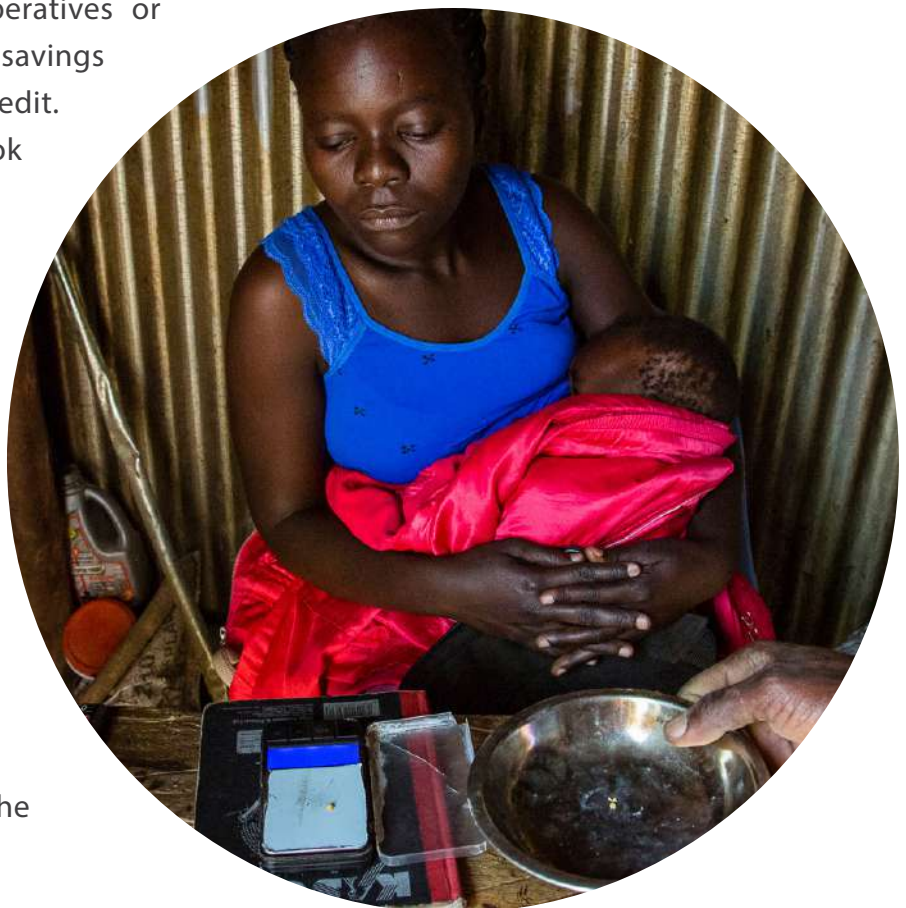
Identify and streamline gender aspect and mitigation measures into each NAP's strategy

Provide opportunities to empower women in ASGM

concerning vulnerable groups and their exposure to mercury are discussed in UN Environment's "Guidance document. Developing a National Action Plan to Reduce, and Where Feasible, Eliminate Mercury Use in Artisanal and Small Scale Gold Mining".

Finally, when considering women's use of ASGM revenues, which are often used to finance their children's food, medicines and education, it becomes clear that women in ASGM should not only be protected but also empowered in ASGM. The NAP provides an invaluable opportunity for doing this. For example, women can be empowered as custodians for environmental stewardship and community health protection by leading awareness raising efforts about mercury use and related issues. Likewise, they could be trained to form their own cooperatives or business entities and establish savings and loans groups or access microcredit. The Formalization Handbook (section 3.2) provides further concrete steps for advancing gender equality and women's empowerment in the ASGM sector.

Indeed, by addressing gender-specific issues and empowering women with the NAP, negative repercussions can be avoided and the NAP and ASGM formalization are more likely to be a vehicle for inclusive development and sustainable transformation of the ASGM sector.



Paving the way towards implementation: mobilizing financial resources, and leveraging political will and inter-ministerial coordination

The preceding six sections have zoomed in on the key issues addressed in the NAP and have largely focused on NAP development. But how do we make all these things happen? How can countries pave the way towards NAP endorsement and subsequently, NAP implementation? In this regard, results from the pre-workshop survey demonstrate that the participating countries struggle with three interrelated challenges: mobilizing financial resources and leveraging political will and inter-ministerial coordination.

Mobilizing financial resources

The issue of leveraging financial resources has been recognized as the greatest challenge and needs to be addressed in a timely manner. There are various international resources available for addressing mercury use in ASGM, but they are limited. For example, the Minamata Secretariat's [Specific International Programme](#) (SIP) has been discussed, which has modest funds to support countries in building their capacity to implement their

obligations under the Minamata Convention. So far, no applications for ASGM have been submitted to the SIP. Moreover, GEF-7 could support NAP implementation. But whereas NAP development can be fully financed by the GEF as an 'enabling activity', NAP implementation will only be supported by GEF-7 within the context of a larger set of projects on implementation of article 7 and these initiatives will fall in the usual GEF scenario of co-financing. Besides co-financing, some other important steps in accessing GEF funding include ratification of the Minamata Convention and alignment of project proposals with national priorities.

