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**Conference of the Parties to the  
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Item 4 (c) of the provisional agenda\*

**Matters for consideration or action by the Conference  
of the Parties: artisanal and small-scale gold mining**

**Taking stock of national action plans on artisanal and  
small-scale gold mining: data, lessons learned and  
implementation**

**Note by the secretariat**

The annex to the present note was developed by the secretariat of the Minamata Convention on Mercury and the Chemicals and Health Branch of the United Nations Environment Programme. It is intended to provide a snapshot of national action plans on artisanal and small-scale gold mining submitted to the secretariat as at 30 June 2023. The annex presents some highlights of the data and the information they contain with respect to elements set out in annex C to the Convention; how the plans have made use of the guidance on developing a national action plan to reduce and, where feasible, eliminate mercury use in artisanal and small-scale gold mining;<sup>1</sup> and some preliminary lessons learned from the experiences in developing and implementing these national action plans, including with respect to environmental impacts, vulnerable populations, and challenges in data collection. The document should be read in conjunction with document UNEP/MC/COP.5/6, entitled “Implementation of article 7 of the Minamata Convention on Mercury: artisanal and small-scale gold mining”.

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\* UNEP/MC/COP.5/1.

<sup>1</sup> In decision MC-1/13, the Conference of the Parties to the Minamata Convention agreed to the use of the guidance on the preparation of national action plans as set out in annex II to document UNEP/MC/COP.1/17. In decision MC-4/4, the Conference of the Parties adopted the updated guidance, including new chapters on public health strategies and preventing exposure of vulnerable populations, as prepared by the World Health Organization, and on tailings management, as prepared by the Global Mercury Partnership in cooperation with the secretariat.

## Annex\*

## Taking stock of national action plans on artisanal and small-scale gold mining: data, lessons learned and implementation

### I. Introduction

1. This document was developed by the secretariat of the Minamata Convention on Mercury and the UNEP Chemicals and Health Branch. It is based on work supported by the Global Environment Facility pursuant to article 13 of the Minamata Convention, on financial resources and mechanism, and undertaken in the context of knowledge management for the development of Artisanal and Small-scale Gold Mining (ASGM) National Action Plans (NAPs). It is intended to provide a snapshot of ASGM NAPs submitted to the secretariat pursuant to article 7 of the Convention as at 30 June 2023, including some of the data and information they contain with respect to elements set out in Annex C to the Convention; how they have made use of the Guidance on developing a national action plan to reduce and, where feasible, eliminate mercury use in artisanal and small-scale gold mining<sup>1</sup>; and some preliminary lessons learned from the experiences in developing and implementing these NAPs, including with respect to environmental impacts, vulnerable populations, and challenges in data collection. This document should be read in conjunction with UNEP/MC/COP.5/6 on Implementation of article 7 of the Minamata Convention on Mercury: Artisanal and Small-scale Gold Mining. It is not intended to be a comprehensive study of mercury use in ASGM or of NAP development and implementation.

2. Characterizing the ASGM sector in individual countries has always been difficult, due to the often informal or illegal, and geographically dispersed nature of the sector. Funds for comprehensive ASGM assessments have been scarce in many areas. While individual studies have described the sector in particular countries and regions, the methodologies used are rarely harmonized. Recognizing that the ASGM NAPs present a unique opportunity to gather data on ASGM from a wide range of countries at a similar moment in time and produced with reasonably similar methodologies, UNEP is collecting and analyzing data from NAPs as part of its work to provide targeted technical assistance for the development and implementation of NAPs in the form of knowledge generation, exchange and management. The technical support builds on the expertise and network of the UNEP Global Mercury Partnership and includes among others:

(a) Generation and curation of guidance materials and methodologies for countries developing NAPs, including guidance on collecting and analyzing baseline information, best practices in development of formalization strategies, guidance for incorporating gender dimension, as well as steps to undertake rapid environmental assessment for NAP projects. A full list of methodologies and guidance is available at the UNEP Global Mercury Partnership website<sup>2</sup> dedicated to the NAP projects;

(b) Review and quality check services to ensure that NAP documents comply with article 7 of the Minamata Convention and Annex C to the Convention, and are of high technical quality and accuracy;

(c) Knowledge management including: 1) maintenance of the knowledge hub dedicated to the NAP projects, and 2) data mining and visualization of the information contained in the submitted NAPs, with results available through interactive dashboards;

(d) Facilitation of the regional and global experiences exchange, including organization of thematic webinars and in-person regional workshop on NAP development and implementation.

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\* The annex has not been formally edited.

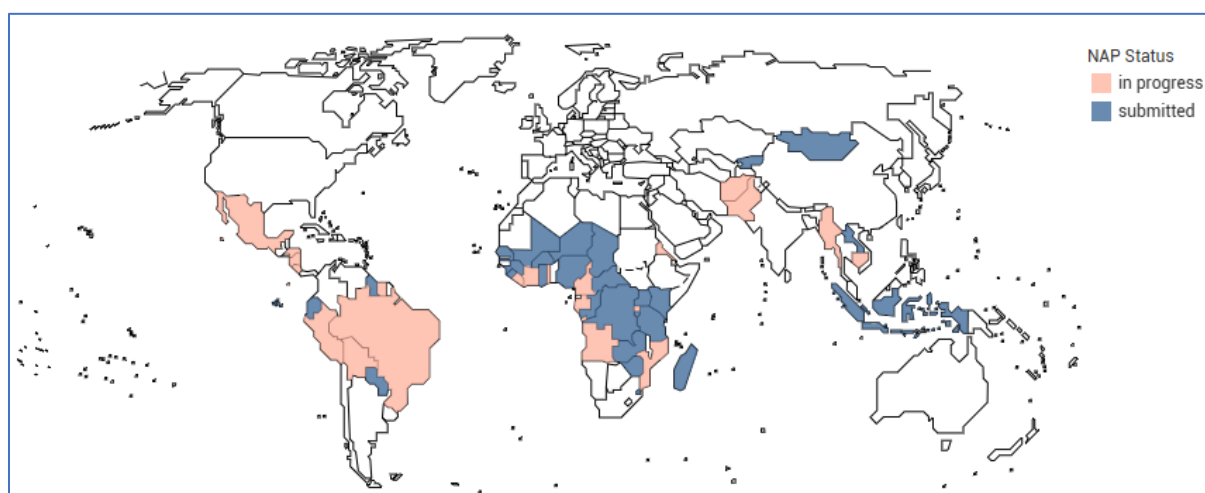
<sup>1</sup> In decision MC-1/13, the Conference of the Parties to the Minamata Convention agreed to the use of the guidance on the preparation of national action plans as set out in annex II to document UNEP/MC/COP.1/17. In decision MC-4/4, the Conference of the Parties adopted the updated guidance, including new chapters on public health strategies and preventing exposure of vulnerable populations, as prepared by the World Health Organization, and on tailings management, as prepared by the Global Mercury Partnership in cooperation with the secretariat, as amended and set out in annexes I and II to document UNEP/MC/COP.4/29.

<sup>2</sup> <https://www.unep.org/globalmercurypartnership/what-we-do/artisanal-and-small-scale-gold-mining-asgm/national-action-plans>

3. To assess the wealth of information generated in the NAPs, quantitative and qualitative data has been extracted from the 27 final NAP documents submitted to the secretariat of the Minamata Convention as of 1 June 2023<sup>3</sup> (Figure 1). Data collection and analysis will continue as new NAPs are published. The quantitative data categories include: (i) estimated amount of mercury used by the sector, (ii) estimated amount of gold produced by the sector, (iii) estimated number of miners (gender disaggregated where available) involved in the sector, (iv) and mercury reduction targets. In addition, qualitative information has been gathered, including presence of worst practices, as well as various environmental, health, and socio-economic information documented in the NAPs. Finally, the reported NAP strategies for each country were summarized and added to the database. The extracted data and information were analyzed, and interactive dashboards<sup>4</sup> were created to facilitate analysis. An earlier analysis was conducted when only 18 countries had submitted their NAPs and has been published in an International Conference on Mercury as a Global Pollutant synthesis paper<sup>5</sup>. It should be noted that the 27 NAPs analyzed are not a representative global sample of ASGM countries but are those which have been submitted at the time of writing.

Figure 1

**Map of countries which have completed or are currently working on their NAPs.(Source: UNEP NAP data dashboards)**



4. This document is organized as follows:
- I. Introduction
  - II. Background
    - a. The NAP approach
    - b. NAP guidance
    - c. Implementation of NAPs
  - III. Analysis of data from completed NAPs
    - a. Mercury use and gold production
    - b. Mining communities
    - c. Formalization and regulation
    - d. Monitoring impacts
    - e. Geospatial data
    - f. Gaps and challenges in data collection

<sup>3</sup> <https://minamataconvention.org/en/parties/national-action-plans>

<sup>4</sup> <https://www.unep.org/globalmercurypartnership/insights-asgm-national-action-plans>

<sup>5</sup> <https://link.springer.com/article/10.1007/s13280-023-01843-2>

## II. Background

### A. The NAP approach

5. The Minamata Convention on Mercury aims to address some of the challenges inherent in regulating ASGM, such as its nature as an informal labor sector, lack of access by regulators to the areas where ASGM operations are occurring, and the unique context in which ASGM operations are conducted. Significant experience with the sector by members of the multi-stakeholder Global Mercury Partnership going back some decades<sup>6</sup> informed the approach to the sector set forth in the Convention text. In contrast to taking an approach to mercury use in ASGM centered on a legally-binding prohibition on the practice or a command-control approach, which was considered to be highly likely to be ineffective in that it would further drive the practice outside of legal frameworks and beyond the reach of technical assistance, the Convention text sets forth an approach which recognizes the complex nature of ASGM and allows parties to design, in close cooperation ASGM miners and other stakeholders, a set of strategies and targets that are appropriate to their national circumstances. The approach taken under article 7 also recognizes the complex challenge of managing the sector especially for developing countries that rely on the economic benefits of mining.

6. NAPs are a cornerstone of the Convention's approach to reducing and where feasible eliminating mercury use in artisanal and small-scale gold mining. NAPs are a type of detailed strategic plan for the sector for the party. The Convention not only requires the timely submission of the NAP to the secretariat, following a party's determination that ASGM using mercury is more than insignificant in its territory, but also requires the NAP's implementation and periodic review.

7. Annex C of the Convention sets forth a list of elements that must be included in each NAP. The following is a summary of the required elements:

- (a) National objectives and reduction targets
- (b) Actions to eliminate worst practices
- (c) Steps to facilitate the formalization or regulation of the sector
- (d) Baseline estimates of the quantities of mercury used and the practices employed
- (e) Strategies for promoting the reduction of emissions and releases of, and exposure to, mercury, including mercury-free methods
- (f) Strategies for managing trade and preventing the diversion of mercury
- (g) Strategies for involving stakeholders in the implementation and continuing development of the NAP
- (h) A public health strategy on the exposure of miners and their communities to mercury
- (i) Strategies to prevent the exposure of vulnerable populations
- (j) Strategies for providing information to miners and affected communities
- (k) An implementation schedule.

8. In addition, Annex C states that a party may include additional strategies including the use or introduction of standards for mercury-free ASGM and market-based mechanisms or marketing tools.

### B. NAP guidance

9. In 2011, the United Nations Environment Programme (UNEP) and the UNEP Global Mercury Partnership drafted a guidance document on developing a national strategic plan to reduce mercury use in ASGM. The document drew upon knowledge and information assembled by the UNEP Global Mercury Partnership, including the ASGM partnership area business plan. The guidance was intended to assist countries in developing their strategic plans on ASGM, and to improve practices and working conditions in ASGM communities.

10. In October 2013, in the Final Act of the Conference of Plenipotentiaries on the Minamata Convention on Mercury (UNEP(DTIE)/Hg/CONF/4), the Conference of the Plenipotentiaries requested the Intergovernmental Negotiating Committee "to support, as practicable and consistent with the priorities in the Convention, those activities required or encouraged by the Convention that

<sup>6</sup> For a description of early interventions on mercury use in ASGM, see the report of the GEF Independent Evaluation Office on artisanal and small-scale gold mining project at <https://www.gefio.org/evaluations/gold>

will facilitate the rapid entry into force of the Convention and its effective implementation upon entry into force, including in particular guidance and assistance to countries with artisanal and small-scale gold mining in developing their national action plans.” With voluntary funding, UNEP worked with the Global Mercury Partnership to update the guidance, expanding the original document and reflecting the language of the Minamata Convention and other advances in understanding of the ASGM sector.

11. At its first meeting, in Decision MC-1/13, the Conference of the Parties agreed to the use of the “Guidance on developing a national action plan to reduce and, where feasible, eliminate mercury use in artisanal and small-scale gold mining”, as set out in annex II to UNEP/MC/COP.1/17. At its fourth meeting, in Decision MC-4/4, the Conference of the Parties adopted the updated guidance, including new chapters on public health strategies and preventing exposure of vulnerable populations, as prepared by WHO, and on tailings management, as prepared by the Global Mercury Partnership in cooperation with the secretariat. The guidance is intended to support countries in formulating NAPs that are compliant with the requirements of the Minamata Convention. The guidance also provides technical, legal and policy information on issues related to ASGM, which may be useful when preparing and implementing the NAP. The use of the guidance is not mandatory for parties.

## C. Implementation of NAPs

12. As noted above, parties are required to implement their NAPs as per article 7. Furthermore, decision MC-4/4 calls upon parties to engage indigenous peoples, local communities and other relevant stakeholders in the development and implementation of national action plans. The NAPs are a critically important tool for parties as they work to reduce and eliminate mercury use in ASGM, fully engage stakeholders, and measure progress in implementation to inform future work under the Convention.

13. The party’s final validation, endorsement by national authorities, and submission to the secretariat of its NAP can be a time-consuming and challenging process. In some cases, NAPs which were finalized months or years ago have not been submitted to the secretariat. The reasons for this are complex and varied. In some cases, the party is implementing the NAP but is awaiting a parliamentary or other national level decree to enable its submission. In other cases, the party is seeking more detailed baseline information prior to submission.

14. The requirement in article 7 for parties that have undertaken NAPs to review their implementation of article 7 provides an opportunity for the party to update baseline estimates, strategies, or other elements of the NAP once the NAP has been submitted.

15. During its fifth replenishment period, the GEF began supporting enabling activities for the Minamata Convention. Support for the development of ASGM NAPs was one of the two types of enabling activities, the other being Minamata Initial Assessments. NAP project funding is generally about USD 500,000 per party project. In some cases, NAP projects cover more than one country.

16. As of 1 August 2023, the GEF has provided support to 48 countries for the development of their NAPs. Of these, 30 countries have submitted their NAPs. Submitted NAPs are published on the Minamata Convention website at the “Parties” tab.

17. Most NAPs submitted to date contain detailed implementation plans. These can be useful in the development of projects undertaken through bilateral and multilateral cooperation and through actions by stakeholders at the regional, national and local levels. They can also directly inform the development of national economic and sectoral plans, including those on biodiversity (e.g., National Biodiversity Strategies and Action Plans or NBSAPS), forestry, fisheries, and river basin management, among others.

18. The NAPs are very important in the development and implementation of projects undertaken through the financial mechanism of the Convention, such as, for example, the planetGOLD programme funded by the GEF. The programme’s components, by design, match the key elements required to be included in NAPs as per Annex C of the Convention. The programme’s global coordination component promotes knowledge sharing and communications including on finance, formalization and technology approaches which can be used in the implementation of NAPs and which are informed by NAPs. The planetGOLD programme’s knowledge repository contains over 600 products and can be accessed from the planetGOLD website at planetGOLD.org. NAPs are also relevant to the design of Integrated Programmes as part of the 8th Replenishment of the GEF Trust Fund.