In GEF6, the GEF invested into the Global Opportunities for the Long-term Development of the ASGM sector (GOLD) which supports work on providing access to finance, markets, technology and information to reduce and eliminate mercury use in ASGM. The programme is implemented in 8 countries. In GEF7, a new iteration of GOLD will be developed with considerations of

land degradation and deforestation issues. Nevertheless, there are other multilateral and bilateral donors that may be interested to finance the implementation of (parts of) a country's NAP. For example, the World Bank conducts several technical assistance projects for the wider ASM sector in sub-Saharan Africa, which can serve as opportunities to finance certain components of the formalization strategy and other aspects of the NAP.

But rather than (or in addition to) relying on international resources, countries should try to leverage national resources to finance NAP implementation. Such resources could include national budget allocations, taxes and royalties levied from the extractives sector, or investments from the Central Bank in countries that are experimenting with State Gold Buying Programmes. A possible starting point for tapping into national and international resources is linking ASGM to national priorities and related frameworks such as National Development Plans and Poverty Reduction Strategy Papers. Likewise, linking the NAP to relevant regional and international policy frameworks such as AU Agenda 2063 and UN Agenda 2030 can further help to tap into international resources. Given ASGM's multisectoral nature and the NAP's holistic scope, it shouldn't be too difficult to make such linkages.¹⁸

Leveraging political will and inter-ministerial coordination

As has become clear from the above, the issue of obtaining financial resources is closely related to the challenges of leveraging political will for NAP endorsement and implementation and ensuring inter-ministerial coordination on ASGM issues. An important lesson learned from the workshop is that such challenges can be best addressed by engaging stakeholders from the outset and throughout the process of NAP development. Such stakeholders should include relevant government departments, civil society organizations and private sector stakeholders at the national level, as well as key stakeholders (such as miners, traders and traditional leaders) at the local level. The process of stakeholder engagement can help in ensuring that each of the stakeholders' needs and interests are incorporated in the NAP development. It can also help to facilitate information exchange between stakeholders and identify roles and responsibilities in NAP implementation.



¹⁸ In fact, the wider ASM sector has been linked to almost all of the SDG's in a recent publication by the World Bank: World Bank. 2019. 2019 State of the Artisanal and Small-Scale Mining Sector. Washington, D.C.: World Bank. <https://beta.delvedatabase.org/resources/state-of-the-artisanal-and-small-scale-mining-sector>

Finally, it helps to raise legitimacy around the NAP development process and build momentum for endorsement.

One way of doing this is mapping ASGM's various impacts and developing a national vision for the ASGM sector in collaboration with stakeholders, as is proposed in the

Formalization Handbook (section

4.3). Such a vision basically describes where the

nation would like to see the ASGM sector in 5,

10 or 15 years from now, highlighting

key issues that reflect national development

priorities. Sierra Leone shared its

experiences in following this process during

the workshop, highlighting

workshops that were organized in the

capital city as well as in the regions to ensure the

effective participation of local stakeholders.¹⁹



establishment of specialized ASM departments was already discussed with examples from Kenya and the Republic of Congo. Besides this, in Congo, a specialized "Unité de Gestion du Projet" (Project Management Unit) has been established under the Ministry of Mines, which is mandated with the implementation of a national action plan for the (wider) ASM sector. Moreover, Congo has established a "Comité de Pilotage" (Steering Committee) which is charged with lobbying and resource mobilization for the ASM sector. It is also mandated with intersectoral coordination, and includes representatives of all key Ministries. Countries could establish similar structures for the development and implementation of ASGM NAPs.

Finally, workshop participants identified the use of audiovisual materials as an effective way of awareness raising and leveraging political will among decision makers for ASGM and mercury issues. This solution was exemplified by Uganda's documentary on ASGM and mercury, which was streamed during the workshop.

Another best practice for inter-ministerial coordination and NAP implementation in general is institutionalizing the NAP or ASM sector in the government. Under key issue 2, the

¹⁹ This process of developing Sierra Leone's national vision for the ASGM sector has been documented in more detail in a separate article: <https://www.unspecial.org/2019/05/participatory-governance-as-the-means-and-the-end-of-development/>

Key takeaways and general recommendations

This report has reflected upon critical issues that were identified during the regional NAP workshop organized by the Africa Institute and UN Environment in Eswatini. The workshop discussions have explored experienced challenges and defined corresponding solutions for the road ahead in NAP development and implementation. According to the results from a post-workshop survey, the workshop, which was conducted in both English and French, could have benefited from an additional day to cover certain topics in more depth. Thus, a lesson learned for similar workshops in the future, is to allow for more time.