### **III. Analysis of data from completed NAPs**

#### **A. Mercury use and gold production**

##### **1. Mercury use estimates**

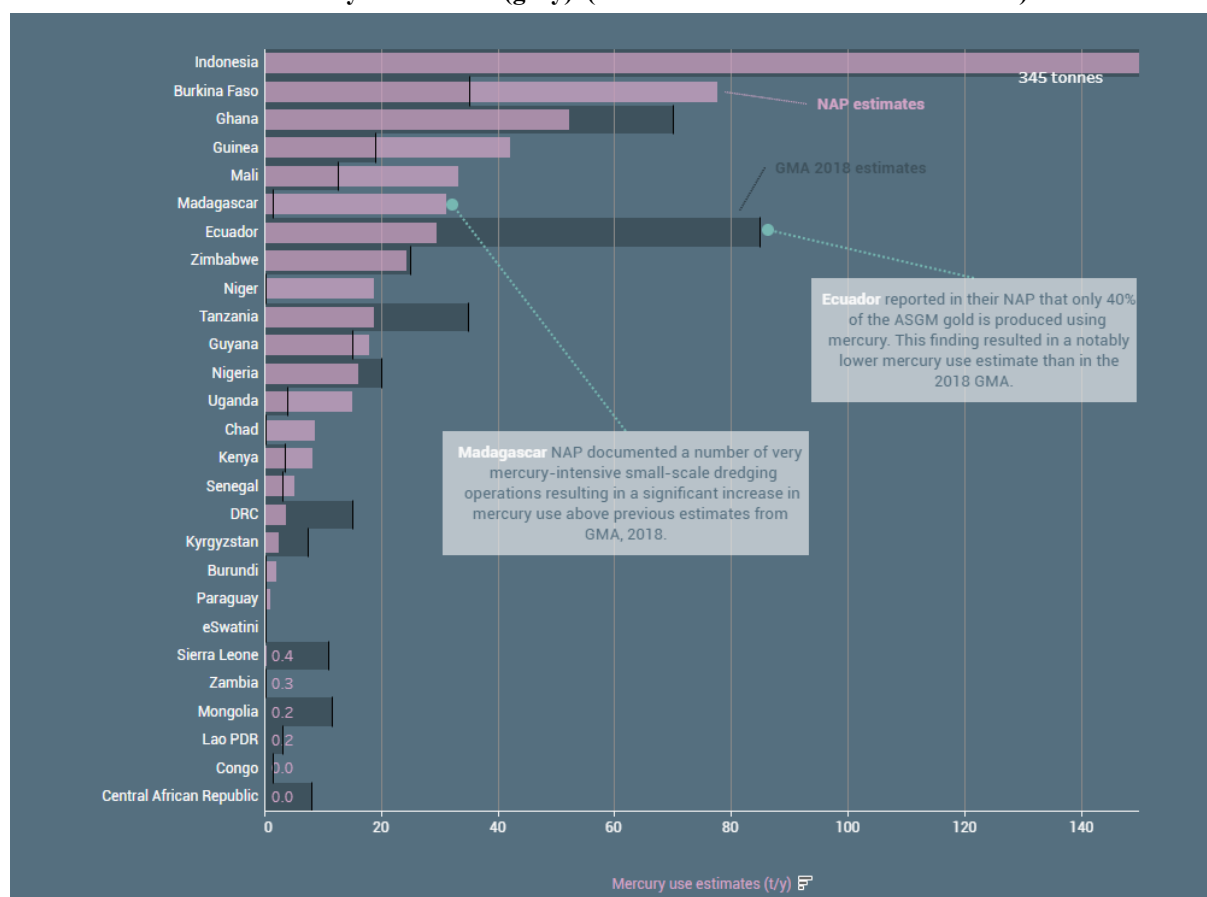
19. The baseline estimates of NAPs contain national estimates of mercury use and gold production in ASGM. The NAP Guidance document provides information on basic principles for making these estimates, and the subsequent handbook developed by UNEP and Artisanal Gold Council introduced a more detailed methodology. Most NAP countries used this methodology in making their baseline estimates of mercury use and gold production, although the methodologies are not completely harmonized among NAPs and the thoroughness and precision varies. Nevertheless, this dataset represents the most comprehensive set of national estimates currently available.

20. National estimates vary from 345.5 to 0 tonnes of mercury used in ASGM in the year of the data collection (generally between 2018 and 2021). Note that these figures are total mercury used, reflecting environmental releases to the air, land and water.

21. The estimated quantities of mercury used in ASGM per country, as reported in NAPs, were compared with the previous estimates reported in the 2018 Global Mercury Assessment (GMA) (Figure 2). In about half of the cases, NAP data indicates a significant increase in the estimated amount of mercury use in contrast to previous estimates. For example, in the case of Madagascar and Burundi, estimates increased by over tenfold. In other cases, for example in Ecuador, Democratic Republic of the Congo or Mongolia, the NAP estimates are lower than previously reported amounts. These differences do not necessarily mean that mercury use changed during this time, but likely reflect, in part, changes in the availability of information collected through the nationwide field studies undertaken by the NAP projects and might reflect the different methodologies used for the data collection. For example, the Madagascar NAP documented several previously unknown, mercury-intensive small-scale dredging operations, resulting in a significant increase in mercury use above previous estimates (including the 2018 GMA). Conversely, Ecuador reported in their NAP that only 40% of the ASGM gold is produced using mercury. This finding resulted in a notably lower mercury use estimate than in the 2018 GMA. Indonesia, the largest ASGM mercury user according to the 2018 GMA with 420 tonnes reported a lower total in their NAP (345.5 tonnes). In the case of Indonesia, the GMA estimate came from data from 2008, while the NAP data came from 2019.

Figure 2

**Estimates of mercury use from ASGM from completed NAPs (violet) compared with estimates from the 2018 Global Mercury Assessment (gray). (Source: UNEP NAP data dashboards)**



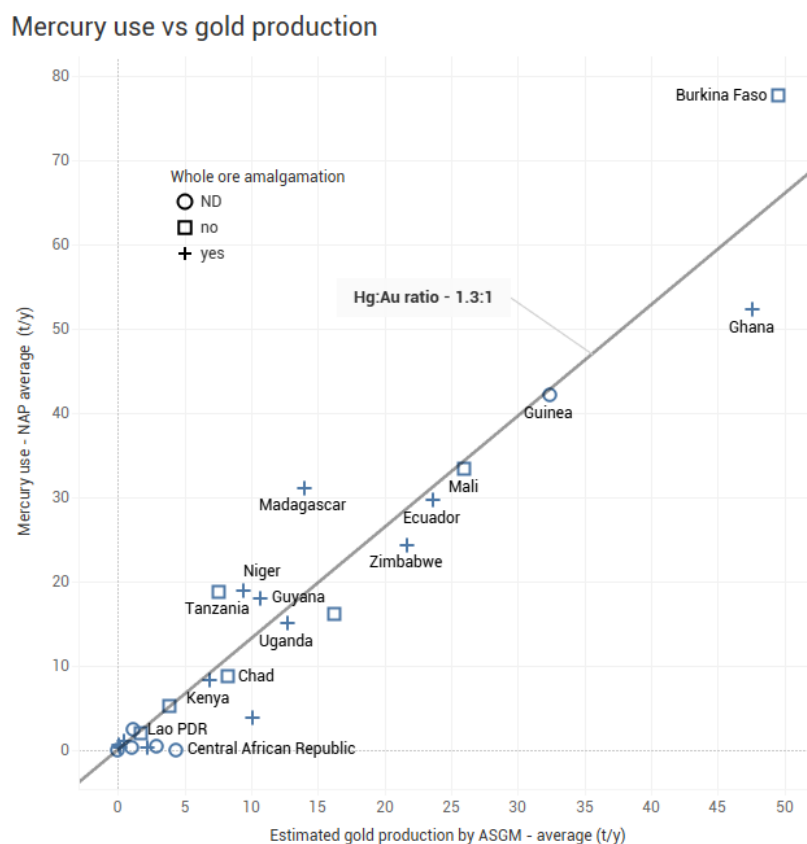
22. ASGM gold production estimates ranged from 53.8 tonnes to 0.02 tonnes. Based on the submitted NAPs, 368.3 tonnes of ASGM gold are produced in 27 countries, which represents a value of approximately 23 billion USD if sold at current prices. Figure 3 plots the estimated quantities of ASGM gold production against the estimated quantities of mercury use by country. Based on data from 27 countries, the mercury to gold ratio (denoted as Hg:Au) is about 2.6:1. However, Indonesia is an outlier, with an implied national Hg:Au ratio of 6.4:1. If Indonesia is excluded the overall Hg:Au ratio is 1.3:1.

23. 21 out of 27 countries have specifically mentioned that the estimated Hg:Au ratio is based on field measurements, while the others have used default ratios in the absence of the field measurements.

24. Countries with more mercury intensive ASGM operations include Indonesia, Burkina Faso and Madagascar, whereas less mercury intensive operations were observed in the Democratic Republic of the Congo, Nigeria, Sierra Leone, and Ghana. While most of the countries did not report whether ASGM gold is entirely or only partially produced using mercury, seven countries provided approximate percentage of ASGM gold being produced using mercury, including Chad (94%), Ecuador (40%), Guinea (60%), Uganda (73%), Mali (88%), Zimbabwe (96%), and Ghana (100% in hard rock mining and 60-100% in alluvial mining).

Figure 3

NAP estimates of mercury use compared with ASGM gold production. Indonesia is excluded from the graph (ASGM gold production = 53.8 tonnes, mercury use = 345.5 tonnes). The line represents a mercury:gold ration of 1.3: 1. Markers are coded by whether the NAP reports the presence of whole ore amalgamation. (Source: created from NAP data extracted by UNEP)



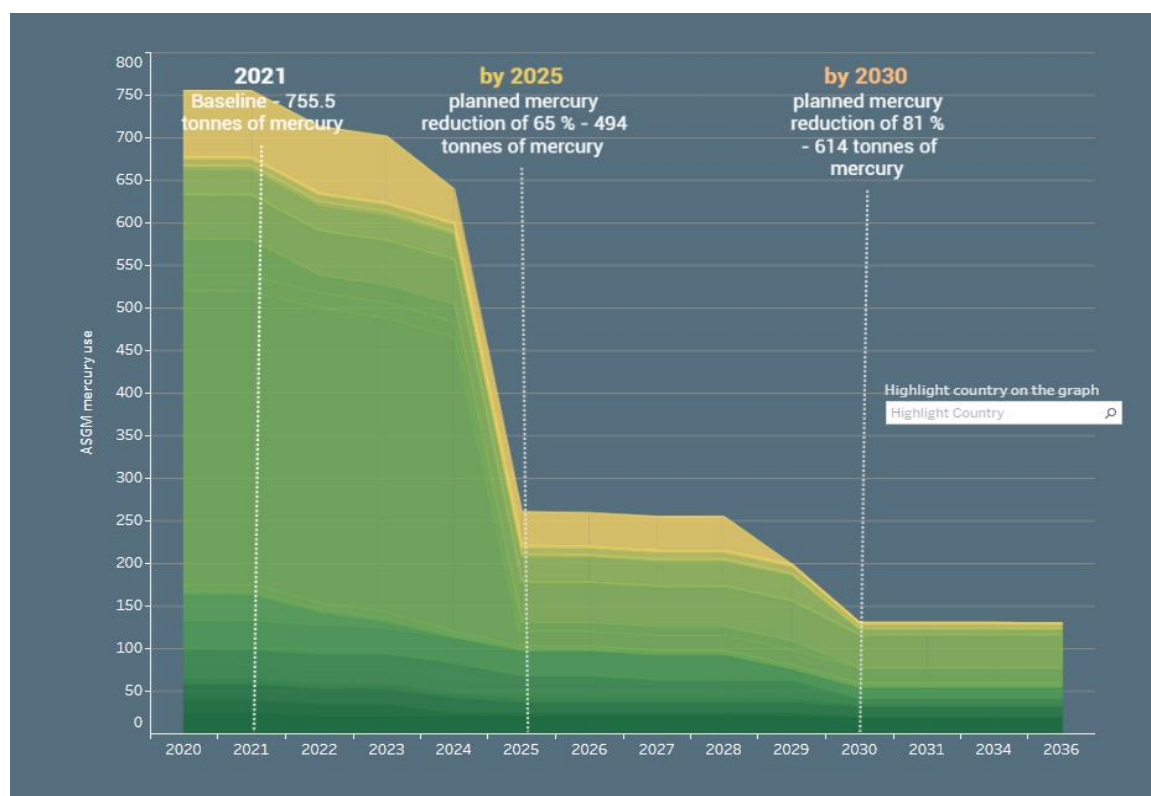
## 2. Reduction targets

25. Mercury reduction targets reported in the NAPs (Figure 4) provide an indication of by when and by how much these countries intend to reduce mercury use. Baseline mercury use reported by the 27 countries is about 750 tonnes per year. By 2025, 65% of that amount, or 494 tonnes, is targeted for elimination by implementing actions outlined in the NAPs. By 2030, 614 tonnes of mercury, or 81% of the baseline amount, is targeted for elimination by the countries. Many NAPs caveat that financial and technical support are needed to achieve the reduction targets. In addition, some countries tie reduction targets to political goals or regulatory measures, which can result in ambitious targets that might be difficult to achieve on current trajectories. Nevertheless, analysis of reduction targets can provide an indication of the possible reductions in mercury use in ASGM if the NAPs are fully implemented.



Figure 4

**Projected reduction in mercury use from the completed NAPs if mercury reduction targets are met. The shaded portions represent projects for individual NAP countries and the top line represent the summed projections. (Source: UNEP NAP data dashboards)**



### 3. Worst practices

26. The Minamata Convention specifies that each NAP elaborate strategies to eliminate four “worst” practices, listed in Annex C as (i) whole ore amalgamation, (ii) open burning of amalgam or processed amalgam (i.e., without a mercury capture device), (iii) burning of amalgam in residential areas, and (iv) cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing mercury. The number of countries reporting on these practices is shown in Figure 5. The most common worst practice, as reported by 24 out of 27 submitted NAPs, is open burning of amalgam. Most of the countries also reported burning of amalgam in residential areas which puts the miners, their families, and the surrounding communities in danger of direct exposure to mercury vapor. Cyanide leaching of tailings or sediment containing mercury has been reported in 16 out of 27 countries. Out of the remaining 11 countries, only three (Chad, Madagascar and Nigeria) explicitly reported absence of this practice, while the other eight countries did not provide information. The least common worst practice is whole ore amalgamation. Its presence was reported in 14 out of 27 countries. Chad, Burkina Faso, Burundi, Mali, Nigeria, United Republic of Tanzania, and Senegal explicitly reported absence of this practice within their territories. Overall, the data shows that ASGM worst practices as defined by the Minamata Convention were still widespread at the time of baseline data collection among countries that have submitted their NAPs.

Figure 5

**Number of NAPs reporting the presence of the four worst practices. (Source: UNEP NAP data dashboards)**



#### 4. Mercury trade

27. The Minamata Convention aims to limit flows of mercury to ASGM, including from international trade. Trade controls can be an important part of a national strategy to reduce mercury use in the sector. Annex C of the Convention requires that NAPs include strategies for managing trade and preventing diversion of mercury into ASGM. Major trade pathways of mercury are reasonably well understood, but because a large portion of mercury trade for ASGM is informal, illegal or unreported, it can be difficult for NAP countries to determine specific pathways and amounts of mercury crossing their borders.

28. Only four submitted NAPs, those for Guyana, Kenya, Lao People's Democratic Republic and Paraguay, were able to provide a quantitative estimate of mercury traded per year. For example, Guyana indicated that a total of 30.1 tonnes of mercury was imported in 2019 from Indonesia, United Kingdom of Great Britain and Northern Ireland, India, Singapore, Russian Federation, Türkiye, and United States of America. Paraguay reported that according to data from the Customs Directorate, Paraguay imported approximately 36 tonnes of mercury mainly from Mexico, Spain, China, and India between 2004 and 2018.

29. Most of the African countries (e.g., Burkina Faso, Burundi, Democratic Republic of the Congo, Guinea, Madagascar, Mali, Nigeria, Senegal, Sierra Leone) reported illegal/informal inflows from neighbouring countries; others, such as Congo, did not provide any information on mercury trade mainly because of the secrecy surrounding its use. Zimbabwe was able to identify, with some precision, the points of entry of mercury into its territory. In Latin America, Ecuador mentioned black-market import of mercury from Mexico via Peru and Bolivia but did not provide any quantitative estimates. Kyrgyzstan, on the other hand, reported that the primary mining of mercury is carried out by two enterprises which produced a total of 80 tonnes of primary mercury in 2019. There is however no official information of the flow of mercury from these sources to the local market since mercury use in ASGM is considered illegal in the country.