Nevertheless, participants' feedback shows that the workshop has undoubtedly achieved its objectives by providing NAP-executing countries with an enabling environment for information exchange and exploring various experiences, challenges and solutions across the region. This report is testimony to that achievement. To briefly recap, below are some of the most important takeaways and solutions identified, which can serve as general recommendations for NAP-executing countries and associated agencies:

Since many of the identified challenges in ASGM field studies are related to issues of suspicion and distrust, **stakeholders should be engaged from the outset** and throughout NAP development

More funds and time need to be allocated to the development of the ASGM overview, and socio-economic and health issues should be investigated in more depth

ASGM formalization needs to be addressed comprehensively so that it can serve as a vehicle for effective mercury management and broader sustainable and socio-economic development

When it is not feasible to formalize the entire ASGM sector, the sector could be divided into subsectors and different approaches could be adopted towards **formalizing individual subsectors**

There is **no 'one-size-fits-all' 'alternative' to mercury use**, and it is critical to integrate considerations of sustainability and scalability in the introduction of new technology

The most suitable mining practices depend on the local geology, current practices used, economic and organizational capacity of ASGM miners, and cultural acceptance of new methods

There is a need to further disseminate and promote the use of existing guidance on direct smelting

Management of mercury trade needs to be approached regionally, with inter-ministerial, multi-sectoral, bilateral and multilateral collaboration and regional projects

Further research into mercury trade needs to focus on key players, key hubs and key sources of mercury supply in the region

There is a need for concrete guidance on developing a public health strategy as part of the NAP

Gender-specific risks in the ASGM sector need to be investigated and corresponding mitigation measures need to be streamlined throughout the NAP, in order to avoid the perpetuation of gender inequalities and address the root causes of vulnerability (to mercury and other threats)

Use of audiovisual materials (e.g. documentaries) can be an effective means of awareness raising and leveraging political will among decision makers for mercury and ASGM issues

A good starting point for mobilizing financial resources for implementation is linking the NAP to national priorities and related national, regional and international development frameworks

Regular consultations of national and local stakeholders for priority setting (or the development of a national vision for the ASGM sector) can enhance inter-ministerial coordination and pave the way for NAP endorsement and implementation

Annexes: Workshop details

The workshop in brief

Prior to the two-day workshop for all UN Environment-implemented NAP countries in the region, a one-day workshop was held which focused on the 8 countries of the Regional Africa NAP project, which is executed by the Africa Institute. These countries include Burundi, Central Africa Republic (CAR), Eswatini, Kenya, the Republic of Congo, Uganda, Zambia and Zimbabwe. This day was opened by EEA, the Africa Institute and UN Environment's GEF team (of the Chemicals and Health Branch). The remainder of the day discussed each of the countries' NAP projects individually, taking stock of the projects' status, challenges encountered, and lessons learned.



The two-day workshop included Benin, Burkina Faso, Cote d'Ivoire, DRC, Guinea, Mali, Niger, Senegal, Sierra Leone and Togo, in addition to the countries listed above.

On day one, the workshop was officially opened by Eswatini's Minister of Environment and Tourism, his Honorable Moses Vilakati, after a ceremonial opening with a showcase of traditional Swazi dance and music. The opening also included statements from EEA, the Africa Institute, UN Environment, and the Secretariat of the Minamata Convention. The remainder of this day largely focused on in-depth discussions about ASGM formalization (facilitated by Jorden de Haan, independent consultant) and a thematic session on advancing gender equality and women's empowerment with NAPs and formalization efforts (facilitated by Kirsten Dales, independent consultant).

Day two started with the screening of a documentary



entitled “Mercury use in ASGM in Uganda: A call for Sector Formalization”, and a related discussion with the Uganda National Environment Management Agency. Subsequently, an interactive session was held, during which country representatives marked on map of Africa: (i) the locations of the countries’ main ASGM areas; (ii) mercury trade routes; and (iii) transboundary movement of miners (see the pictures below).

This final day proceeded with a discussion of mercury-free technologies for ASGM, which included a presentation of success stories by the AGC. Subsequently, regional mercury trade was discussed. This included a presentation by IUCN about mercury trade on the African continent, as well as break-out sessions where countries developed steps for managing illegal mercury trade. In the afternoon, the development of public health strategies for ASGM was discussed with a presentation from AGC, and the development of ASGM overviews was discussed with a presentation from Centre Africaine de la Santé Environnementale (CASE). The day was concluded with a discussion of the role of international actors and the mobilization of national resources for NAP implementation, and a brief recap of the key takeaways from the workshop.