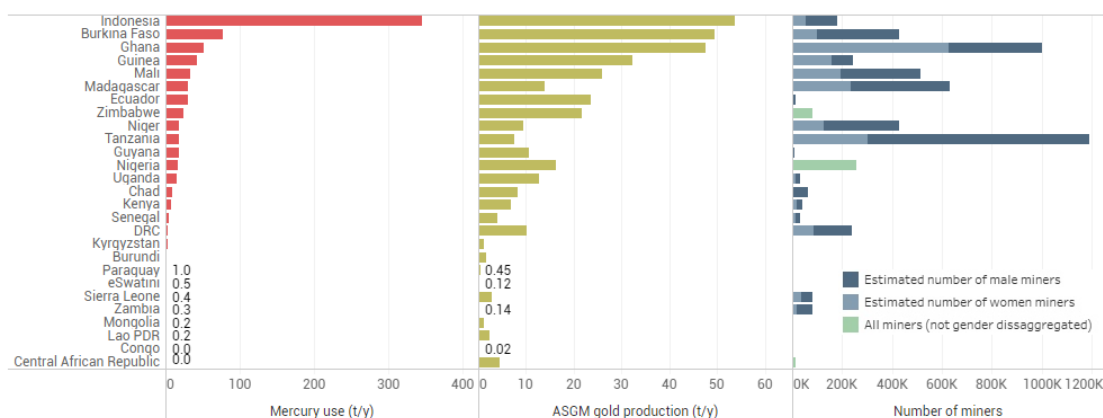
30. A majority of the submitted NAPs underlined the need to improve control of mercury trade through strengthening and/or adjusting the regulatory framework, advocating for a regional approach to the harmonization of mercury trade and building the capacity of customs officers to identify and track mercury trade along all customs points. For example, Lao People's Democratic Republic proposed to conduct regional investigation of mercury trade with trade agencies of neighbouring countries. Niger underlined the need to equip custom officials with the mercury detection tools.

Zambia, Eswatini and Central African Republic also suggested to introduce permits for the mercury seller/distributors to track mercury flows in the country. Burkina Faso proposed to advocate for development of the regional facilities for the safe storage of seized mercury. Furthermore, many submitted NAPs mentioned a need to undertake more detailed investigation to understand better the mercury flows for use in ASGM, including informal and illegal channels. Finally, Kenya proposed to enforce the regulation banning use of mercury in ASGM, whereas Chad, based on its current experience regarding secrecy of mercury use, proposed to reassess and revise the text prohibiting the use of mercury in Chad in order to better understand and manage mercury flows in the country.

## B. Mining Communities

### 1. Miners

31. Global estimates of the number of people directly involved in ASGM are in the range of 15-20 million, about a fifth being women and children<sup>7</sup>. NAP countries provided estimates of the number of ASGM miners in their baseline estimates, which ranged from 300 (Eswatini) to 1.2 million (United Republic of Tanzania). The total number of miners estimated from the 27 submitted NAPs is about 5.6 million. Most NAPs, 20 out of 27, also provided gender disaggregated estimates of the number of ASGM miners. According to these estimates, the share of women miners in the sector ranged from 4% (Chad) to 65% (Guinea), with a median of 32%. The participation of women miners in the sector among the 27 countries is higher than previous global estimates, but this may be partly explained by the fact that these countries are not a representative sample of global ASGM. African countries, where women's participation in ASGM tends to be high, are strongly represented among the submitted NAPs, and there is a smaller representation of Latin American countries, where women's participation tends to be lower. Global patterns will become clearer when more NAPs are submitted and analyzed.



32. By comparing the estimated number of miners with the estimated ASGM gold production in each country, it is possible to measure the implied productivity of the sector, measured in grams of gold produced per year per miner. Productivity varies greatly among the NAPs surveyed, ranging from two grams of gold per year per miner in Zambia to nearly 1,500 in Ecuador. Higher productivity suggests an elevated level of mechanization in gold extraction and processing, while low productivity suggests a relatively lower level of mechanization and a dependence on more rudimentary methods. Caution is warranted in drawing too many conclusions about relative ASGM productivity from the NAP data because countries use different methods to estimate the number of miners and to account for part-time or seasonal miners.

### 2. Vulnerable populations

33. Many participants in ASGM and people living in ASGM communities are subject to vulnerability due to poverty, occupational risks, lack of rights, pollution, pollution and other factors. NAPs examine how certain vulnerable groups (namely children, women and, in some cases, Indigenous peoples and local communities) participate in and are impacted by ASGM and include strategies for reducing ASGM impacts on such groups.

<sup>7</sup> <https://www.unep.org/resources/publication/global-mercury-assessment-2018>

### 3. Children

34. Nearly all NAPs acknowledge that children are involved in ASGM to some degree. Children's involvement in ASGM or other informal sector activities is common in many of the NAP countries and does not necessarily indicate the presence of the worst forms of child labor<sup>8</sup>. Of the 27 NAP countries analyzed, 10 included quantitative estimates of the number of children involved in ASGM. These ranged from 40% to 0.8% of the total number of miners. Most countries estimated that less than 10% of ASGM workers were children (median = 5.7 percent). United Republic of Tanzania was an outlier at 40%, noting in their NAP that despite the prohibition by law, children are involved in mining activities, particularly in transport, treatment and/or water supply. Even when not directly involved in mining, children in ASGM communities may still be vulnerable to mercury pollution. Niger estimated that over 225,000 children under 15 years of age and 8,000 children under 5 years of age are directly or indirectly affected using mercury in ASGM.

35. In addition to the estimates of the number of children involved in or impacted by ASGM, the NAPs also described the general conditions in which children participate in the sector. These vary significantly. However, several commonalities are observed. Most countries report that children are involved in ASGM, but Congo, Burundi and Kyrgyzstan report that their involvement is rare. Several other countries (e.g., Democratic Republic of the Congo, Burkina Faso) mention that children's involvement in ASGM is prohibited by law, but occurs nevertheless. Many NAPs report that children frequently accompany their parents to mining sites, where they may participate in activities. Several countries noted that mothers might bring children to ASGM sites where they worked because there were no other options for childcare. Other countries indicated that children would come to mining sites on weekends or after school. Many NAPs described children involved in ancillary tasks around ASGM sites, such as helping with water supply, transporting or selling food, drinks or other supplies or bringing tools. Some NAPs indicated that children were involved more directly in ASGM, in activities like processing concentrate, crushing and milling.

### 4. Women

36. As mentioned in the previous section, most NAP countries presented their estimates of the total number of miners disaggregated by gender. Women generally make up less than half of all miners (with some notable exceptions) but are nevertheless well represented in many countries (median = 32%).

37. Women's roles in ASGM vary considerably among countries, from participating in only tangential activities to being engaged in nearly all steps in the mining process including as owners and operators. The only activity that women do not participate in, according to the NAPs surveyed, was extracting in underground shafts. Women are involved in transporting and crushing ore, washing and sluicing, and amalgamation. Their involvement in ancillary activities such as cooking and providing services was also well documented in many of the NAPs. In some cases (e.g., Guyana), women's role in ASGM extends to administration or ownership of claims and operations. In other countries, women do not have direct access to primary ore, but only to tailings and waste rock (Democratic Republic of the Congo, Ecuador). According to Indonesia's NAP, women in ASGM receive lower wages than men. In Mongolia, they frequently experience verbal abuse as well as physical and emotional stress. For example, Guyana identified five barriers to entry to women in ASGM, which are: 1) access to finance and land; 2) limited opportunities for gaining experience; 3) low awareness of opportunities for women in ASGM; 4) prevailing stereotypes on women's ability to become involved in the sector; and 5) discriminatory site-level policies preventing women's employment.

### 5. Indigenous peoples and local communities

38. In the NAPs analyzed to date, there was little discussion on vulnerable groups, such as some Indigenous peoples. However, many NAPs from areas with frequent interactions between Indigenous groups and ASGM (such as the Amazon Basin) are not yet completed. These future NAPs will likely include more consideration of Indigenous peoples in the context of ASGM, particularly in light of the COP-4 decision MC-4/4, which, in paragraph 2, calls upon parties to engage Indigenous peoples, local communities and other relevant stakeholders in the development and implementation of national action plans, and which, in paragraph 3, requests the secretariat to compile views on the needs and priorities of Indigenous peoples and local communities with regard to the use of mercury in artisanal and small-scale gold mining.

<sup>8</sup> [https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100\\_ILO\\_CODE:C182](https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C182)

39. One exception among the analyzed NAPs is the Guyana NAP, which explicitly discusses the relationship between Indigenous communities and ASGM operations. It reports two main types of interactions: 1) arrangements where Indigenous communities contract their village lands to allow operators to mine gold in exchange for a negotiated fee which is intended to contribute directly to the development of these communities, or 2) direct involvement of the Indigenous peoples in the sector as miners or service providers. Moreover, during the baseline assessment in Guyana, it was noticed that some Indigenous communities have a higher presence of authorities and therefore higher level of safety for the community members in case of possible conflicts.

## **6. Measures to protect vulnerable populations**

40. All the submitted NAPs included strategies for reducing ASGM impacts to vulnerable groups. These varied among regions and countries, but many common approaches were observed. By and large, these strategies focused on mitigating the impacts to women and children.

41. Many NAPs mentioned awareness raising and information dissemination as important parts of their vulnerable population strategies. This included providing information on the dangers of mercury, in particular for children and women of childbearing age. Several NAPs recognized the importance of working with community leaders in disseminating information and honing messages that are appropriate for mining communities.

42. Another frequent proposed approach in the strategies was the promotion of education for children, which not only helps their overall potential and well-being, but keeps them away from mining sites where they may be vulnerable to exploitation or exposure of mercury. Similarly, several NAPs plan to facilitate access to childcare as a way to prevent children from being around dangerous mining sites and also improve opportunities for women who may otherwise be responsible for caring for their children.

43. Several NAPs also planned more direct measures aimed at eliminating child labor, such as the creation or modification of policies, programmes, laws and regulations. A few NAPs proposed increased monitoring and inspections of mining sites to detect and prevent incidences of the worst forms of child labor.

44. NAP strategies on vulnerable populations also contained numerous measures to improve the rights and well-being of women in ASGM. These included the creation of educational and vocational training programmes for women to improve their skills and earning potential, strengthening institution representing women miners, and mainstreaming gender into mining policy. The Kenya NAP included a separate gender mainstreaming strategy to compliment the one on vulnerable populations.

45. In terms of strategies related to the effective engagement of Indigenous peoples, the Guyana NAP proposed measures to enhance local capacity to monitor ASGM activities on the Indigenous lands and territories<sup>9</sup>, as well as included Indigenous communities explicitly in an overarching strategy to raise the awareness on the detrimental effects and safe use of mercury, develop health programmes and strengthen education and outreach programmes, including for example the need to produce inclusive materials in local and Indigenous languages.

46. Finally, many NAPs noted the important role of health care in protecting vulnerable populations in ASGM area. Ghana merged their vulnerable populations and health care strategies into a single coordinated one. Several other NAPs mentioned the need to improve the health care services in ASGM communities, including on monitoring, diagnosis and treatment of mercury poisoning.

## **7. Health aspects**

47. ASGM is associated with many public health challenges, including but not limited to chronic and acute mercury poisoning. All the ASGM NAPs surveyed included baseline information about the public health situation in ASGM areas, as well as public health strategies for NAP implementation. Nearly all NAPs highlight problems with poor access to health care in many ASGM areas. This is attributed to the informal nature of ASGM, remote areas far from health clinics, lack of qualified medical personnel, and lack of awareness. However not all NAPs characterize health care access in ASGM areas as poor. Ecuador reports that primary health facilities are available in all ASGM communities, and Kenya notes that adequate access to basic health care is available in most mining

<sup>9</sup> Information on conducting monitoring in and around ASGM sites, which could be of use in monitoring in, in the vicinity of, or upstream from Indigenous lands and territories, can be accessed in UNEP/MC/COP.5/INF/9, Technical background document on monitoring of mercury and mercury compounds in and around artisanal and small-scale gold mining sites.

areas. Several NAPs mention limited knowledge and awareness among health care workers of mercury poisoning, making diagnosis and treatment more difficult.

48. Common health problems in ASGM areas reported in the NAPs include inhalation of mercury, accidents such as fall and pit collapse and silicosis, as well as diarrheal diseases resulting from poor water, sanitation and health conditions, malaria, pneumonia, and tuberculosis. Several NAPs mention that prostitution is common in some ASGM areas and sexually transmitted diseases are prevalent in mining communities. Monitoring of mercury exposure was difficult or not possible in many countries. However, Mongolia reported that 8-17% of miners have some level of mercury poisoning. Paraguay reported that 11% of the sample population in a mining area had mercury levels in urine above permissible levels.

49. Public health strategies outlined in the NAPs feature several common elements. Most countries prioritize a strengthening of the health care sector (including access to care) in ASGM areas. This includes improving capacities to diagnose and treat mercury-related illnesses, but also ensuring that the entire range of health needs of the communities can be met. Training for health-care workers in dealing with mercury poisoning was mentioned in several NAPs as a component of overall capacity development. Other public health measures such as ensuring safe drinking water and sanitation, as well as fighting malaria, were included in some NAP strategies.

50. Another common component of the public health strategies was the provision of better data and monitoring of the health situation and outcomes in ASGM areas. The need for diagnostic laboratories in particular was noted in one NAP. The need to create and improve poison control centers was also noted by several countries. Occupational health measures were a common part of many NAP strategies, such as education to promote safer mining practices and mitigate the risks of mercury and cyanide poisoning, dust, noise, and accidents. A few NAPs included the provision of personal protective equipment for miners. A final common theme in the public health strategies was the need to ensure interministerial coordination, especially between health, environment, and mining ministries, and avoid uncoordinated responses from different parts of government.

## **C. Formalization and regulation**

51. The regulatory and formalization status of the ASGM sector in countries that have submitted their NAPs ranges from highly formalized in Guyana and Mongolia (estimated up to 75% of ASGM actors being formalized) to fully unregulated in Eswatini. Other countries report that although the sector and miners are being increasingly organized in an informal manner, e.g., through miners associations, overall formalization remains low. For example, Zambia and Zimbabwe reported only 2% of ASGM actors being formalized at the time of the baseline inventory undertaken in the context of the NAP project. Moreover, Nigeria underlined that ASGM actors are unwilling to formalize their operations, mostly due to lack of incentives and inability to navigate the bureaucracies involved in acquiring small-scale mining licenses.

52. The majority of countries that submitted their NAPs have reported the presence of national laws and regulations that explicitly address the ASGM sector, while some, for example Congo and Eswatini, underline the lack of ASGM specific regulations in their countries. The lack of, or insufficiency of existing regulations was mentioned as a key challenge to formalization by many NAP countries. For example, in Zambia the existing regulatory framework, even though adequate to address ASGM, does not lead to the formalization or specifically regulate ASGM as a sector. In Zimbabwe, on the other hand, since 2014, ASGM is no longer a criminal activity. However, the country does not currently have a national ASGM policy. Ghana reported in their NAP that ASGM was legalized in the country in 1989, with several new policies being adopted recently, including a National Mining Policy and its amendment in 2015 which added substantial penalties for unlawful engagement of foreigners in small-scale mining. Similarly, Guyana highlighted that their ASGM sector is recognized and governed by several pieces of legislation and is fully legalized and supported through a licensing system.

### **1. Mercury bans in ASGM**

53. Regarding the regulations that govern the use of mercury in ASGM, 11 out of 27 submitted NAPs mentioned an explicit ban of mercury importation, use and/or trade for the purpose of gold mining. For example, in Kenya and Burkina Faso, the use of chemical substances, including mercury and cyanide, is prohibited on all artisanal sites. In Ghana the law does not prohibit the use of mercury in the ASGM sector. However, mercury imports are prohibited except under a license. In Guyana, on the other hand, mercury use in the ASGM is not banned, however the practice of whole ore amalgamation is prohibited according to the national regulations.

54. Some of the NAPs highlighted specific challenges arising from this situation. For example, Mongolia and Senegal reported that despite the ban, hidden mercury trade is prevalent, and miners are using mercury secretly. In Guyana, even though the practice of whole ore amalgamation is illegal, the NAP reported the presence of this worst practice in some settings. Moreover, Chad has adopted a regulatory text prohibiting the trade, possession, and use of mercury in the gold panning sector throughout the national territory. However, according to the country's NAP, the regulations produced the opposite effect, fueling illegal routes of mercury entry with over 8 tonnes of mercury being reported to be used in the sector. In response, to better understand and manage mercury flows in ASGM, Chad NAP proposed to revise the text prohibiting the use of mercury in ASGM. These examples further highlight a need for any prohibition measures to be accompanied by other technical, financial and social efforts if the transition away from mercury is to be achieved.

## 2. Interaction with large-scale mining sector

55. With regards to co-existence of large-scale gold mining (LSGM) and ASGM, 14 out of 27 countries that have submitted NAPs mentioned presence of the LSGM within its territory - with 7 NAPs explicitly reporting the co-occurrence and interactions between both sectors (Table 1).

Table 1

**List of NAP documents that either 1) mention and describe ASGM-LSGM interaction, 2) only mention presence of LSGM, or 3) do not mention LSGM presence at all.**

<b>Interactions between LSM-ASGM identified and presented in the NAP</b>	<b>Presence of LSM mentioned, but no interactions reported in the NAP</b>	<b>Presence of LSM not mentioned in the NAP</b>
Ghana	Burkina Faso	Indonesia
Guyana	Lao Peoples Democratic Republic	Burundi
Kenya	Mali	Central African Republic
Paraguay	Mongolia	Chad
eSwatini	Sierra Leone	Congo
Tanzania	Uganda	DRC
Zambia	Zimbabwe	Ecuador
		Guinea
		Kyrgyzstan
		Madagascar
		Niger
		Nigeria
		Senegal

56. Ghana reported that miners sell their tailings to the large-scale mining companies who in turn use cyanidation to recover the gold. Since whole ore amalgamation is widely practiced in the country – which results in mercury contaminated tailings – this practice leads to another worst practice of cyanidation of mercury containing tailing, which in turn results in significant risk of mercury releases among the surrounding communities and the environment. Kenya identified competition between both sectors linked to the fact that ASGM occurs largely in areas previously occupied by large-scale exploration and mining companies. In Zambia, ASGM miners are considered to be illegal when their activities occur in an area where LSGM occurs. As such, the two are constantly in conflict. Furthermore, Zambia documented ASGM activities on an LSGM concession where ASGM miners were illegally collecting stockpiles from the large-scale mining operations.

57. On the other hand, Guyana noted private-public partnerships with larger scale mining companies located near ASGM communities. The baseline assessment revealed that LSGM companies were equipped to support ASGM and nearby communities with health care services related to malaria and other communicable and non-communicable diseases common in mining communities. In Indonesia, where social conflicts between ASGM communities and LSGM companies are often reported, the application of consensus for decision-making and law enforcement mechanisms were suggested as strategies to mitigate the conflicts. Even though the interaction between both sectors was not documented in Uganda's NAP, the document proposed activities to develop collaborative mechanisms between ASM and LSM. Similarly, United Republic of Tanzania suggested a strategy to promote partnership between large scale and small-scale miners.



### 3. Strategies

58. In terms of strategies to promote formalization and regulations of the sector, most of the submitted NAPs mentioned the need to develop, strengthen, disseminate, and simplify the regulatory framework surrounding the ASGM sector. Central African Republic also proposed to put in place a simplified taxation system, whereas Eswatini suggested to develop laws protecting the environment and laws prohibiting child labour in the sector. Promoting miners' organizations through formation of associations was also a common strategy mentioned in most of the submitted NAPs. Furthermore, Chad proposed to inform and sensitize around the need to organize women into ASGM associations. Promoting miners access to finance was another common measure countries highlighted in their NAPs. Central African Republic, Ghana, Guinea, United Republic of Tanzania and Uganda, among others, highlighted the need to unlock access to credit, financial training and access to formal gold markets. Moreover, Chad and Mali suggested to raise awareness among financial institutions and Zimbabwe suggested to advocate for allocation of at least 1% of the yearly national fiscal budget to support NAP implementation.

59. To support the above-mentioned measures, countries also suggested complimentary activities. For example, Uganda proposed to undertake a national biometric registration and mapping of all key players in the ASGM value chain. Ghana and United Republic of Tanzania highlighted the need to increase the availability of the geological data and demarcate land for ASGM, whereas Nigeria and Zimbabwe suggested to include programs aimed at sensitizing miners about the benefits of the formalization.

## D. Monitoring impacts

### 1. Biodiversity and protected areas

60. Pollution, including from the unsound management of chemicals and waste, such as mercury, is one of the key drivers of biodiversity loss. Informal or poorly regulated ASGM, often using mercury and operating around or within the biodiversity hotspots and/or protected areas, has been reported to contribute to deforestation coupled with land degradation, contamination of soil and water bodies, and loss of habitat, eventually resulting in the diminution of ecosystems services.<sup>10</sup> Furthermore, a recent study undertaken by the secretariat of the Minamata Convention<sup>11</sup> emphasizes the importance of understanding the effects of mercury on fish populations, as well as the often overlooked social, environmental and economic costs associated with mercury pollution. All 27 NAPs submitted to date have expressed concern about observed impacts of ASGM on the surrounding environment and biodiversity. The majority of completed NAPs acknowledged various effects of ASGM practices on ecosystems and wildlife, including: deforestation, soil degradation, chemical pollution of terrestrial and aquatic ecosystems, loss of habitats and alteration of the physical conditions of watercourses, particularly turbidity.

61. More than half of the submitted NAPs reported deforestation, loss of vegetation and forest cover as key impacts of ASGM activities. For example, Guyana reported more than 9,182 hectares were cleared for ASGM operations between 2004 and 2021 based on studies in four key ASGM locations. Burundi and Central African Republic reported that deforestation in ASGM is also linked to the proliferation of wood fires, whereas United Republic of Tanzania reported the use of extracted wood to strengthen road access to the mining sites. Furthermore, according to Democratic Republic of the Congo, certain forest species are used to source construction materials for shafts for underground extraction, to create barriers on the rivers in the case of alluvial river extraction, or to make charcoal for cooking in mining communities.

62. With respect to other impacts, Ecuador reported that the ASGM operations disturb the local ecosystem which leads to species migration and loss of biodiversity, landslides and eutrophication of waters. Madagascar expressed concern about alluvial ASGM using river dredges and occurring upstream of, adjacent to or near important aquatic ecosystems, that may result in the sedimentation of particles from discarded mining waste, and the increase of water turbidity. Furthermore, Guyana, in its

<sup>10</sup> Secretariats of the Basel, Rotterdam, Stockholm Conventions and the Minamata Convention on Mercury, 2021 "Interlinkages between the chemicals and waste multilateral environmental agreements and biodiversity: Key insights" available at: <https://minamataconvention.org/biodiversity-report/>

<sup>11</sup> Secretariat of the Minamata Convention on Mercury, 2023, "Exploring how a natural capital approach may support the implementation of the Minamata Convention on Mercury", available at <https://minamataconvention.org/en/resources/socio-economic-impacts-mercury-pollution-fisheries-and-livelihoods>



national report to the United Nations Convention on Biological Diversity<sup>12</sup>, noted inadequate tailings management, little to no rehabilitation of mined areas, and increased hunting of wildlife typically associated with gold mining in Guyana posing increasing threats to biodiversity and species endemism.

63. In relation to protected areas, 9 out of 27 submitted NAPs explicitly reported ASGM activities happening inside or in the vicinity of protected areas. For example, the Democratic Republic of the Congo reported ASGM presence in almost 40% of protected areas. Lao People's Democratic Republic noted that hard rock mining and processing with mercury occurs within the boundaries of the Nakai-Nam Theun National Biodiversity Conservation Area. Niger reported that ASGM is practiced in some protected areas, such as in the Reserve Naturelle National de l'Air et du Ténéré. Mali and Mongolia highlighted the link between ASGM activities and excessive poaching of the wildlife and disruption of migration routes of protected species in the vicinity of or inside protected areas.

64. The scale of interaction between ASGM and biodiversity conservation can be estimated by overlaying ASGM mining sites and regions as reported in NAPs with the key biodiversity hotspots and protected areas. Such an analysis could be facilitated by the creation of a geodatabase of ASGM locations as documented in the NAPs (see below).

## **2. Tailings management**

65. Recognizing the importance of tailings management in ASGM context, parties to the Minamata Convention called for further guidance regarding ASGM tailings management at COP-3, resulting in subsequent adoption of such guidelines by COP-4. Sound management of tailings is often neglected in ASGM settings. Many NAPs, including those of Congo, Ecuador, Guyana, Niger and Zambia, reported that tailings are either directly released into the environment or left behind without proper stabilization or containment measures after the operations cease or move to new locations. Furthermore, Zimbabwe's NAP highlighted that at all visited gold processing sites the tailings from milling and cyanidation ponds were not lined and were, in some cases, located close to rivers and water reservoirs. According to Guinea and Kyrgyzstan, tailings are also used to build barriers for tailings ponds or used as construction material contributing to the spread of potentially contaminated materials.

66. Due to inefficiencies in ore processing, some ASGM tailings contain significant amounts of unrecovered gold and may subsequently be reprocessed to recover it. For example, United Republic of Tanzania reported that tailings from ASGM operations were estimated to have 60-70% of the initial gold ranging between 0.2 and 232 mg/kg in selected ASGM sites. Ghana's NAP identified miners who sell their tailings to specific large-scale mining companies who in turn use cyanidation to recover the gold. Cyanide leaching in tailings to which mercury has been added without first removing the mercury is one of the worst practices as defined by Annex C of the Minamata Convention because it leads to generation of mercury-cyanide complexes that are highly mobile in the environment and bioavailable. As reported earlier, 16 out of 27 submitted NAPs reported explicitly the presence of this worst practice within their territories. On the other hand, Chad reported that tailings that are reprocessed with cyanide are not contaminated with mercury and only tailings that are obtained through gravity concentration are recovered and passed to the cyanidation plant.

67. Although not required as a stand-alone strategy beyond required actions to address worst practices as per Annex C of the Minamata Convention, strategies to manage tailings have been highlighted in most NAPs as a cross cutting measure. For example, Central African Republic proposed immediate actions that could be taken to better manage tailings, including informing public about mercury-contaminated sites and designing strategies to better dispose of wastes contaminated with mercury. Paraguay included in its NAP an additional strategy for the management of contaminated sites and residues containing mercury. Furthermore, Guyana is in the process of developing Codes of Practice on Mercury Use in ASGM to provide environmental management guidance and promote best management practices for mercury use, including ASGM tailings management.

## **3. Environmental monitoring**

68. Due to the lack of analytical capacity to analyze environmental samples for mercury content and the fact that GEF-funded NAP projects do not employ explicit activities to undertake the quantitative environmental measurements, the environmental assessments undertaken within the context of NAP projects mainly focus on qualitative measures by examining how and where mercury is being used in ASGM settings and identifying the most likely routes of exposures.

<sup>12</sup> <https://www.cbd.int/doc/world/gy/gy-nr-04-en.pdf>

69. For several countries where the analytical capacity existed, the NAP documents provide results of quantitative environmental assessments. For example, in Zambia a total of 47 sediments and water samples were collected from ASGM sites, including extraction and processing sites, as well as tailings dams. The samples, analyzed using handheld XRF as well as laboratory analysis, revealed the significant presence of mercury at one of the sites. In the context of Paraguay NAP13, river sediments and tailings from ASGM processing sites were analyzed using atomic absorption spectrophotometry revealing the values of mercury content detected in the tailings of  $0.4 \pm 0.22$  mg/kg, whereas in river sediment between 0.2 to 0.5 mg/kg.

70. In the Indonesia NAP, a comprehensive environmental assessment was carried out by analysing samples from ASGM tailings, air, river water, sediment, fish, soil, plants, biota, drinking water, well water, cyanide vat water, and rice. In many study locations, the total concentration of mercury in the environment – in river water and well water – was still below the threshold limit value (TLV), while for tailings and soil sediments, it greatly exceeded it. Likewise, the mercury content in plantation soil, paddy field soil, food crops, biota, and local rice had exceeded the TLV, underlying the need to address high levels of mercury use, including whole ore amalgamation, at identified locations.

71. Recognizing the importance of the environmental assessment and where possible in-situ mercury monitoring around ASGM sites, complimentary guidance materials have been developed by UNEP and the secretariat of the Minamata Convention to guide national efforts in that respect, including a technical background document “Monitoring of mercury in and around artisanal and small-scale gold mining sites”<sup>14</sup> and “Guidance for Conducting a Rapid Environmental Mercury Assessment of Artisanal and Small Scale Gold Mining Sites in the Context of National Action Plans”<sup>15</sup>. The documents provide a benchmark for a range of environmental assessments that can be undertaken in the context of ASGM and NAPs, depending on country needs, timelines, capacities and resources, ranging from basic qualitative assessment, through rapid environmental assessment to in-depth sampling and analytical analysis.

## E. Geospatial data

72. Knowing the locations of ASGM mining areas and sites is necessary to understand the sector and effectively implement the NAPs. All the NAPs surveyed made efforts to characterize the geographic distribution of mining sites as part of their baseline analysis. All the NAPs contained maps that present the locations of areas, regions or individual mining sites. Because of the difficulties in locating and characterizing potentially hundreds or thousands of mine sites in remote areas, the comprehensiveness of this location data varies greatly. Some NAPs were able to find or generate fairly comprehensive maps of known ASGM sites in the country. Others were only able to map those sites visited in the data collection phase of the NAP. A few NAPs were only able to identify particular subnational regions where ASGM takes place.

73. Further, there was considerable variability in the attributes collected for each geographic ASGM location. Some NAPs made the distinction between sites where mercury use is known and those where it is not, or between the types of mining. A few NAPs present richer geographic datasets that included, e.g., estimated number of miners or presence of armed groups from International Peace Information Service data. Remote sensing and earth observation data are promising tools for mapping, describing, and monitoring ASGM sites and their impacts in some conditions. Few of the NAPs analyzed made use of these tools, except for Sierra Leone’s NAP, which used satellite data to help estimate the distribution of mine sites. The absence of remote sensing analysis may have been due to lack of funds in the NAP project, lack of awareness about the potential, capacity constraints, or geographic features that make the use of remote sensing to detect ASGM more difficult.

74. As part of its efforts to collect and analyze data from the NAPs, UNEP is creating a geographic database of ASGM locations published in the NAPs. ASGM site locations and regions and areas of ASGM activity are published in the NAPs, or NAP baseline assessments, as data table or maps, which can be digitized. If geographic data from the NAP is not present in a convenient format, UNEP is requesting NAP countries to provide their geographic data as tables or in a standard geographic data file format.

<sup>13</sup> “Determinación de niveles de mercurio en sedimentos de recursos hídricos en el Distrito de Paso Yobái 2020”, available at: <https://www.mades.gov.py/wp-content/uploads/2021/12/Determinacion-de-niveles-de-mercurio-en-sedimentos-de-recursos-hidricos.pdf>

<sup>14</sup> UNEP/MC/COP.5/INF/9

<sup>15</sup> <https://www.unep.org/globalmercurypartnership/resources/guidance/guidance-conducting-rapid-environmental-mercury-assessment-artisanal-and-small>

75. To date, the NAP ASGM site location map has data from 26 countries, comprising 3,859 point locations of ASGM sites as well as locations of regions where ASGM is present, if available. Work on building this map will continue as more NAP data is acquired and more countries publish NAPs. This global geographic database will be shared publicly for use by social and environmental scientists, other researchers, and policymakers. In addition, the dataset will be valuable with regards to efforts to model the global transport and fate of mercury in the environment. Atmospheric models of mercury transport will benefit from better constraints on the location of emissions from ASGM.

## **F. Gaps and challenges in data collection**

76. Challenges with data collection for NAPs are largely related to the informality of the ASGM sector. In most, if not all, of the countries that have developed their NAPs, high levels of informality, and in some countries, legal prohibitions on the use of mercury in ASGM, inhibit open dialogue with miners, which is a significant obstacle to collection of reliable data on key aspects such as mercury supply and use, gold production, trade dynamics and flows, and gender dimensions.

77. Another gap relates to the lack of detailed geographical information on ASGM sites in many NAPs. Most NAPs mention the main regions, provinces, or districts where ASGM occurs, and many also include maps depicting these areas. Not all NAPs undertake detailed and comprehensive geographic inventory of sites. Admittedly this is a difficult task, due to the sheer number of sites, their inaccessibility, and limited time and resources for field data collection.

78. Various sources of information and diverse methodologies might amplify the observed differences between data sets. For example, despite the availability of guidance, a number of different techniques for site level analysis and extrapolation to the national level are used for the NAP baseline assessments. Further, the many other sources of ASGM information at the national and local level, including academic studies and civil society initiatives, represent a wide range of data quality and variable methods, contributing to the limitations in comparability.

79. Finally, most baseline estimates fail to quantify uncertainty, including through more rigorous methods such as error propagation or Monte Carlo analysis, which could help researchers and policymakers better understand the state of knowledge of the sector. Instead, uncertainties are often provided in a qualitative manner listing challenges and gaps linked to the presented quantitative data.

80. As a result of these challenges and uncertainties, collecting reliable data and developing national overviews of the ASGM sector in NAPs has proven to be a complex task that requires specific capacity-building, considering local realities. Lessons learned from ongoing and completed projects will help to strengthen and harmonize existing approaches to obtaining representative and comparable data at local, regional, and international levels. Many countries have expressed the need for additional capacity-building on the use of tools for collection and interpretation of data and baseline estimates. These trainings, which could be extended to local practitioners in the gold mining sector, could facilitate better access to sites and strengthen communication with ASGM actors, but also guide investigations and define precise site selection criteria to be representative of the national context.